Characterization of Emerging Organic Contaminants In the Awash River Basin

Kidist Hailu

A Thesis Submitted to
The School of Earth Sciences
Addis Ababa University

Presented in partial fulfillment of the requirement
For the Degree of Doctor of Philosophy in Earth Sciences (Hydrogeology)
Addis Ababa Ethiopia
April, 2025

Addis Ababa University

College of Natural and Computational Sciences, School of Earth Sciences

A member of Examining Board of the PhD open defense, we certify that we have read and evaluated the Dissertation prepared by Kidist Hailu Tadesse entitled: Characterization of Emerging Organic Compounds in Awash River Basin and submitted in partial fulfillment of the degree of Doctor of Philosophy in Earth Sciences (Hydrogeology) complies with the regulations of the university and meet the accepted standard with respect to originality and quality.

Dr. Mohammed Ahmed	____________________	____________________
Chairman	Signature	Date
Dr. Mohammed Haji	____________________	____________________
External Examiner	Signature	Date
Prof. Tenalem Ayenew	____________________	____________________
Internal Examiner	Signature	Date
Prof. Seifu Kebede	____________________	____________________
Principal advisor	Signature	Date
Dr. Behailu Birhanu	____________________	____________________
Co-advisor	Signature	Date
Dr. Tilahun Azagegn	____________________	____________________
Co-advisor	Signature	Date

I hereby certify that I have read the revised version of this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Prof. Seifu Kebede	____________________	____________________
Principal advisor	Signature	Date
Dr. Bayissa Regassa	____________________	____________________
Department chairperson	Signature	Date

Abstract

Emerging Organic Contaminants (EOCs) affecting freshwater quality have become a rising concern with adverse effects on human health and the environment. In this research, we characterized EOCs in the water supply sources (boreholes, surface water reservoirs, and river) and tap water in upper and middle Awash River sub-basins. Awash River basin is a rapidly growing and highly utilized and industrialized river basin in central Ethiopia where both surface and groundwater are used to supply major settlements and industries. Characterization of the EOCs was supplemented by hydro-chemical analysis (major anions, cations, and heavy metals). Environmental isotopes (^{2}H, ^{18}O, and ^{222}Rn) were applied to further investigate the exchange of contaminants between surface and groundwater supply sources and groundwater recharge source. Environmental tracers and EC also used as a tool for backtracking the water source, estimating pipe water residence time and monitoring the instability of water quality in the water pipe network. Characterization of groundwater flow system using vertical profiling of EC and temperature data is used to identify the recharge sources of the shallow and deep groundwater system with respect to fate of contaminants along the depth of the aquifer system and along the Awash River flow direction. More than 100 EOCs are identified in all water supply sources and tap water. The EOCs are sourced from agricultural applications (Pesticides, herbicides, veterinary drugs, and plant growth regulators), urban (artificial sweeteners, pharmaceuticals, personal care products), and industries (surfactants, flame retardants, plasticizers, and volatile solvents). Based on the analysis of hydro-chemical and environmental tracers, the deep groundwater system is relatively safer from contamination caused by human activities than the river and the shallow groundwater system. Due to connectivity and the recharge source, the shallow wells are noticeably affected by urban, industrial, and agricultural pollutants discharged into the Awash River. Attributed to the different contaminant sources, distinct variations in terms of compound types were observed at different locations. Upstream water supply sources are dominated by urban and industrial contaminants while compounds from agricultural applications dominate downstream. Artificial infrastructures (i.e. Aba Samuel Lake, Koka Dam) seem to serve as attenuation points for urban and industrial compounds sourced from upstream. Characterization of EOCs showed new contaminant loads in the water supply sources, which haven't been tested before. The new contaminant loads in the supply sources, with potential impact on human health, necessitate the need to revisit the customary water quality test and monitoring practices. Moreover, Electrical conductivity and temperature data shows that the local recharges zones are located in highly urbanized and industrialized areas; therefore attention should be given to protect groundwater resources from anthropogenic contamination.

Key words: Emerging organic contaminants, Groundwater flow, Isotopes, Electrical conductivity, Awash River basin

Acknowledgement

I am grateful to Prof. Seifu Kebede, my advisor, for his direction, guidance, and generous supply of the required resources. The deepest appreciation goes to Dr. Behailu Birhanu, my co-advisor, for his unlimited support, assistance and all rounded advice to the completion of this research and my co-advisor Dr. Tilahun Azagegn for his supervisory. My sincere gratitude is extended to Dr. Dan Lapworth for his assistance in setting up the laboratory at the British Geological Survey and for his insightful remarks on this study.

I also acknowledged the PhD supervisory committee members (Prof. Tenalem Ayenew, and Dr. Dessie Nadew) and Dr. Mebatsion who coordinated the graduate program. I also like to thank the head of the School of Earth Sciences, Dr. Bayissa Regassa.

I acknowledge the support of Swedish Government Development Program (SIDA) who support part of this research work.

I would also like to express my gratitude for the logistics assistance provided by Addis Ababa University, the School of Earth Sciences, Water and Land Resource Centre (REACH- improving water security for the poor program), University of KwaZulu-Natal, Ethiopian Construction Design and Supervision Corporation-Water and Energy Design and Supervision Sector, Addis Ababa Water and Sewerage Authority, Ministry of Water and Energy in Ethiopia, and the Ethiopian Meteorological Agency.

I also thankful to all my family for their direct and indirect support (Ababa, Etye, Daniel, Genet, Elsabet, Selamawit, Mintesinot, Eyerusalem, Natnael and Abiy) and I am also thankful to all my colleagues and friends who helped me a lot during my research period especially Ephrem.

Lastly, my darling daughter Zema and charming sons Maraki and Leul have my undying love.
My life is what it is because of them.

Above all, I am grateful to God for enabling me to begin and finish my research.

Table of content

List of figures

List of Tables

List of Acronyms

BH	Borehole
AAWSA	Addis Ababa Water and Sewerage Authority
BGS	British Geological survey
EC	EC
EOC	Emerging Organic Contaminants
GCMS	Gas chromatography mass spectrometry
LCMS	Liquid chromatography mass spectrometry
m.a.s.l	meter above sea level
ml	milliliter
mm	millimeter
NIST	National Institute of Standards and Technology
NLS	National Laboratory Service
PCDLs	Personal Compound Databases and Libraries
PPM	parts per million
RS	Reservoir
SP	Spring
SPE	Solid phase extraction
UK	United Kingdome
UKAS	United Kingdome Accreditation Service
VSMOW	Vienna Standard Mean Ocean Water
µS/cm	micro Siemens per centimeter
^0C	degree centigrade

1. Introduction

1.1 Background

One of the major problems of the availability of sufficient clean water is the pollution of water bodies by contaminants from different sources. Water quality is important as an available quantity of water. Water quality is influenced by the natural, physical and chemical state of the water as well as by the consequence of human activities. Water is considered to be polluted or contaminated if human activities alter its natural quality to the point where it is no longer suitable for its intended usage (Fetter, 1992).

Because of natural and anthropogenic influences, water is becoming scarcer as the population increases across the world. Anthropogenic factors affecting water quality include impacts due to agriculture, the use of fertilizers, manures and pesticides, animal husbandry activities, inefficient irrigation practice, deforestation, pollution due from industrial effluents and domestic sewage, mining and recreational activities (Adeba, 2015; Khatri and Tyagi, 2015; Li, 2016; Serre and Karuppannan, 2018; Youse *et al.*, 2018). Human activities strongly influenced water quality. The most common human influence in water quality is the introduction of disease causing organisms due to industrialization and agricultural development which dispose of their waste into water bodies (Boyd, 2014). Good quality water is essential to sustain human health and the health of the environment while polluted water supply source poses a serious human health risk.

Among several natural and anthropogenic water quality contaminants, the presence of group organic chemicals that had not been previously detected or found in lesser concentrations are termed as emerging organic contaminants (EOCs) (Rodriguez-Narvaez *et al.*, 2017). EOCs are a group of organic compounds that had not been previously detected in the conventional water quality analysis (Rodriguez-Narvaez *et al.*, 2017; Stefanakis, 2017). Currently, such kinds of contaminants are detected in surface and groundwater (Pereira *et al.*, 2015; Ali, Sardar and Ihsanullah, 2018; Bai *et al.*, 2018; Mohan *et al.*, 2019; Bayabil, Teshome and Li, 2022). The contaminants have been recognized as significant water pollutants that negatively impact the human endocrine system. The widespread occurrence of natural and synthetic organic compounds in surface water and groundwater has the potential to cause known or suspected adverse ecological or human health effects (Bai *et al.*, 2018).

EOCs represent relatively newly discovered groups of unregulated contaminants that occur in surface and subsurface water. They include a wide array of different compounds and their transformation products: pharmaceuticals, personal care products, pesticides, veterinary products, industrial compounds/by-products, food additives, and engineered Nano-material generally include compounds used in everyday life. Most of these pollutants were previously unknown or simply unrecognized or unidentified and have recently emerged as contaminants associated with potential environmental risk (Stefanakis, 2017).

Furthermore, EOCs are known by trace pollutants which indicate low concentration in freshwater normally in Nano-gram or micro-grams per liter. Many of these pollutants can exceed an acceptable daily intake for humans. Currently, the frequency of detection of these pollutants is increasing. It's difficult for regulators to restrict the use of pollutants that are human health hazards due to the vast number of EOCs and breadth of literature on the occurrence, use, and toxicity and its challenging to develop a list of EOCs because new chemicals are continuously discovered and produced (Kyle E. Murray, Thomas and Bodour, 2010).

Groundwater is believed to be less vulnerable to pollution than surface water(Foster *et al.*, 2020). However the research conducted by (Kyle E Murray, Thomas and Bodour, 2010) showed the frequent occurrence of emerging contaminants such as industrials, pesticides, pharmaceuticals, and personal care products in surface and groundwater and recommends the need to set acceptable daily intake levels for humans. According to (Lapworth *et al.*, 2012) understanding the spatial and temporal variation of EOCs can be used to set a drinking water standard for EOCs. (Lapworth *et al.*, 2019) outlined the process undertaken in Europe to develop a groundwater watch list for emerging organic contaminants to monitor the groundwater quality. (Xabadia, Esteban and Martinez, 2021) mentioned the urgent need for economic research that guides regulating these organic compounds. Moreover, some research showed the use of EOCs to fingerprint sources of contaminants and flow pathways in the groundwater and as a tracer to provide information on catchment pathways and groundwater-surface water interaction (Stuart *et al.*, 2014), a tracer of wastewater (White *et al.*, 2019) and groundwater residence time (Lapworth et al. 2018).

In Africa, these organic compounds are mainly observed in areas where there are poorly protected wells, poor sanitation, and poor household waste disposals (Sorensen *et al.*, 2015; Ngumba, Gachanja and Tuhkanen, 2016), although there have been relatively few studies in Africa to date. Some pharmaceuticals used to treat HIV and malaria are more frequently detected in some regions in Africa (K'oreje *et al.*, 2016).

In order to identify the source of pollution, fate of contaminants and the exchange of contamination between surface and groundwater system, proper groundwater flow system characterization is required. This is because sustainable water resource management is dependent on both the quantity and quality of water. Groundwater flow is characterized by hierarchically nested groundwater flow lines representing local, intermediate (sub-regional), and regional flow systems (Toth, 1962). Passing through interconnected cracks and pore spaces of geological materials-aquifers (Cook, Land and Osmond, no date; Fetter, 2014), groundwater can move from a few meters (local flow) to hundreds of kilometers (regional flow) (Schaller and Fan, 2009). Many authors explained the different dynamics of how groundwater moves in different geological settings (Toth, 1962; Myers, Finnegan and Breedlove, 1999; Dassi, Zouari and Faye, 2005; Praamsma *et al.*, 2009; Cartwright *et al.*, 2017; Karroum *et al.*, 2017; Mechal *et al.*, 2017; Strydom *et al.*, 2021). More generally, the shallow groundwater flows and discharges to local wetlands and streams. Whereas deeper groundwater travels long distances and feeds the wetlands and rivers far downstream from its source (Schaller and Fan, 2009). Most hydrological and hydrogeological models are designed based on such characterization of the groundwater flows. In many instances, catchments are considered self-contained systems with the groundwater basin having similar catchment as the corresponding surface water divide (Gutentag *et al.*, 1984). This implies the water generated at recharge zones in the highlands will sink into the discharge zones in the low lands without considering potential groundwater transfer downstream.

Aquifers in arid and semi-arid regions of the world derive a significant portion of their recharge from adjacent mountains either through stream infiltration in the mountain front zone or from subsurface flow from the bounding highlands (Bresciani *et al.*, 2018). Understanding mountain recharge systems in terms of distinguishing between mountain front (local recharge system) and mountain block recharge (regional recharge system) is important to conceptualize and manage groundwater resources in the mountain-bounded basins (Chavez, Davis and Sorooshian, 1994; Manning and Solomon, 2003, 2005; Wilson and Guan, 2004; Wahi *et al.*, 2008; Kebede, Travi and Stadler, 2010; Bresciani *et al.*, 2018).

The focus of this research is the upper and middle Awash River sub-basins located in central Ethiopia. Awash River is the most utilized river and the most polluted river in the country (Hague, 2013; Adeba, Kansal and Sen, 2015) with a significant number of small, medium, and large-scale irrigation schemes and industries located along the riverside. The Awash River and its tributaries are sources of drinking water for large and small cities such as Adama, Awash, and Metehara town. As a matter of fact, it is also the main source of domestic water for the majority of the (nomadic) people in the eastern Afar Region (Hague, 2013). Together with surface water abstraction for irrigation, groundwater is the main water supply source for industries, urban and rural communities, and irrigation (Birhanu *et al.*, 2021).

Conceptualization of the groundwater flow system has been done in the Awash River basin. (Demlie *et al.*, 2007; Ayenew, Demlie and Wohnlich, 2008; Ayenew, Kebede and Alemyahu, 2008; Kebede *et al.*, 2008; Yitbarek *et al.*, 2012a; Azagegn *et al.*, 2015b). There is a regional groundwater system that extends from the plateau towards the rift through structurally controlled conduits or hydrologic windows (Kebede *et al.*, 2008). Regardless of the geological complexity of the region, studies tend to simplify the conceptualization by categorizing the aquifer systems into upper and lower basaltic aquifers (Yitbarek *et al.*, 2012a). Based on the assumption that the groundwater supply wells are fed by regional groundwater flow originating from recharge in the highlands Figure 1, and therefore groundwater is less vulnerable to pollution and resilient to climate variations, more and more groundwater exploration has been done to supply the ever-increasing population growth and industrialization mainly in the upper Awash sub-basin. More than 300 boreholes have been drilled in this area for the municipality, irrigation, industries. Among these, in Addis Ababa city, Akaki, South Ayat, Legedadi, and Sebeta Tefki well-fields (located in the upper Awash sub-basin), deep boreholes were drilled to supply Addis Ababa city (AAWSA, 2011). In Becho plain (located in the upper Awash sub-basin), and Alliadege plains (located in the middle Awash), deep boreholes were drilled to supply large-scale irrigation schemes (MoWR, 2011).

Moreover, different private owners under a government-promoted self-supply policy, a number of boreholes also drilled with in and suburbs of Addis Ababa city to supply water to various industries, hotels, hospitals and other establishments without taking well interference in to account. The well interference results in a cone of depression which leads to reduce the availability of groundwater. The shallow aquifer, which is more contaminated due to interaction with contaminated surface water, is drawn by the deeper groundwater through the cone of depression, which degrades the groundwater quality in the deeper aquifer system as well.

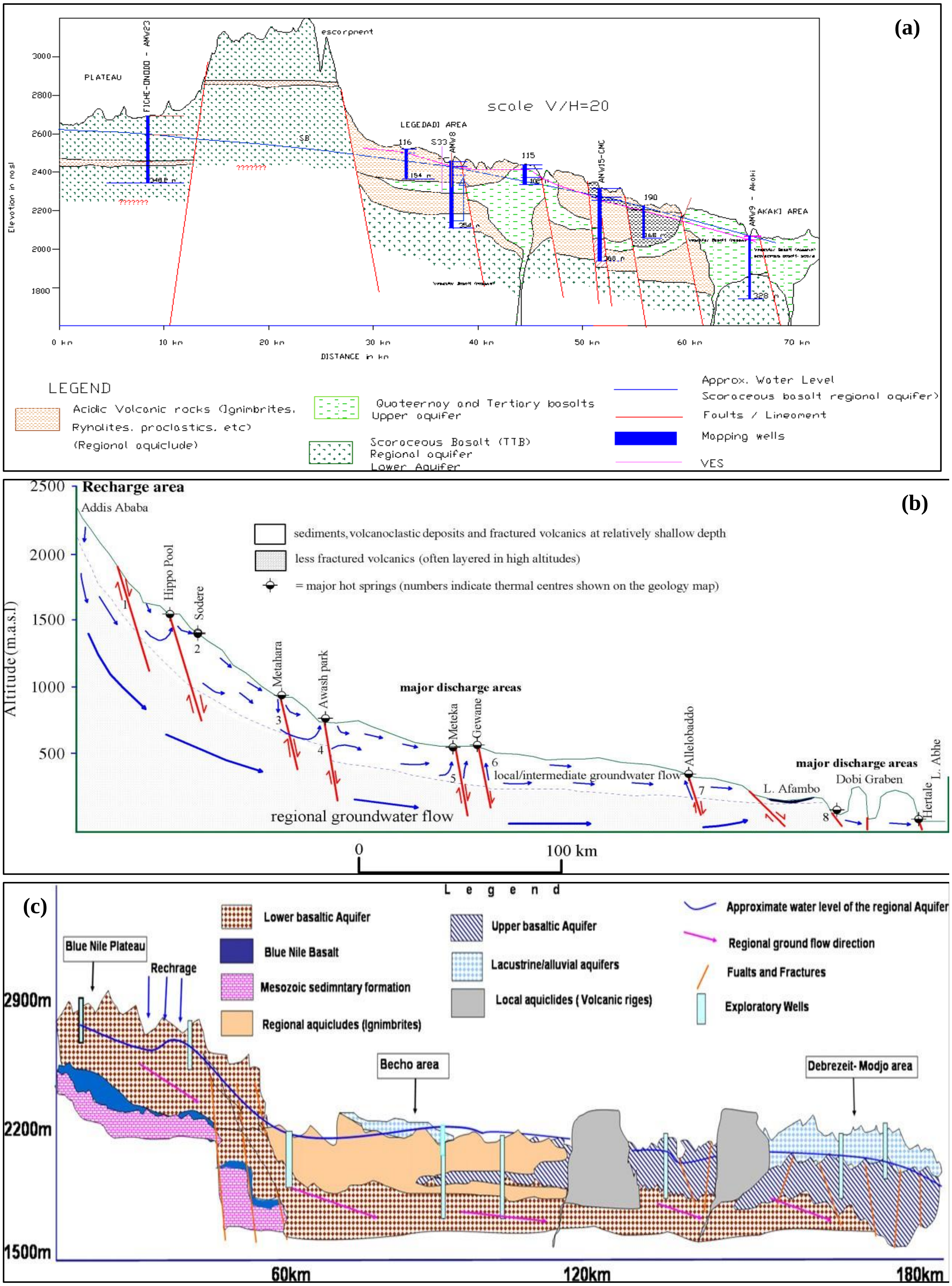


Figure 1: Previous conceptual diagram of regional groundwater flow adopted from (a)(MoWR, 2008), (b)(Ayenew, Demlie and Wohnlich, 2008) and (c) (Yitbarek *et al.*, 2012a)

Based on most of the aforementioned previous studies, the Akaki well-field is recharged by subsurface groundwater inflow from the highlands. The rapid decline in groundwater level as also observed by (Demlie *et al.*, 2007) in the major well fields (e.g. Akaki well field) evokes the need to revisit the conceptual model of groundwater flow in the region. Large drawdowns are observed in several solitary boreholes and well-fields. As shown in Figure 2, some of the boreholes in well-fields around Addis Ababa show water level decline exceeding 30 meters. The rapid groundwater level decline has also led to the abandonment of the old Akaki well-field or deepening of the boreholes to reach the new dynamic water level. This by itself necessitates the need for an in-depth understanding of the groundwater flow dynamics with particular emphasis on groundwater recharge sources, aquifer storage and size, interconnectivity between the various aquifers, and groundwater discharge processes in the region.

Furthermore, the research conducted by (Birhanu *et al.*, 2021) addressed the significance of conjunctive use of surface and groundwater resources to satisfy the demand of Addis Ababa city water supply as it is on an ever-increasing demand due to population growth. The population growth leads to the scarcity of both quantity and quality of water.

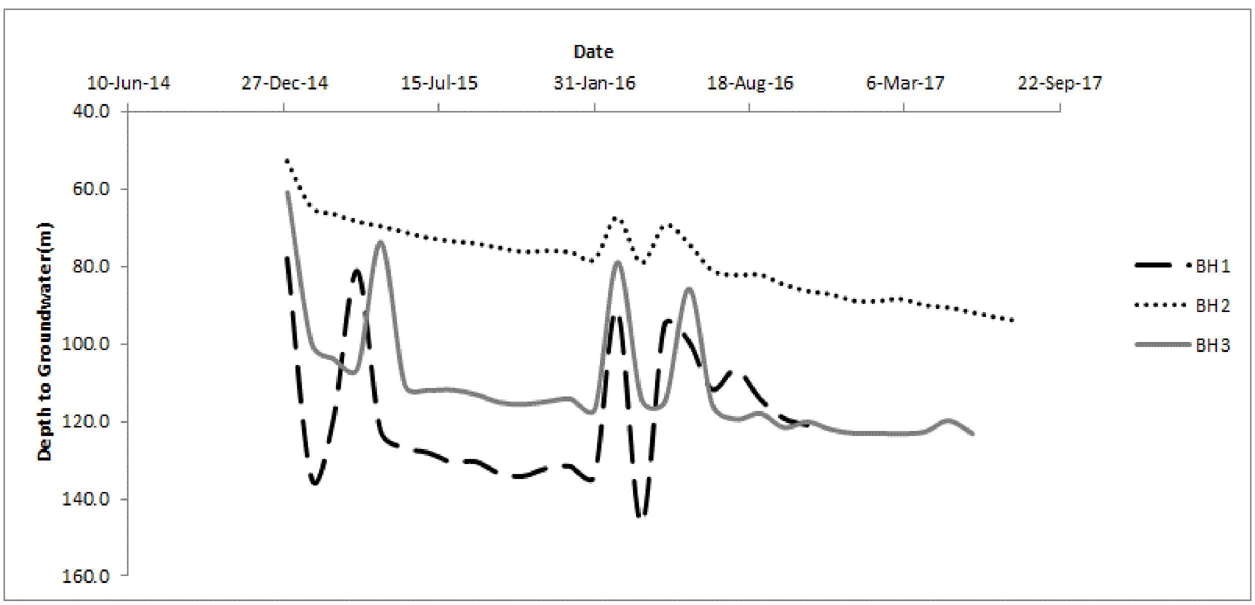


Figure 2: Water level decline in three boreholes in Akaki well-field supplying the city of Addis Ababa.

The release of untreated wastewater from industries, leakage from agricultural applications, and pollution from urban sources resulted in a reduction of water availability (Sonder, 2015; Keraga, Kiflie and Engida, 2017; Keraga, Kiflie and Nigussie, 2017; Yohannes and Elias, 2017; Colombani *et al.*, 2018a; Dessie *et al.*, 2022). Addis Ababa, the capital city of Ethiopia, located within the upper Awash River Basin (upstream of this research area) hosts about 65% of industries in the country and more than 90% of the industries discharge their waste to nearby rivers without proper wastewater treatment (Yohannes and Elias, 2017; Eliku and Leta, 2018). One of the major problems of the availability of sufficient clean water is the pollution of water bodies by contaminants from different sources. There is an obvious reduction in water availability and water quality due to both natural and anthropogenic causes in this River Basin (Yohannes and Elias, 2017).

Likewise, in urban areas, decentralized pipe network also contributes to the change of water quality due to mixing of different sources and longer residence time within the pipe network (Tinker *et al.*, 2009; Zlatanović, van der Hoek and Vreeburg, 2017). This pipe network has more significant impact in water quality of the cities of developing countries like Addis Ababa city where frequent interruption of water supply is observed in order to fairly distribute the water in the city based on the scheduled time.

The objective of this study is to undertake a systematic analysis of EOCs and hydro-chemical parameters (major ions and heavy metals) within the source (both surface and groundwater supply sources including tap water) in the upper and middle Awash River sub-basins for the first time. In addition to this, the study aims to delineate the groundwater recharge zones and their protection from contamination and depletion of groundwater. Integrated approaches of water quality parameters, stable isotopes of δ^2H, $\delta^{18}O$, radioactive isotope (Rn-222) and vertical profiling of EC and temperature have been used to track the exchange of contaminants between surface and groundwater system and the groundwater recharge source. Back-tracking of pipe water source using environmental tracers (δ^2H, $\delta^{18}O$, and Rn-222 and EC) also used to monitor the composition stability of water and residence time in the pipe.

In general, this study addresses the pressing issue of declining water quality and availability in the upper and middle Awash River sub basins, primarily driven by the infiltration of emerging organic contaminants (EOCs) and other pollutants from anthropogenic sources. By systematically analyzed both surface and groundwater using an integrated approach including hydrochemical parameters, stable isotopes and radioactive isotope and environmental tracers, the research aims to characterize groundwater flow dynamics, identify groundwater recharge source, and trace contaminant pathways. This comprehensive investigation will inform the development of conceptual model that enhances the understanding of EOCs behaviors in the region's hydrological system. Ultimately, the findings will contribute to improve groundwater management strategies and policy frameworks that protect public and environmental health and ensure the sustainable use of water resources in the face of growing population pressure and industrial expansion.

1.2 Objectives

1.2.1 Main objectives

The Main objective of the research is to characterize Emerging contaminants in the water supply sources (shallow and deep boreholes, rivers, surface water reservoirs and tap water) in the upper and middle Awash River Sub-basins.

1.2.2 Specific objectives

The specific objectives include:

- Determine the occurrence, concentration and sources of emerging contaminants, and identify the newly detected compounds
- Database development for emerging contaminants for the research area
- Determine the groundwater flow system using integrated approaches with vertical profiling of EC and temperature with varying characteristics of EOCs, heavy metals and major ions along the groundwater flow direction.

- Characterize the hydro-chemical parameters (major ions and heavy metals) in all water supply sources (boreholes, river, surface water reservoirs and tap water)
- Determine surface and groundwater interaction with regards to the exchange of contaminants.
- Back-tacking of the composition of water and residence time in the piped network to determine the change of water quality in the pipe using environmental tracers and EC.

1.3 Significance of the research

This study makes a substantial contribution to raising the awareness on the water quality monitoring parameters. A review of the standard procedure for water quality testing and monitoring is required due to the loads of EOCs in water supply system. Monitoring the instability of water quality in the water pipe network also used to see the effect of water interruption in the urban area like Addis Ababa. Characterization of EOCs showed new contaminant loads in the water supply sources in Ethiopia, which haven't been tested before and may have potential impact on human health and the environmental.

Awash River basin is a highly utilized river basin that received its water supply from both surface and groundwater sources. Understanding of groundwater flow dynamics, groundwater recharge sources and surface-groundwater interaction is crucial for sustainable management of the water resource in the basin's water resource by providing insightful information on the exchange of contaminants between surface and groundwater system and the fate of contaminants along the groundwater flow path.

1.4 Site description

The Awash River basin has a total areal coverage of 110,000 km^2 (Hague 2013; R. Hemel and H. Loijenga, 2013). The study area (upper and middle Awash River basin) is located within the geographic coordinate of 385384 to 658532 Easting and 871282 to 1038597 Northing, with total aerial coverage of about 25,671 km^2 and elevation ranging from 700 to 4150 m.a.s.l Figure 3a. The land use and land cover is characterized mainly by rain-fed farmland (68%) and the remaining 32% by irrigated area, forest cover, shrub-land, grassland, and built-up areas Figure 3b. The rapid expansion of urbanization, population growth, and industrialization observed are the main factors for water quality deterioration in the basin (Mcgrane, 2016; Assegide *et al.*, 2022).

The rainfall pattern is predominantly bimodal, with the heaviest rains beginning in July and continuing through September, while the light rains occur from March to May. Fifteen years of meteorological data (2000 to 2015) from eighteen stations show that the average annual rainfall and temperature in the upper Awash River basin is 994.5mm and 17°C and the middle Awash River basin is 761 mm and 24°C, respectively.

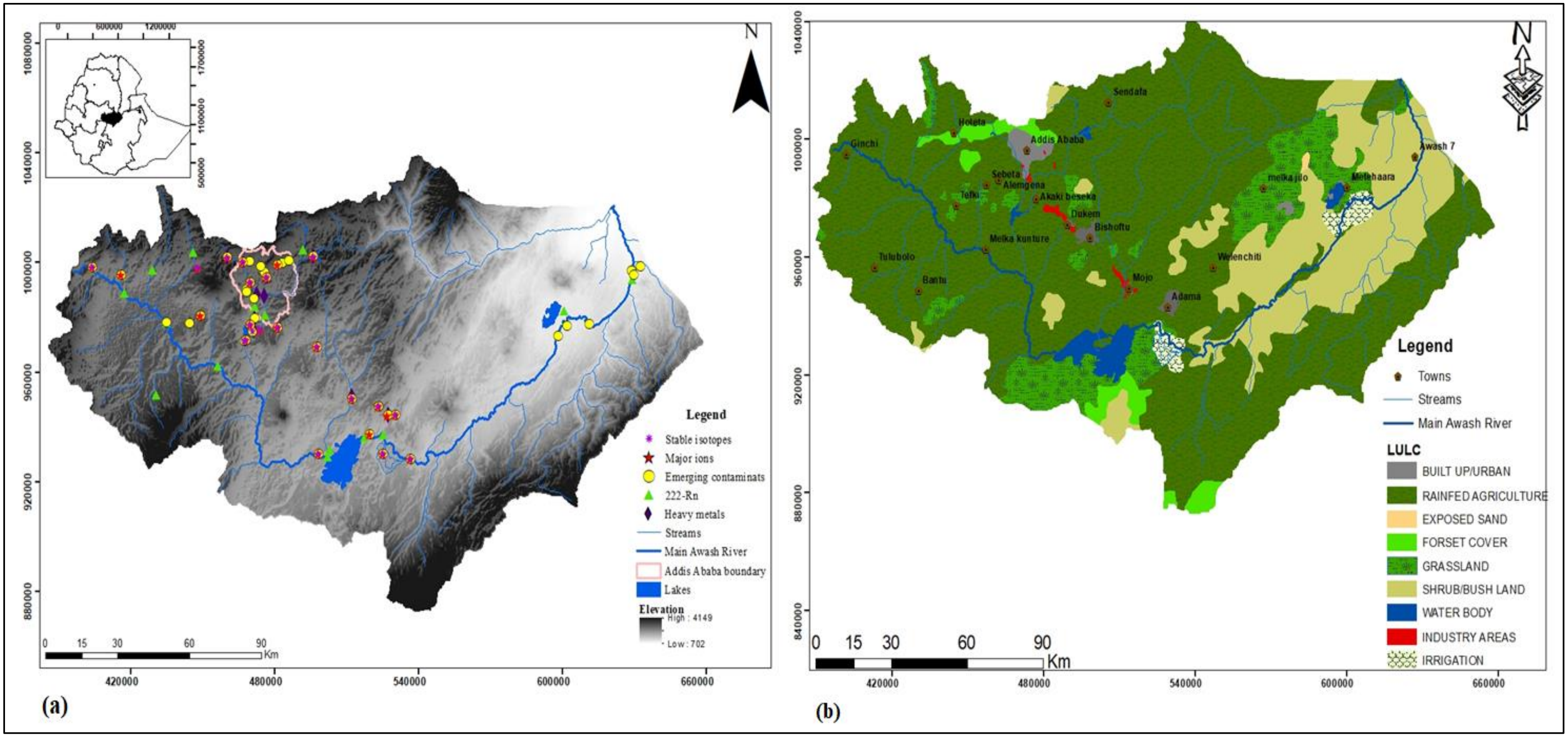


Figure 3: Location of the study area for EOCs (a) sampling site for EOCs, (b) LULC map

2. Literature review

The global concern about EOCs has attracted significant attention, especially in Western researches. However, EOCs have not received the same attention in Africa, despite the continent's rapid population growth, urban expansion, and industrialization.

The research conducted by (Kyle E Murray, Thomas and Bodour, 2010) showed the frequent occurrence of EOCs such as industrials, pesticides, pharmaceuticals, and personal care products in surface and groundwater. It underscores the necessity of establishing acceptable daily intake levels for humans. (Lapworth *et al.*, 2012), emphasizing the importance of comprehending the spatial and temporal variation of EOCs in setting drinking water standard.

Furthermore, studies stress the urgency of initiatives like developing groundwater watch lists for EOCs (Lapworth *et al.*, 2019) and conducting economic research to guide regulatory measures (Xabadia, Esteban and Martinez, 2021). Moreover, some research showed the use of EOCs to fingerprint sources of contaminants and flow pathways in the groundwater and as a tracer to provide information on catchment pathways and groundwater-surface water interaction (Stuart *et al.*, 2014), a tracer of wastewater (White *et al.*, 2019) and groundwater residence time (Lapworth *et al.*, 2018).

The occurrence of EOCs is observed in different ranges and concentrations in surface water, wastewater, groundwater, and drinking water in different countries (Houtman, 2010; Kyle E Murray, Thomas and Bodour, 2010; Lapworth *et al.*, 2012; Jesus *et al.*, 2014; Odendaal *et al.*, 2015; Sorensen *et al.*, 2015; Subedi *et al.*, 2015; Agunbiade and Moodley, 2016; Ngumba, Gachanja and Tuhkanen, 2016; K'oreje *et al.*, 2016; Kermia, Fouial-Djebbar and Trari, 2016; Balakrishna *et al.*, 2017; Wanda *et al.*, 2017; Rimayi *et al.*, 2018; Damkjaer *et al.*, 2018; Gogoi *et al.*, 2018; White *et al.*, 2019; Galindo-miranda *et al.*, 2019; Richards *et al.*, 2021).

In Africa, these organic compounds are mainly observed in areas where there are poorly protected wells, poor sanitation, and poor household waste disposals (Sorensen *et al.*, 2015; Ngumba, Gachanja and Tuhkanen, 2016). Some pharmaceuticals used to treat common African diseases such as HIV and malaria are more detected in Africa than in the Western world (K'oreje *et al.*, 2016).

Numerous studies have been conducted on water quality of Awash River basin, among those, (Yohannes and Elias, 2017) focuses on intensive review of various documents, research papers and reports to determine the primary source, significance and pattern of River and water reservoir pollution in and around Addis Ababa. (Taddese, Sonder and Peden, 2003) demonstrates the challenges the Awash River basin faces due to land degradation, high population density, natural water degradation, salinity and wet land degradation.

The Awash River's water quality is assessed in terms of its suitability for drinking and irrigation (Keraga, Kiflie and Nigussie, 2017). Water quality indicators were calculated using the Canadian Council of Ministers of Environment Water Quality Index (CCMEWQI) throughout the evaluation. It was found that the Awash River isn't good enough. Building a water treatment plant and controlling the storm water quality in hotspot areas were recommended by the research as ways to improve the quality. (Van Rooijen and Taddesse, 2009) analyze how improved sanitation in Addis Ababa will impact the quantity and quality of water entering and leaving the city.

According to (Degefu., Lakew., Tigabu, 2013) measurements of physicochemical parameters and heavy metal concentrations, together with a thorough identification of micro-invertebrates, were reported and these data were taken into consideration when evaluating the upper Awash River's water quality. (Tadesse, Peden and McCornick, 2005) illustrates the rising levels of pathogen, coliform, and heavy metal pollution in the surface and groundwater of the Addis Ababa catchments.

(Colombani *et al.*, 2018b) state that human slurry waste and urine have contributed to an anthropogenic fluoride concentration in the Addis Ababa Rivers. By using bacteriological and physical-chemical analyses on the river and shallow groundwater, the study evaluated the impact of fluoride rich human slurry on the quality of Addis Ababa's surface waters.

(Gudissa, 2010) was aimed to identify the pathways of pollutants and travel times of contamination and found out that, the flow lines intersect with the Akaki River in numerous places. Furthermore, the flow line converges towards Akaki well field, implying that the wells will draw contaminated water from the surface water through the upper aquifer. Finally the research shows that the high risk of vulnerability of the well field to pollution and recommended to conduct contaminant transport analysis taking in to account chemical reactions, attenuation and multiple layer aquifer manufacturing activities having pollution potential must be limited in special areas far from the water wells.

(Azagegn *et al.*, 2015b) noted that human activities such as waste disposal, agriculture runoff, and human and animal feces have a significant impact on the deterioration of natural groundwater quality.

As these contaminants observed in surface and groundwater systems, it’s very critical to see the interaction between surface and groundwater system. Previously, several studies have been done on the connection of surface and groundwater system using hydrochemistry, isotopes, and numerical modeling approaches (Ayenew, Kebede and Alemyahu, 2008; Demlie, Wohnlich and Ayenew, 2008; Yitbarek *et al.*, 2012a; Azagegn *et al.*, 2015b; Kebede and Zewdu, 2019; Birhanu *et al.*, 2021; Kebede *et al.*, 2021). Conceptualization of the groundwater flow system has been done in the Awash River basin as well (Demlie *et al.*, 2007; Kebede, Travi and Asrat, 2008; Yitbarek *et al.*, 2012a; Azagegn *et al.*, 2015b).

The study by (Kebede *et al.*, 2021) illustrate the regional scale interaction of the surface and groundwater in the Awash River basin using geochemical tracers and piezometric approaches which has significant implication for the development and management of the water resources. Regional groundwater flow doesn't return to stream network in arid and middle and lower parts of the basin. While in humid upland area, groundwater inflow is detected in the stream network. (Ayenew, Kebede and Alemyahu, 2008) shows the recharge of the lowland aquifers through channeled big regional faults. As highland rainfall feeds the deeper level and forms large aquifer in the intermountain valleys, there is a preference for substantial groundwater movement in the regional faults.

Hydrochemistry, isotope hydrology, and traditional hydrogeological field research have all been used to examine the groundwater flow system and recharge mechanism of various aquifers (Yitbarek *et al.*, 2012a). The finding shows that the various volcanic aquifers have highly complicated hydraulic properties and flow patterns. The litho-hydrostratigraphic connection suggests that the lower basaltic aquifer, which is porous and permeable, is scoracious and extends laterally from the plateau to the rift.

The surface water is intimately linked with the groundwater system, it is apparent that the pollution of either surface or groundwater resources affects the quality of the other (Winter *et al.*, 1998). Surface water bodies gain water and solutes from groundwater systems, and in others, the surface water body is a source of groundwater recharge and causes changes in groundwater quality (Winter *et al.*, 1998).

Generally, the previous study show how much upper Awash River basin water quality is degraded due to anthropogenic factors and shows how characterizing the groundwater flow dynamics is helpful to understand the recharge source, exchange of contaminants between surface and groundwater systems, and fate of the contaminants along the flow path for sustainable water resource management decision making.

3. Methodology

To characterize EOCs, it requires more integrated scientific evaluation; including factors that control the quality of the water sources, hydro-chemical evolution, groundwater-surface water interactions and groundwater flow characterization. This integrated approaches is important to produce data that will be used to get a reliable result on the main objective of this research

To do this study, samples from groundwater, Awash River, tap water, and surface water reservoirs were collected for emerging contaminants and hydro-chemical analysis. In-situ measurements of EC, temperature, and pH were measured at each point where the samples for laboratory analysis were taken. Stable readings for field parameters (EC, pH and temperature) were obtained prior to sampling groundwater sites. Moreover, samples for stable isotope analysis ($\delta\ ^{2}H$, $\delta^{18}O$) from boreholes, river, and surface water reservoirs and tap water were collected, and in-situ measurements of a radioactive isotope (^{222}Rn) were done along the course of the Awash River and in the water pipe network. River water samples were collected by grab sampling from a flowing section of the river. Groundwater samples were collected from existing abstraction boreholes which are in continual use, thus sampling aquifer groundwater rather than just groundwater in close proximity to the borehole. Tap water samples were collected from the main tap in the building following extensive flushing to ensure to minimize effects of ‘standing’ water in the pipe network.

Spatial distribution of the research area and variety of water sample sources (Awash River, tributaries, shallow and deep groundwater, tap water and surface water reservoirs (Legedadi and Gefersa) were taken in to consideration while choosing the sample points. Additionally, due to the vulnerable locations caused by the disposal of wastes from municipality and industries to the river, the sample sites were chosen to represent the major urban settlements (Addis Ababa, Mojo, Adama, Wonji, Metehara, and Awash).

Additionally, EC and temperature profiling readings have been obtained from 109 existing boreholes measured at every 2 m depth interval that were drilled between 2010 to 2021, with boreholes depth varies between 30 to 500m. This measurement is significant in characterizing the groundwater flow system of the area and in identifying the source of contamination in relation to the groundwater recharge source.

3.1 Emerging Organic Contaminants (EOCs)

Samples for EOCs were collected using pre cleaned amber glass bottles. The samples were collected in November 2019. Samples were kept in ice box during their transport sent to the UK for analysis. The analysis was conducted at Agilent laboratories and at the NLS Environment Agency Laboratory (Starcross, UK) using two methods.

Qualitative non-target screening was undertaken at Agilent laboratories (Cheadle, UK) using an Agilent 1290 Infinity II LC coupled with 6546 LC-QTOF. 900 µL of each sample was added to 100 µL methanol in sample vials to prevent hydrophobic analytes like long chain PFAS sticking to vials, the direct injection volume was 100 µL. Each sample was analyzed twice: once with a positive mode method and once with a negative mode method. Both methods used All Ions, a data-independent acquisition mode with no quadruple filtering and several different collision energies, including 0 V. Blank samples of ultrapure water from the lab were analyzed alongside each batch. All reported compounds should be considered suspect screening hits. Suspect screening was performed by searching against PCDLs (Personal Compound Databases and Libraries) in the Mass Hunter Qualitative Analysis (Qual) software using the Find-by-Formula feature. Positive and negative data files were searched against a large database of all classes of potential contaminants (pesticides, drugs, E+Ls, known water contaminants etc). Positive mode data files were also searched against a smaller plasticizers PCDL, and negative mode data files against a smaller PFAS PCDL. Requirements for suspect hits in Qual were as follows: i) EIC abundance filter – 5000 counts for general screen in positive mode; 2000 counts for targeted plasticizers PCDL and in negative mode, ii) Mass error < 5 ppm, iii) At least one qualifier ion was required (hits with no library spectrum were ignored), iv) Overall score (mass accuracy, isotope pattern + isotope spacing) > 90 %. For each group of samples (tap water, groundwater, river), any compounds that was a suspect hit were added into a method in Mass Hunter Quantitative Analysis to show the relative abundances of the primary peak in the different samples at the retention time of the suspect hit.

Semi-quantitative analysis was undertaken at National Laboratory Service (NLS). Solid phase extraction (SPE) was conducted with an automated extraction system using waters Oasis HLB SPE cartridges, which had been conditioned with 6ml of methanol followed by 6ml of ultra-high purity water. A 1000 ml water sample was loaded on to the cartridge at a flow rate of 10ml/min. An isotopically labeled internal standard (Carbutamine-d9) was added to each of the pre-conditioned SPE cartridges to assess instrument performance. After loading, the cartridge was washed with 6ml of ultra-high pure water and sorbent dried fully with high purity nitrogen, followed by elution first with 6ml of 0.1% formic acid in methanol: acetonitrile (1:1) and then with 6ml of dichloromethane. The eluted fractions were collected in separate vials; with the dichloromethane elute evaporated to incipient dryness under a gentle stream of nitrogen. The corresponding methanol: acetonitrile elute was transferred to the dry dichloromethane vials and evaporated to 100 µL. Ultra-high purity water (900 µL) was added to each vial to a total volume of 1000 µL. The sample was vortex mixed, filtered and transferred to a salinized screw top vial for analysis. Ultra-High Definition Liquid Chromatography/Quadruple-Time-of-Flight Mass Spectrometry (LC/Q-TOF-MS) analysis was performed using a semi-quantitative method on an Agilent Q-TOF (model 6545). This broad screening approach allows for semi-quantitation of > 750 compounds. The compounds were identified by compounds matching database such as Pharmaceutical drugs, pesticides, veterinary drugs, insecticides, herbicides, artificial sweeteners, surfactants, personal care products, plasticizers, flame retardants, and volatile solvents. Hits were confirmed manually by checking retention times and mass fragments. A two-point calibration procedure was used to semi-quantify hits.

Eleven additional samples were collected on December 2022 from the Awash River and its tributaries. The analyses result have been done on LCMS methods and reported as presence or absence of EOCs (qualitative result).

For later comparisons between samples, we grouped organic chemicals into three broad categories; urban, agricultural and industrial sourced organic compounds. Pharmaceuticals (equine medications, endocrine disruptors, psychoactive stimulants, drug of abuse, antiviral, analgesic, bactericide, antibiotic, anti-inflammatory, antidepressant, and anticonvulsant) as well as personal care products and artificial sweeteners are among the urban-sourced organic compounds. Solvent, surfactant, plasticizer, and flame retardant are examples of organic compounds that are used in industry. Moreover, pesticides, plant growth regulators, fungicides, insecticide, and veterinary drugs as well as herbicides and insecticides are included in the category of agricultural sourced organic compounds.

3.2 Hydro-chemical parameters

Twenty-four spatially distributed samples for physicochemical analysis were taken from surface water, tap water, surface water reservoirs, and deep and shallow wells with 30ml Nalgene sample bottles from 27th December to 4th January 2023. Before sampling, sample bottles were washed three times with the water to be sampled at each point. The 0.45-micron filter papers were used to filter the samples in situ and fill the bottles to separate the suspended particles from the samples. The samples were labeled with the descriptive code and sent to the British Geological Survey laboratory, UK within an ice-box on 5th January 2023 for analysis. Major cations, anions, and metals (Cr, Pb, Cu, Ni, and Cd) were analyzed. Cations were analyzed by ICP-MS (Agilent 8900 Triple Quadruple), anions by ion chromatography (Dionex ICS5000 dual line IC). Anion and cation analysis was undertaken using UKAS accredited methods using NIST traceable standards and analysis checked with Certified Reference Materials.

The quality of the analysis was checked according to the principle of electro-neutrality (Cherry, 1979). To preserve electro-neutrality, there must be a balance between cations solution and anions (Hem, 1985). All the sample results are in acceptable range with an ionic balance error less than 10% (Mageshkumar and Vennila, 2020).

3.3 Environmental isotopes

Environmental tracers ($\delta^{18}O$, $\delta^{2}H$, ^{222}Rn, and EC) are widely used in hydrology to trace the origin and movement of water in the hydrological cycle (Bresciani *et al.*, 2018; Kebede *et al.*, 2021).

3.3.1 Stable isotopes (δ^2H, $\delta^{18}O$)

Isotopes of water molecules are very useful to understand the groundwater flow system and provide information on hydrological processes and the source of groundwater (Clark, no date; Gat, 1971). And Water isotopes ($\delta^{18}O$–δ^2H) have recently been employed in urban water systems to differentiate between the sources of water in pipe networks and to investigate the reliance of the urban water supply on one source or another (Jameel *et al.*, 1969; Bowen *et al.*, 2007; Nagode *et al.*, 2022). The advantage of water isotopes is that once the source water enters the pipe network, its $\delta^{18}O$–δ^2H composition does not change within the pipes. Thus, $\delta^{18}O$ and δ^2H are powerful conservative tracers for back tracking the sources of pipe water, given that the different sources show different compositions.

For this study, a stable isotope ratio of H (δ^2H) and Oxygen ($\delta^{18}O$) is used to characterize the groundwater flow system of the upper and middle Awash River sub-basins and used for back tracking the sources of pipe water within Addis Ababa city.

To characterize the groundwater dynamics, forty Seven samples for isotope analysis have been collected in August 2021 for the dry season and twenty eight samples in March 2022 for the wet season. The samples were analyzed at the Centre for Water Resources Research laboratory, University of KwaZulu Natal, South Africa. The samples were collected with 50ml polyethylene sample bottles from boreholes drilled at different depths ranging from less than 30m to more than 500m. To systematically evaluate the variations in isotopic signatures of different groundwater systems, we have categorized the boreholes drilling depth as shallow (< 150m), intermediate (150 to 300m), and deep (> 300m). Besides, based on the locations where they are found in the basin, the boreholes were clustered into three categories (upland, midland, and lowland). The areas included in the upland, the midland and lowland categories from where the borehole samples were taken are shown in Table 1.

Additional twenty samples were collected in December 2022 from Awash River, surface water reservoirs, shallow and deep boreholes with 30ml Nalgene sample bottles. The ^{18}O and ^2H samples were analyzed at the British Geological Survey laboratory using standard preparation techniques followed by isotope ratio measurement on a VG-Micro mass Optima mass spectrometer. Measurement precision was within ±0.1‰ for $\delta^{18}O$ and ±1‰ for $\delta^{2}H$. Stable isotope results are reported as a deviation from Vienna Standard Mean Ocean Water (vs. VSMOW) in per mil (‰) difference using delta (δ) notation.

To look into how dependent the urban (Addis Ababa city) water supply on one source or another, 48 groundwater sources (spring, shallow wells, and deep wells) and 10 samples from the reservoir and stream water that fed the reservoirs (Gefersa and Legedadi) and tap water was sampled for $\delta^{18}O$ and $\delta^{2}H$ analysis primarily before the pipes entered the household storage reservoir. During sampling, the tap water runs for 15 second before taking the samples. In all cases, leak-proof doubly capped plastic bottles were used for sample collection for $\delta^{18}O$ and $\delta^{2}H$ analysis. Liquid Water Isotope Analyzer version DLT 100 at Addis Ababa University was used to determine the $\delta^{18}O$ and $\delta^{2}H$ results in per mil (‰) notation calibrated against Vienna Standard Mean Ocean Water (VSMOW). The laboratory standard deviations are 0.2‰ for $\delta^{18}O$ and 3‰ for $\delta^{2}H$. Locations for the spatial sampling of tap waters were chosen to represent the entire Addis Ababa and the water sources. The sites for temporal monitoring of water quality in tap waters were chosen based on a prior knowledge of the water source at the point of monitoring. The Spatial Analyst tool in ArcGIS version 10.8 was used to produce the maps in this work.

3.3.2 Radioactive isotope (^{222}Rn)

^{222}Rn is a radioactive noble gas produced from Radium-226 as part of the decay series of Uranium-238 to lead-206 (Cook, Wood and White, 2008). ^{222}Rn is a naturally occurring and inert radioactive gas with a half-life of 3.82 days. It is produced in rocks and is abundant in groundwater, but non-existent in surface water. Depending on their residence time and degassing rate, water sources connected to groundwater should show a measurable ^{222}Rn content.

It is the most reliable radioactive isotope to investigate surface and groundwater interconnection (Freyer *et al.*, no date; Cook, Wood and White, 2008; Schmidt *et al.*, 2008; Dimova and Burnett, 2011; Cartwright *et al.*, 2017; Kebede and Zewdu, 2019;

Kebede *et al.*, 2021). In this study, we used radioactive isotopes to investigate the contaminant exchange between the surface and groundwater whenever interactions occur between the surface and groundwater systems and since the half-life of ^{222}Rn is short, it is an ideal isotope for determining the residence time of groundwater-sourced pipe water, as the typical age of water in pipes ranges from a few hours to a few days. Furthermore, ^{222}Rn is an ideal tracer for discriminating between groundwater-sourced pipe water from surface-sourced (reservoir) ones. Given that the residence of water in the pipe network is sufficiently short (e.g.,<10 days) and that the source water contains sufficient initial ^{222}Rn, pipe water sourced from groundwater must show detectable levels of ^{222}Rn. All surface-sourced pipe water must show non-detectable levels, as the ^{222}Rn in this water is near zero. No published literature is available on the use of ^{222}Rn for determining the residence time of pipe water and for back-tracking the water sources. However, a number of studies employ ^{222}Rn measurements in pipe networks to assess the radioactivity hazard of the water (Thabayneh, 2015; Büyükuslu *et al.*, 2018). This study is apparently the first in using ^{222}Rn to determine the water source and residence time in pipe networks.

To understand the dynamics of the groundwater, the ^{222}Rn concentration was measured at 23 sites (tributary streams and main Awash River) and at 27 selected tap water locations; ^{222}Rn was measured along the predefined flow direction of the pipe water.

A RAD7 radon electronic detector, fitted with a Big Bottle System for high sensitivity (Durrige Company Inc., 2020), was used to analyze the in situ ^{222}Rn content on grab samples of the waters. The detection limit of the device is of the order of 40 Bq/m^3. Counting is based on the principle of liquid-gas-membrane extraction (Schmidt *et al.*, 2008; Schubert *et al.*, 2008). An extraction module, which consists of hollow vinyl fibers, allows radon stripping from the water of interest into a connected closed-air loop. The water temperature was measured to convert ^{222}Rn in the air to ^{222}Rn in water. The overall standard deviation varies between 15% and 20%, which is higher for low radon content. Radon counting was conducted for a period of 2 hours in four cycles of 30 min each. The first two readings were discarded and the average of the last two readings was taken as the mean ^{222}Rn composition of the specific water point.

3.4 Electrical conductivity (EC) and Temperature

Electrical conductivity (EC) and temperature parameters were used in this study because of the apparent ease of their measurement and the usefulness of these tracers in understanding groundwater flow patterns. EC and temperature are proven tracers a significant role in understanding the groundwater flow path (Sakura and Aslam, 2005; Bresciani *et al.*, 2018). EC has a direct relationship with total dissolved solutes (Hem, 1985), and an ionic concentration increases along the groundwater flow path due to rock-water interaction and long residence time. Under normal conditions, temperature increases with depth following the geothermal gradient (Edmunds, Carrillo-Rivera and Cardona, 2002). Thus EC and temperature could be good tracers for analyzing the interconnectivity between different flow paths which is important to characterize the contaminants along the flow path. The EC and temperature measurements from 109 deep bore holes were collected at 2 m depth intervals during water supply wells drilling Figure 4.

Furthermore, EC is a vital water quality parameter that can be measured easily (Bresciani *et al.*, 2018). It correlates with most other dissolved substances in water and is thus widely used as a proxy for other dissolved substances in water (USGS, 2019). Thus change in the EC signifies a change in the water quality, implying EC can be used as a tracer of the water quality changes within a pipe network. Groundwater has a higher EC than surface water due to its chemical interaction with rocks (USGS, 2019). Generally, the shallow layers of an aquifer have a lower EC, compared to the deeper layers (Hem, 1985). Thus, EC can be used to back-track pipe water to its shallow aquifer, deep aquifer, or surface water sources.

On-site EC (25°C) monitoring was conducted hourly at five selected households at the five locations (Sites RS1, RS2, BH1, BH2, SP1 in Figure 5 for a minimum of 72h and a maximum of 4 months. Hand-held devices (HannaTM 98312) with automatic temperature compensation and daily calibration were used to measure the EC of the water. The monitored sites included two predominantly surface water-sourced sites (RS1 and RS2), two solitary borehole-sourced sites (BH1 and BH2), and a site with mixed surface water and spring water source (Sp1). The purpose of the long-term hourly measurement was to monitor the instability of the water quality within the pipe network accompanying the various sources.

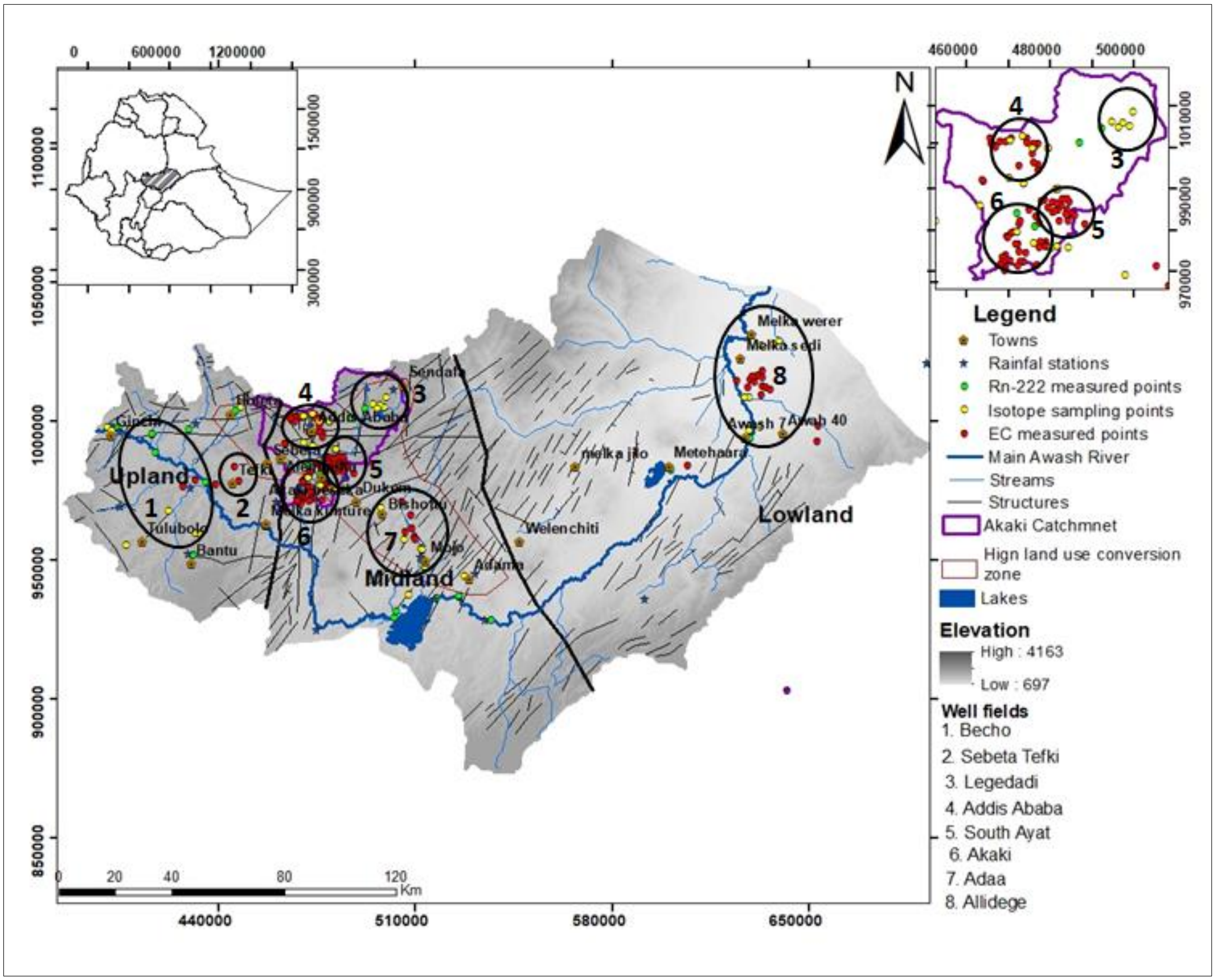


Figure 4: sampling site for vertical profiling of electrical conductivity and temperature for vertical profiling analysis

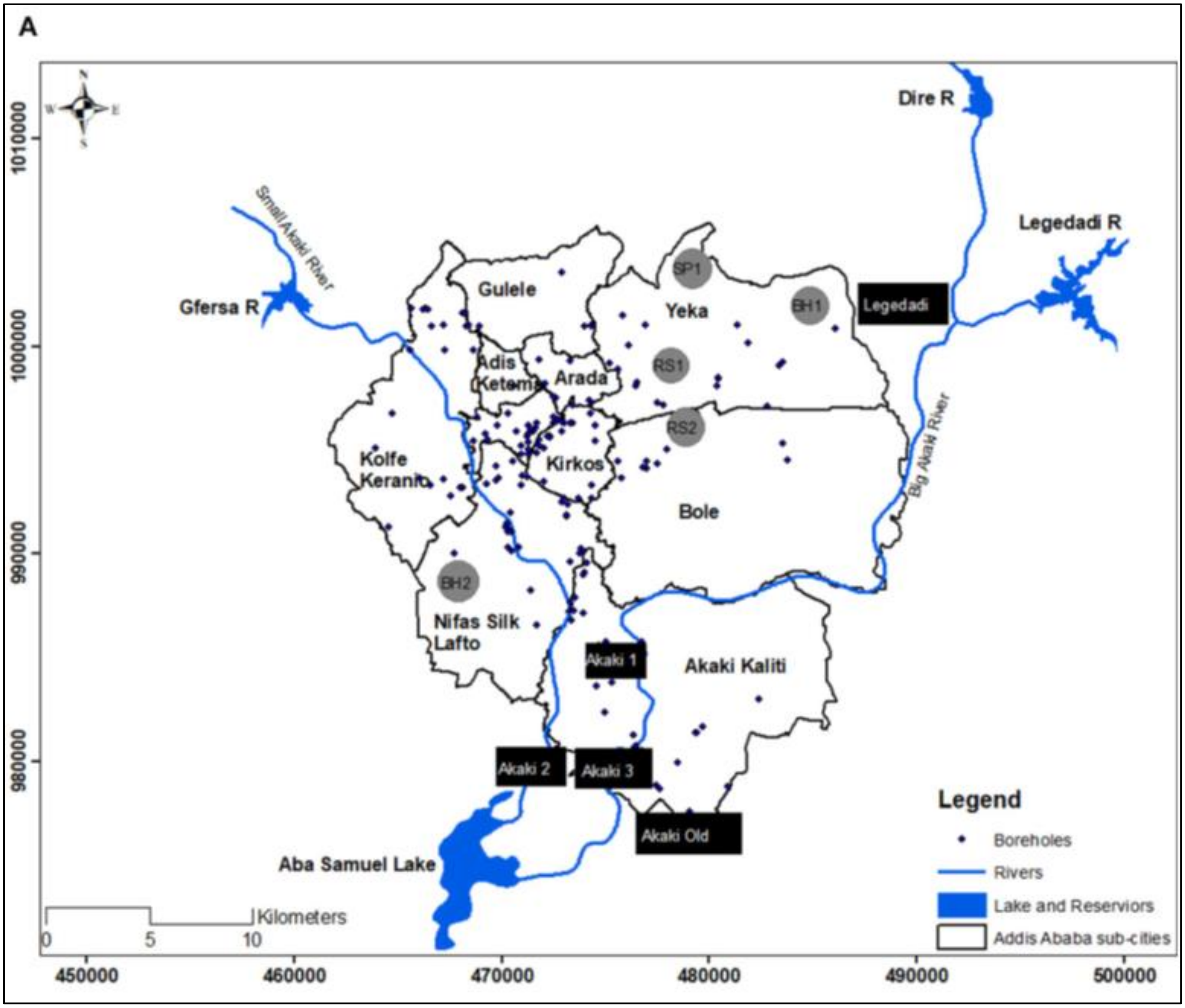


Figure 5: Location of the various water sources supplying the city of Addis Ababa and EC monitoring sites

4. Result

4.1 Emerging organic compounds (EOCs)

Samples were collected in December 2022 to characterize the contamination pattern in the Awash River and its tributaries. The number of organic compounds detected in the upstream of Addis Ababa at Ginchi area is lower than the downstream of Addis Ababa area (little Akaki, Big Akaki, inlet and outlet of Aba Samuel Lake). Tables of results for the qualitative and semi- quantitative screening are given in the Appendix. Overall, the number of compounds gradually decreased further downstream up to Melkasa except for a slight increase in compound detection at Koka inlet Figure 6. Using the qualitative screening method, there were no hits for groundwater samples that met the confirmation criteria.

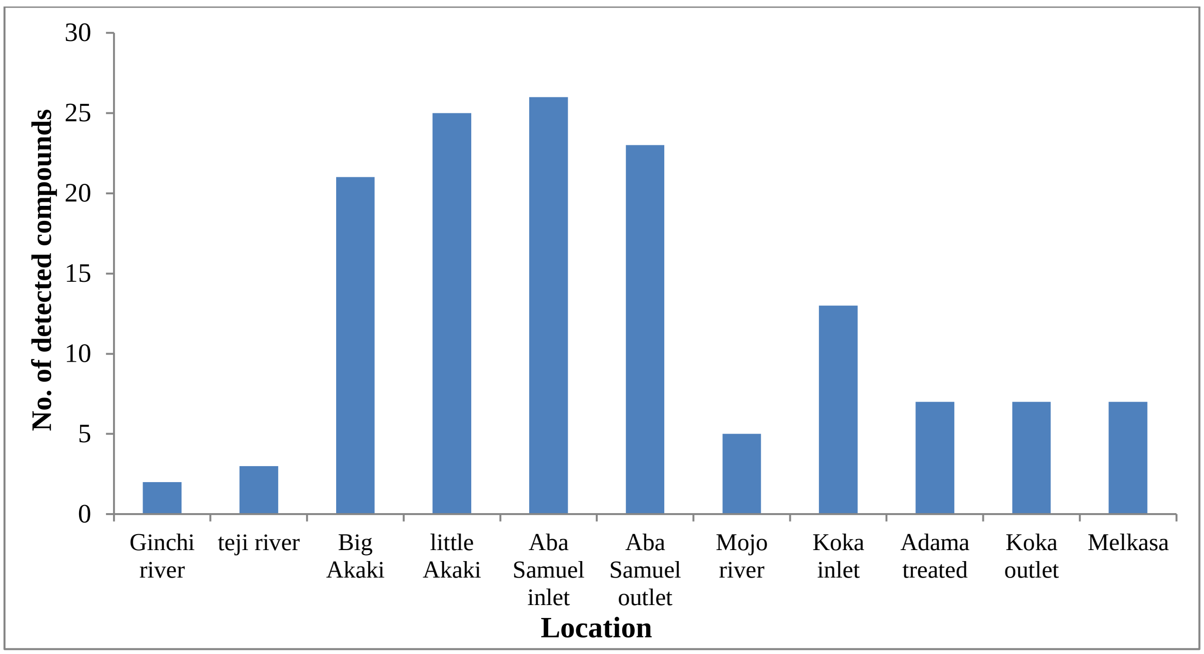


Figure 6: Number of EOCs detected in the Awash River using qualitative analytical method

For the semi-quantitative data analysis of EOCs, more than a hundred different compounds are identified in the seventeen collected samples. EOCs are detected in all water samples collected from all sources including tap water. Pharmaceutical drugs (Caffeine (0.01 µg/l), Atazanavir (0.001–0.0043 g/l), Carbamazepine (0.001–0.0058 µg/l), Cocaine (0.001 µg/l), Ibuprofen (0.001 µg/l), bactericide (0.001–0.0015 µg/l), disinfectant (0.001–0.0015 μg/l), and Acetaminophen (0.005 μg/l) were detected in the Awash River and the tap water samples. Pesticides, veterinary drugs, artificial sweeteners, and personal care products were detected in samples from all sources (surface, ground, and tap water). Endocrine disruptors and equine drugs were found in both surface and groundwater sources. Several newly identified compounds from industrial uses and urban sourced compounds were identified. Melamine is a newly identified compound in Awash River and Akaki shallow well sourced from industries. Bromoacetonitrile, Dibromoacetonitrile, Acetonitrile, dichloro (industrial sourced compounds) and Iohexol (from urban source) were detected in Awash River samples. Amantadine, Azelaic acid (from urban source) and Benzoylecgonine 1,1-Dimethyle-3-chloropropanol, 2-Methyle-3-bromo-2-butanol, and 1-bromo-2-methyle-2-butanol (from industries) were detected in tap water samples at Addis Ababa condominium sites which sources its water from a self-supply borehole.

The shallow groundwater system is more contaminated with organic compounds than the deep groundwater system Figure 7. Atrazine, Boscalid, Dodecamethylcyclohexasiloxane (D6), Sulfamethoxazole, Trinexapac, Saccharin, Acesulfame (Acesulfame-K), Bisphenol S, Diphenhydramine, and Thiabendazole are found in shallow groundwater system whereas Trinexapac, Bisphenol S, and N, N-Diethyl-m-toluamide were found in the deep groundwater system. The number of emerging organic contaminants identified in the deep borehole samples was much lower than samples collected from shallow wells, tap water, surface water reservoirs, and Awash River. The Awash River has the highest number of organic compounds by a factor greater than 2 compared to other water types Figure 7. The semi-quantitative EOCs analysis result shows the similarity of detected EOCs at Adama towards Awash town Figure 7b.

At Addis Ababa tap water samples taken at Jemo-1 and Jemo-2 sites (low-cost housing area and sourced from shallow groundwater drilled within the condominium area), the impact of industry and urbanization is more pronounced than in the other tap water samples. Moreover, at Addis Ababa, Paulos tap water which is sourced from the Gefersa reservoir has contamination from a range of different potential sources including industrial, urban and agricultural. At Addis Ababa in the Kotebe and Bole tap water samples, only agricultural contaminants are observed.

EOCs linked to urban and industrial sources were detected in high total concentrations in all water samples as compared to total concentrations from agricultural sources. In the Awash River at Adama sample (31.34 µg/L) and in the tap water sample at Jemo 1 (22.2 µg/L) exceptionally high concentration industrial EOCs were detected Figure 7b.

The highest concentration of total emerging contaminants from urban sources was observed in Awash River sample at Adama 1.76 µg/L. Concentration of emerging contaminants associated with agricultural usage ranges from 0.03 µg/L at Legedadi reservoir to 0.997 µg/L at Downstream of Awash River (Awash town) Figure 7b.

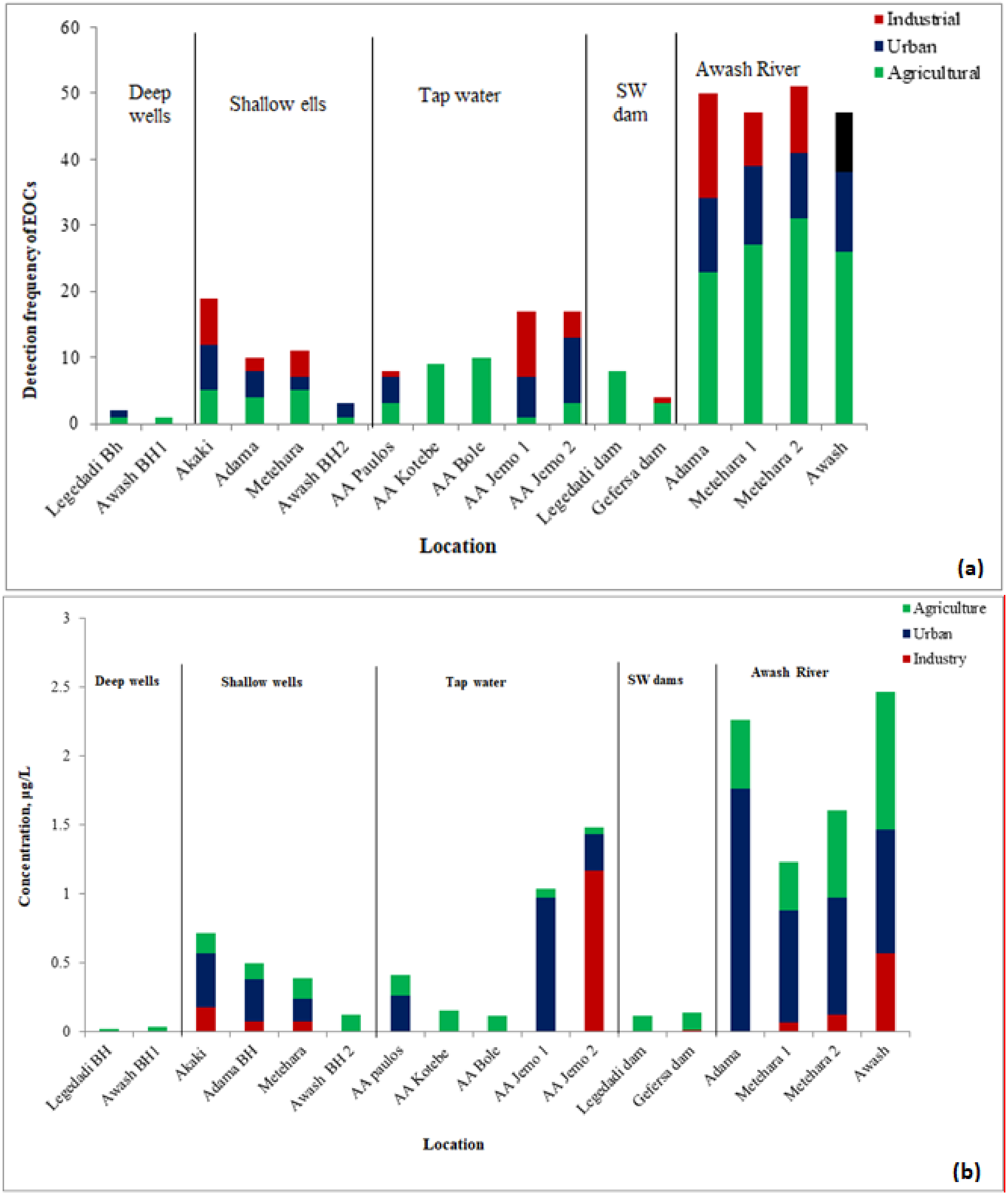


Figure 7: Detected frequency of EOCs and (a) and Concentration of Emerging Organic Contaminants (b) in all water sample sources using the semi-quantitative LCMS method

4.2 Chemical characteristics of water samples

4.2.1 Major cations and anions

From the Piper diagram constructed by Grapher software, different water types are identified. The shallow groundwater system is a modern water type (Ca-HCO_3) similar to surface water. The deep groundwater system has a relatively good quality of water compared with the other water samples. As observed in the EOCs, the water types of deep groundwater (Na-HCO_3) may be more protected from anthropogenic pollutants due to the lack of direct interaction with the polluted Awash River. The deep groundwater system's groundwater type (Na-HCO3) demonstrated that cation exchange between Ca and Na happens due to long residence times as the deep groundwater system is recharged from the plateau. The surface water reservoirs (Gefersa and Legedadi reservoirs) show a higher concentration of sulphate and chloride due to contamination from agricultural applications Figure 8.

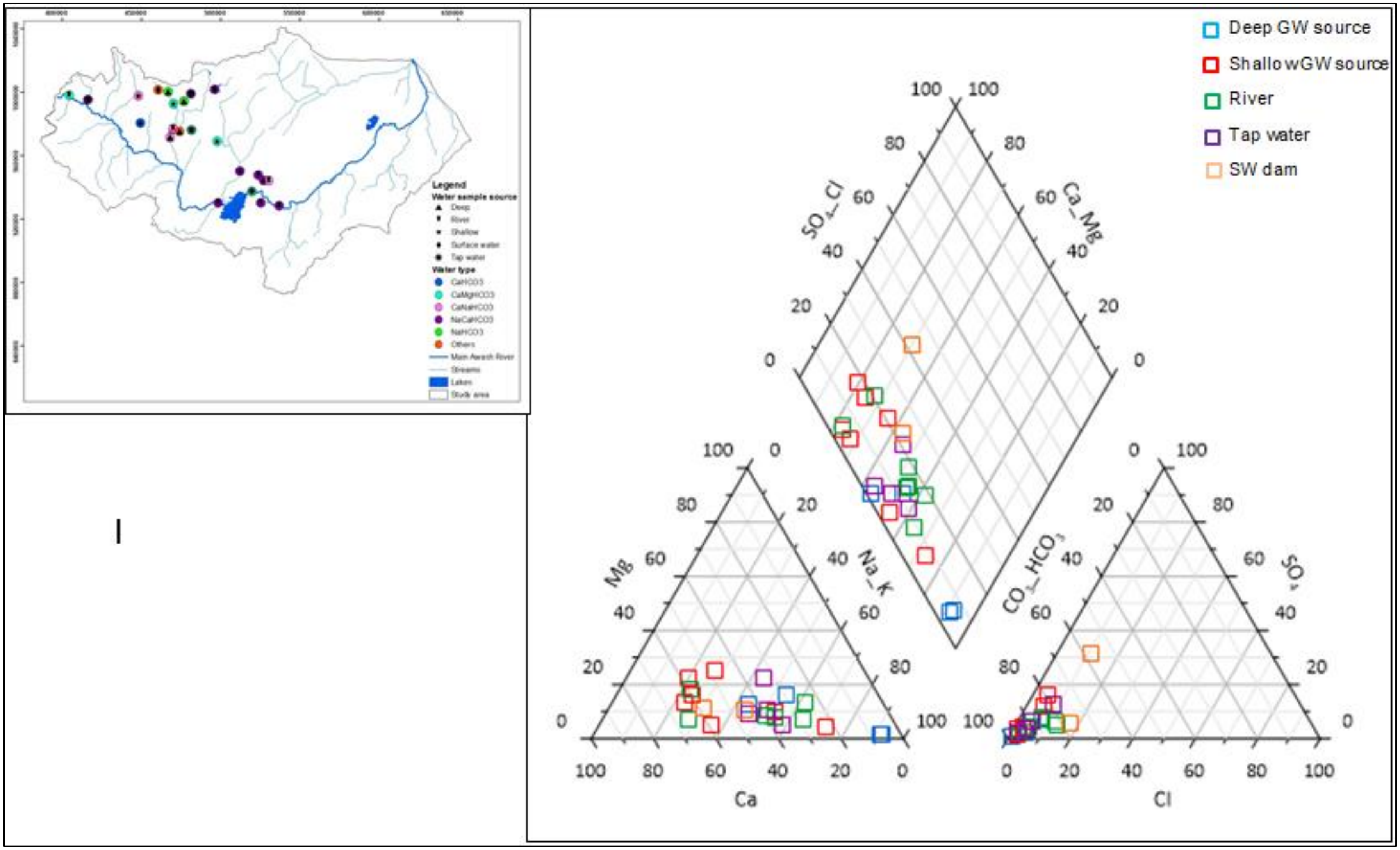


Figure 8: Piper plot of all water samples collected from shallow and deep groundwater, river, surface water reservoirs, and tap water

4.2.2 Fluoride, Chloride and Nitrate

The concentration of fluoride along the Awash River from upstream to downstream shows an increasing trend except for the relatively high value recorded at the inlet of Koka Dam (2.85 mg/l). In the shallow groundwater system, relatively high concentrations of fluoride are observed in the major cities (Addis Ababa, Mojo and Adama range 1.11–1.41 mg/L) compared to the other shallow groundwater samples (0.35–0.76 mg/L). The deep groundwater samples (2.99–4.69 mg/L) at Addis Ababa City exceeded WHO standard guidelines of 1.5 mg/L. Except for the tap water sample taken upstream of the study area (Wolenkomi: 2.16 mg/L), both surface water reservoirs and tap water had fluoride concentrations that are within WHO permissible limits Figure 9a.

The Awash River samples taken at the inlets of Aba Samuel Lake and Koka Dam show higher Chloride concentrations than the other samples. A deep groundwater sample from the Addis Ababa Bole area shows a relative increase in chloride. Chloride concentrations are lower in the other sample sources, which include shallow groundwater systems, tap water, and surface water reservoirs Figure 9b.

Nitrate concentrations in the Awash River sample taken at the inlet of Aba Samuel Lake is 102 mg/L, exceeding the permissible limit of WHO guideline (50 mg/L), and a relative increase in nitrate concentration was also noted at the inlet of Koka Dam (39.8 mg/ L), compared to the other sample sources (0.02–20.3 mg/L) Figure 9c. Shallow groundwater nitrate concentrations were found to be higher compared to deep groundwater (mean 9.05 mg/L and 3.73 mg/L respectively).

The upstream of Awash River samples shows a higher concentration of Mn (122–1583 provisional health based guideline value for Mn (80 μ μ g/L) which is above the limit of the new g/L) (WHO, 2021), whereas, the samples taken downstream of Awash River from Koka outlet to Melkasa area are under the limit (17.3–47.3 μ g/L) Figure 9e.

Aluminum concentrations in all Awash River samples, with the exception of the inlet of the Koka Dam, are higher value than the WHO allowable limit (200 μ g/L) with a range between 499 and 1516 μ g/L Figure 9d. Zinc concentrations are all below the limit of WHO guideline (5 mg/L), the shallow groundwater system has a substantially higher concentration of Zinc (4.2–226 μ g/L) compared to the Awash River samples (2.4–19.9 μ g/L) Figure 9f.

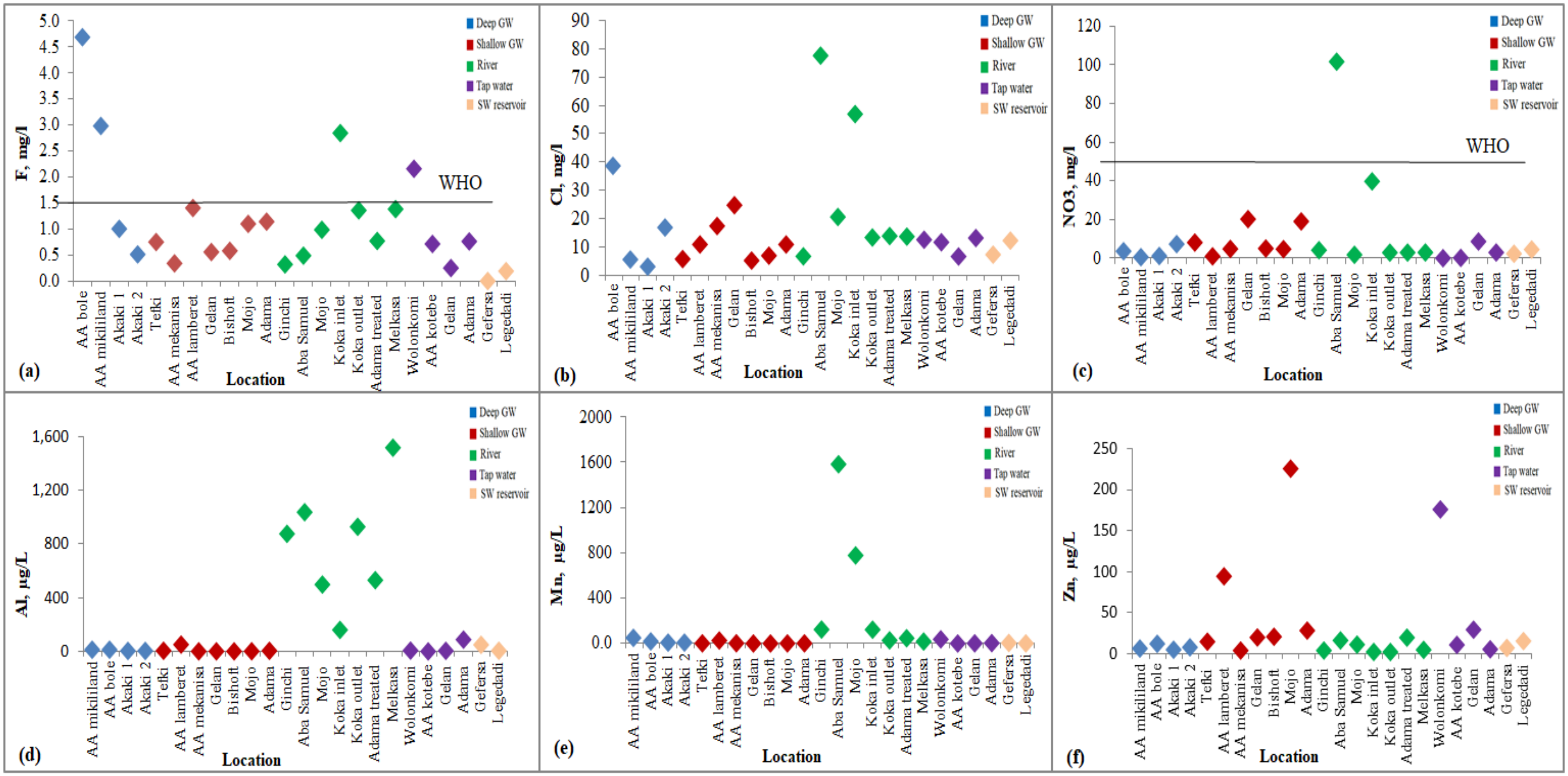


Figure 9: Concentration of (a) Fluoride, (b) Chloride, (c) Nitrate, (d)Aluminum, (e) Manganese and (f) Zinc in different locations and sources (deep, Shallow, River, Tap water, and surface water reservoirs)

4.3 Heavy Metals

Ten heavy metals (Cr, Pb, Cu, Ni, Cd, U, As, Mn, Al and Zn) were selected to be analyzed for this study. Along upstream to downstream of Awash River samples, the concentration of metals increased from Ginchi (upstream) site to Aba Samuel Lake (downstream of Addis Ababa city). Then, a decreasing trend is observed from Addis Ababa to Melkasa, except for the higher concentration of metals observed at the Adama site (the Adama River sample was taken from the Awash River treatment plant from treated water)Figure 10a. Comparing the shallow groundwater system with the other sources (surface water reservoirs, Tap water, and deep groundwater system), the concentration of heavy metals is higher in shallow groundwater systems Figure 10b.

Except for the higher Awash River uranium concentrations at the inlet of the Koka Dam (6.62 μ g/L), the groundwater has a higher the concentration of uranium (mean 2.7 μ g/L) than the surface water sources (mean 1.88 μ g/L), Figure 10c, but all are below the WHO guideline value of 30 μ g/L. The surface water reservoirs (Gefersa and Legedadi dam) that provide water to Addis Ababa city have a very low uranium concentration (0.008 μ g/L and 0.024 μg/L respectively) as shown in Figure 10c.

Arsenic levels in the Awash River range from 0.032 μg/L to 3.22 C), which is significantly higher than those in the other water sample sources, but below the WHO drinking water limit of 10 μ g/L. The surface water reservoirs exhibited reduced arsenic contents Figure 10c.

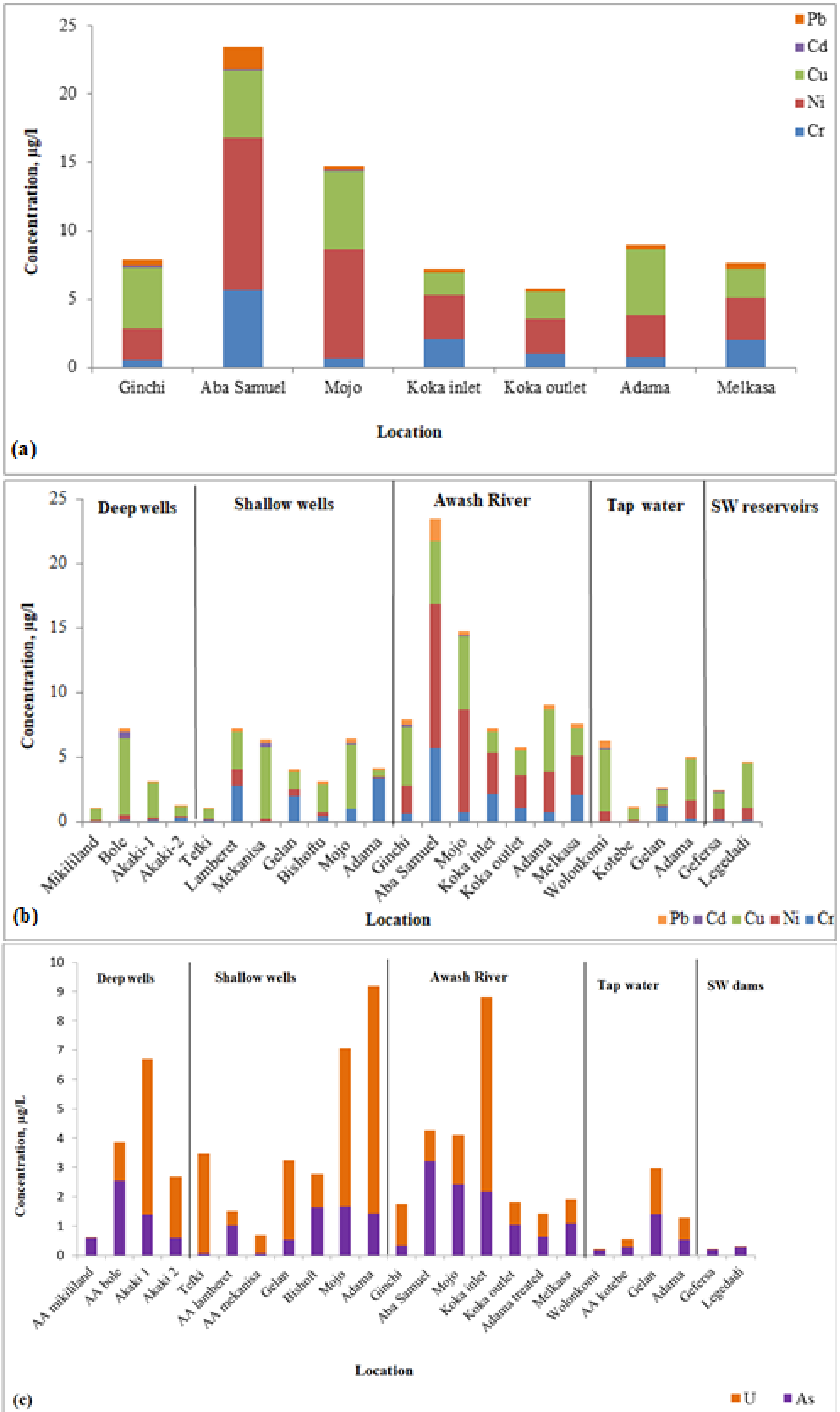


Figure 10: Heavy metals plot of the (a) Awash River (b) all water sample sources (c) Uranium and Arsenic concentration in all water sample sources

4.4 Environmental isotopes (δ^2H, $\delta^{18}O$ and ^{222}Rn)

4.4.1 Stable isotopes

The isotopic compositions of all samples show a depleted isotopic composition compared with the weighted mean isotopic signature of rain fall at Addis Ababa Figure 11. Furthermore, the isotopic composition of all samples fall close to the local meteoric water line (LMWL, D=7.2*^{18}O+11.9). Shallow wells and surface water samples showed similar isotopic signatures with high ^{2}H and ^{18}O values for most sites and are enriched (more positive) compared to the isotopic compositions of deep wells Figure 12.

The spread Figure 11 generally shows there may be more than one flow system in the region of each of the well fields, not only one continuous regional groundwater flow connecting the highland recharge zones to the lowland discharging points. But, rather dominated by a mix of both deeper percolations from the highlands and compartmentalized shallow groundwater aquifers replenished by local recharge.

In both dry and wet seasons, the observed isotopic composition of all boreholes spread horizontally regardless of the location (upland, midland, lowland) and vertically based on the drilling depth of the boreholes from which the samples were collected (shallow, inter mediate, deep) Figure 11 and Table 1.

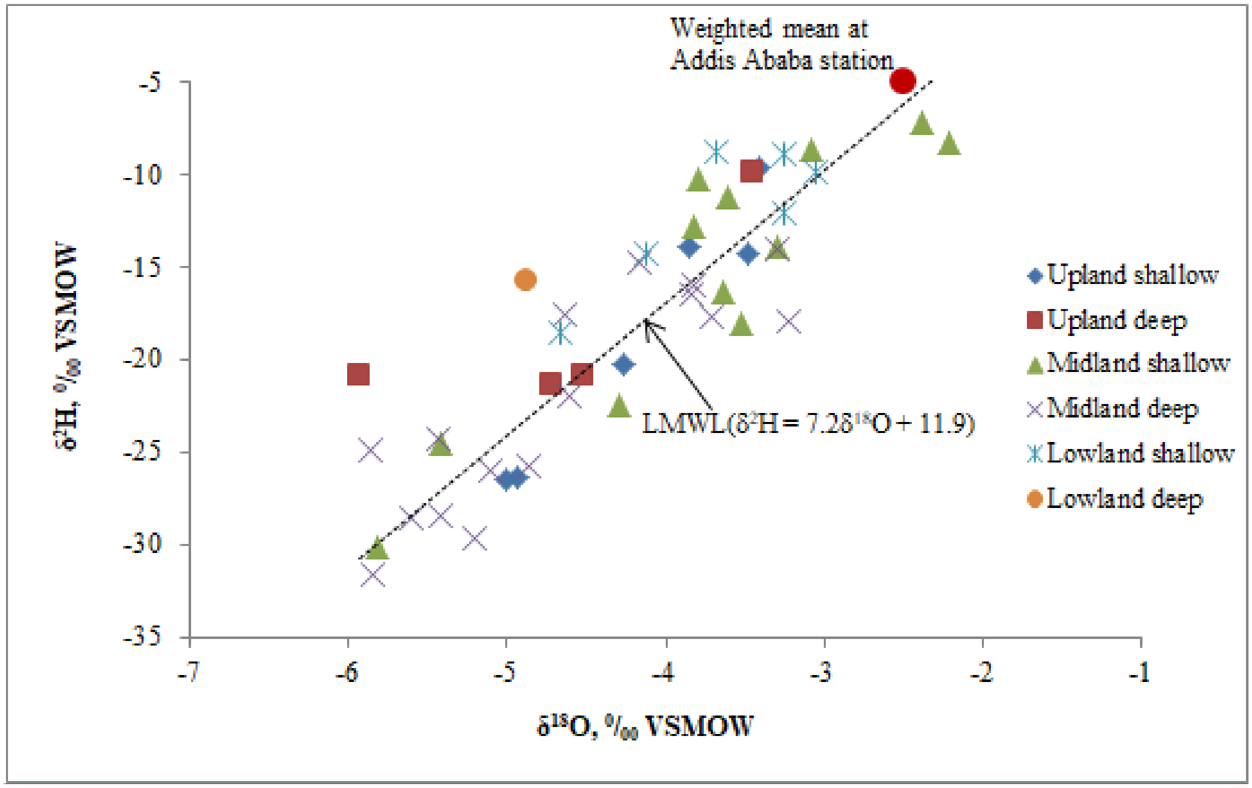


Figure 11: The δ18O-δ2H plot of the groundwater samples from the shallow (<150 m), intermediate (150 m-300 m), and deep (>300 m) boreholes drilling depth compared with the weighted mean isotopic composition of rainfall in Addis Ababa city

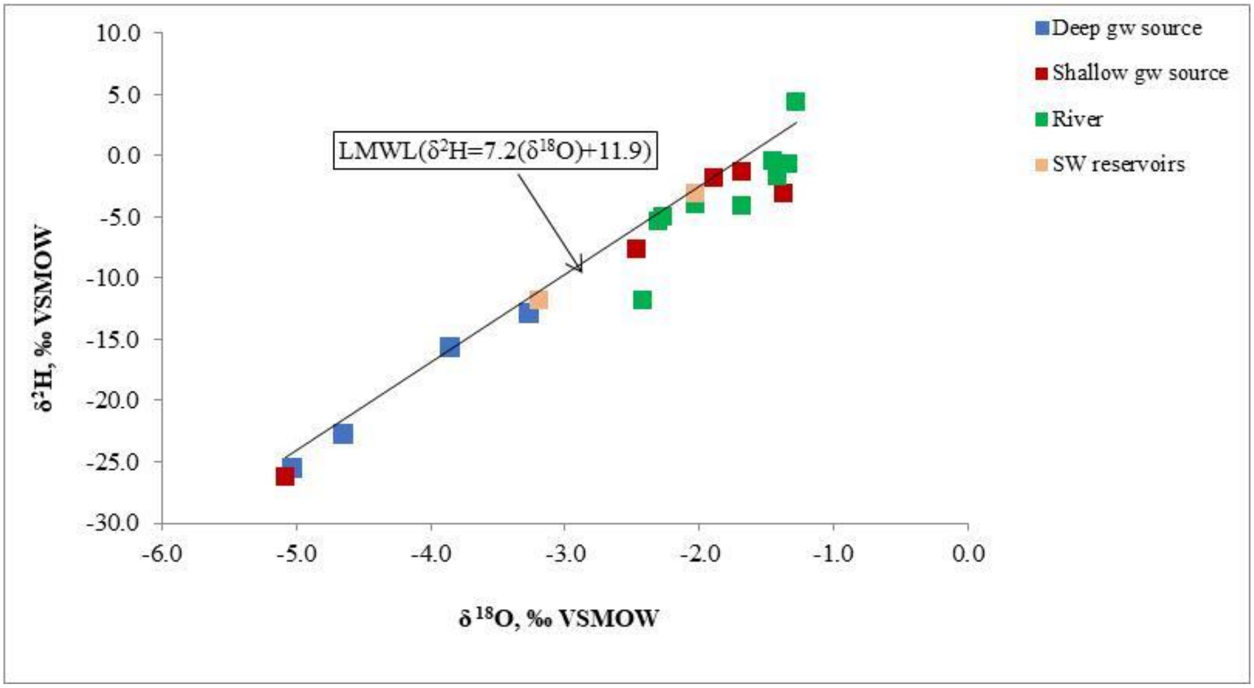


Figure 12: δ^2H and δ^{18}O plot of samples taken from deep wells, shallow wells, and surface water

The isotopic composition of both shallow (No 5 in Table 1) and deep (No 7 in Table 1) groundwater samples at Becho well-field showed a depleted signature, indicating the shallow as well as the deep Becho plain aquifer systems are connected with regional groundwater flow system. Both Akaki and Addis Ababa well-fields isotopic composition show enrichment on the Western side, dominated by local recharge, and depletion on the Eastern side as a result of structurally controlled regional groundwater flow characteristics. The deeper (>350m) aquifer also showed very low EC (320 µS/cm) justifying the deeper aquifer at Addis Ababa might be connected to the regional groundwater flow recharged from the plateau. Mojo well-fields showed depleted isotopic composition regardless of depth (No 38 in Table 1) owing to a location in the discharge zone of the regional flow.

At Alliadege plain the isotopic composition of the shallow system is enriched (mixing with from Awash River) and the deep groundwater is depleted (due to recharge from the adjacent escarpment). However, compared with the well-fields upstream (No 38 in Table 1), the isotopic signature show enrichment (No 45 in Table 1). This could be related to the short distance travel of water from the adjacent escarpment. The low EC value (1011 μS/cm) of the deep groundwater registered at Alliadege also confirms the low residence time.

Table 1: The borehole samples taken during the dry season for Isotope analysis (δ18O and δ2H).

No.	Lab ID	Sample ID	δ^{18}O, in ‰	δ^{2}H, in ‰	Depth	Area	Location
1	W-1738	BHK47	-3.25	-10.6	Shallow	Becho	Upland
2	W-1766	BHK38	-3.46	-9.8	Deep		
3	W-1771	BHK48	-3.41	-9.6	Shallow		
4	W-1745	BHK39	-5	-26.5	Intermediate		
5	W-1769	BHK46	-4.94	-26.4	Shallow		
6	W-1739	BHK41	-4.72	-21.3	Deep		
7	W-1782	BHK13	-5.93	-20.9	Deep		
8	W-1757	BHK15	-4.52	-20.9	Deep		
9	W-1765	BHK43	-4.27	-20.2	Intermediate		
10	W-1744	BHK42	-3.48	-14.2	Shallow		
11	W-1761	BHK14	-3.85	-13.9	Shallow		
12	W-1749	BHK1	-3.64	-16.3	Intermediate	South Ayat	Midland
13	W-1763	BHK2	-4.64	-17.5	Deep		
14	W-1773	BHK3	-3.82	-16	Deep		
15	W-1779	BHK4	-4.16	-14.7	Deep		
16	W-1762	BHK5	-5.43	-24.3	Deep		
17	W-1742	BHK37	-5.1	-26	Deep		
18	W-1743	BHK40	-3.84	-16.5	Deep		
19	W-1785	BHK10	-5.86	-24.9	Deep	Addis Ababa	
20	W-1777	BHK11	-2.35	-3.9	Shallow		
21	W-1750	BHK12	-4.86	-25.7	deep		
22	W-1768	BHK31	-4.61	-22	Deep		
23	W-1746	BHK32	-3.83	-12.8	Intermediate		
24	W-1767	BHK33	-3.29	-14	Deep		
25	W-1754	BHK6	-3.8	-10.2	Intermediate	Akaki	
26	W-1758	BHK7	-3.09	-8.6	Intermediate		
27	W-1783	BHK8	-3.61	-11.2	Shallow		
28	W-1772	BHK9	-3.3	-13.9	Intermediate		
29	W-1774	BHK34	-3.71	-17.7	Deep		
30	W-1764	BHK35	-3.22	-17.9	Deep		
31	W-1770	BHK36	-5.2	-29.6	Deep		
32	W-1780	BHK23	-5.42	-24.5	Intermediate	Ada'a	
33	W-1752	BHK30	-2.22	-8.3	Shallow		
34	W-1740	BHK44	-4.3	-22.4	Intermediate		
35	W-1741	BHK45	-2.39	-7.2	Shallow		
36	W-1755	BHK24	-5.82	-30.1	Shallow		

37	W-1756	BHK25	-5.61	-28.6	Deep		
38	W-1776	BHK26	-5.84	-31.6	Deep		
39	W-1747	BHK28	-5.42	-28.4	Deep		
40	W-1748	BHK29	-3.52	-18	Intermediate		
41	W-1775	BHK16	-3.25	-12.1	Shallow	Alliadege	Lowland
42	W-1784	BHK17	-4.67	-18.5	Shallow		
43	W-1778	BHK18	-3.05	-9.8	Shallow		
44	W-1751	BHK19	-3.25	-8.9	Intermediate		
45	W-1781	BHK20	-4.87	-15.7	Deep		
46	W-1753	BHK21	-4.12	-14.3	Intermediate		
47	W-1759	BHK22	-3.68	-8.8	Intermediate		

In the water pipe network in Addis Ababa city, the $\boldsymbol{\delta}^{18}$O– $\boldsymbol{\delta}^{2}$H composition of the water sources shows significant spatial and depth-wise variations. The shallow aquifers (Old Akaki Well-field) and the cold springs plot near the weighted average $\boldsymbol{\delta}^{18}$O– $\boldsymbol{\delta}^{2}$H composition of the Addis Ababa summer rains Figure 13. The deeper aquifers distinctly show the depleted $\boldsymbol{\delta}^{18}$O– $\boldsymbol{\delta}^{2}$H, when compared to the composition of the shallow aquifers and the weighted mean rainfall Figure 14. The two surface water reservoirs and their tributaries showed a relatively enriched $\boldsymbol{\delta}^{18}$O– $\boldsymbol{\delta}^{2}$H composition, owing to evaporation from their surfaces Figure 14.

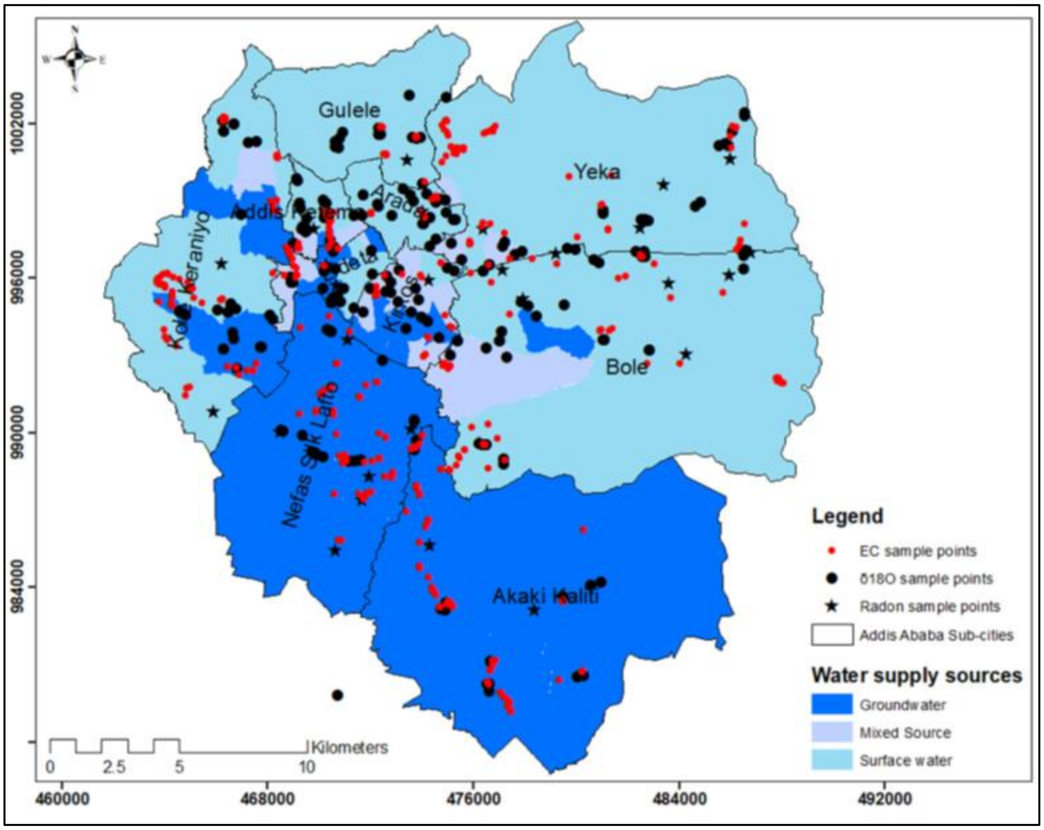


Figure 13: Approximate urban water utility water source map and snapshot of tap water sampling sites

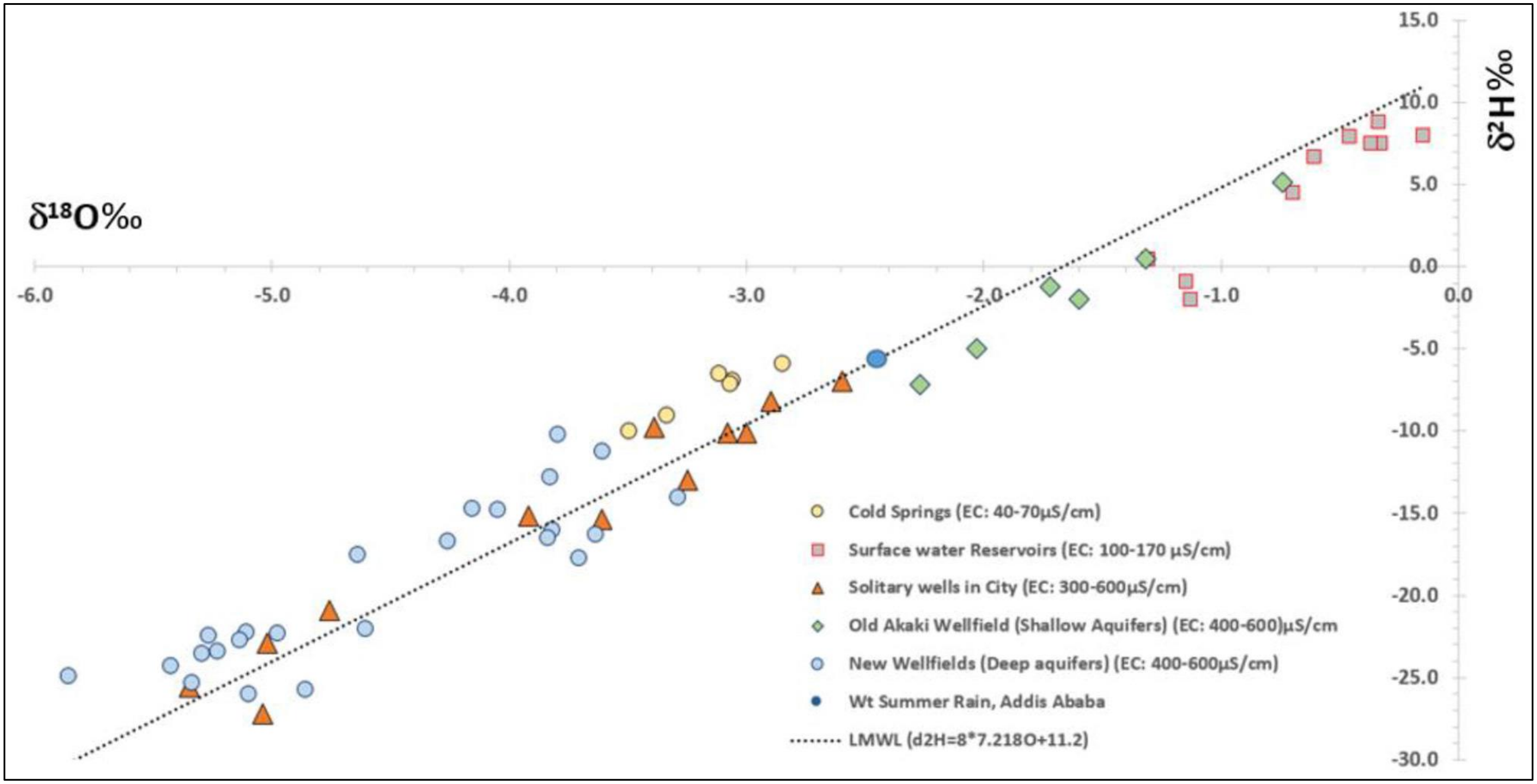


Figure 14: The $\delta^{18}O$– $\delta^{2}H$ composition $\delta^{18}O$– $\delta^{2}H$ composition of the various water sources supplying the city of Addis Ababa. The range of EC values corresponding to each water source is given along with the legend

The tap waters showing the depleted $\delta^{18}O$ signals in the south-western and most eastern sub city mirror the deep $\delta^{18}O$–$\delta^{2}H$ depleted groundwater sources coming from the Akaki well-fields 1, 2, 3, and the Led̵edadi well-field, while the $\delta^{18}O$ enriched regions reflect the sources from the surface water reservoirs (Legedadi R and Gefersa R). The enriched $\delta^{18}O$ region in the south-eastern sector of the Akaki-Kaliti sub-city mirrors source from the shallow, relatively $\delta^{18}O$-enriched aquifers from the Old Akaki well-field Figure 15.

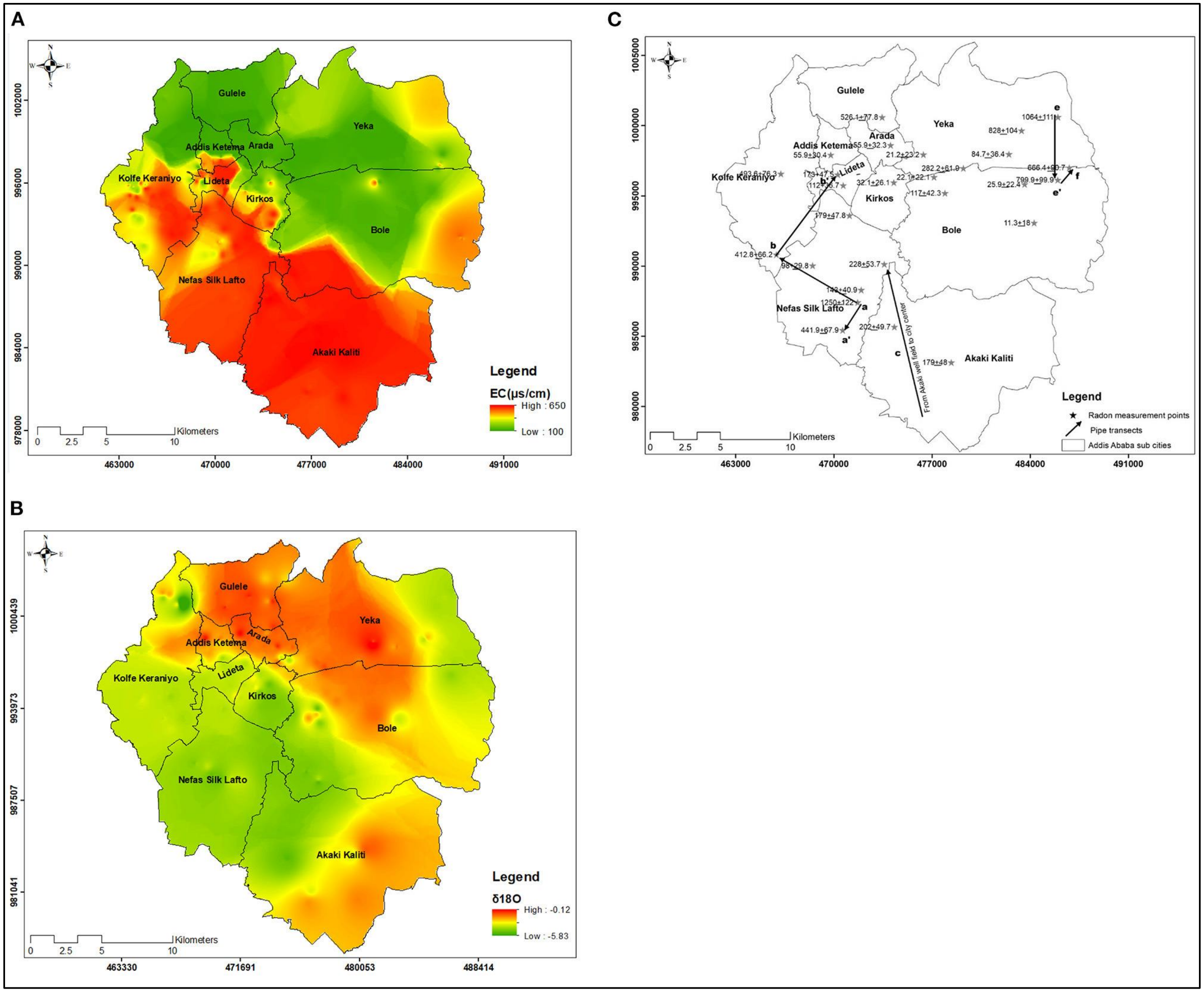


Figure 15: (A) The spatial pattern of EC, (B) the spatial pattern of ^{18}O-^{2}H, and (C) the ^{222}Rn composition in selected tap waters

4.4.2 Radioactive isotope (222-Rn) in the study area

The high ^{222}Rn concentrations in the upstream part of the main Awash River show that there is groundwater contribution to the river. Though smaller compared to the main Awash River, the groundwater contribution is also observed to the upstream tributaries Figure 16. Unlike the upstream part of the river which is gaining from the groundwater, evidence for groundwater discharge into Awash River at Allaidege is lacking. The lower end of the Awash River in the study area show low ^{222}Rn content. Similar pattern is observed in both wet and dry seasons. However, as shown by the range of ^{222}Rn concentration, there is more groundwater contribution during the dry season (0-1500 Bq/m^3) than in the wet season (0-500 Bq/m^3) Figure 16.

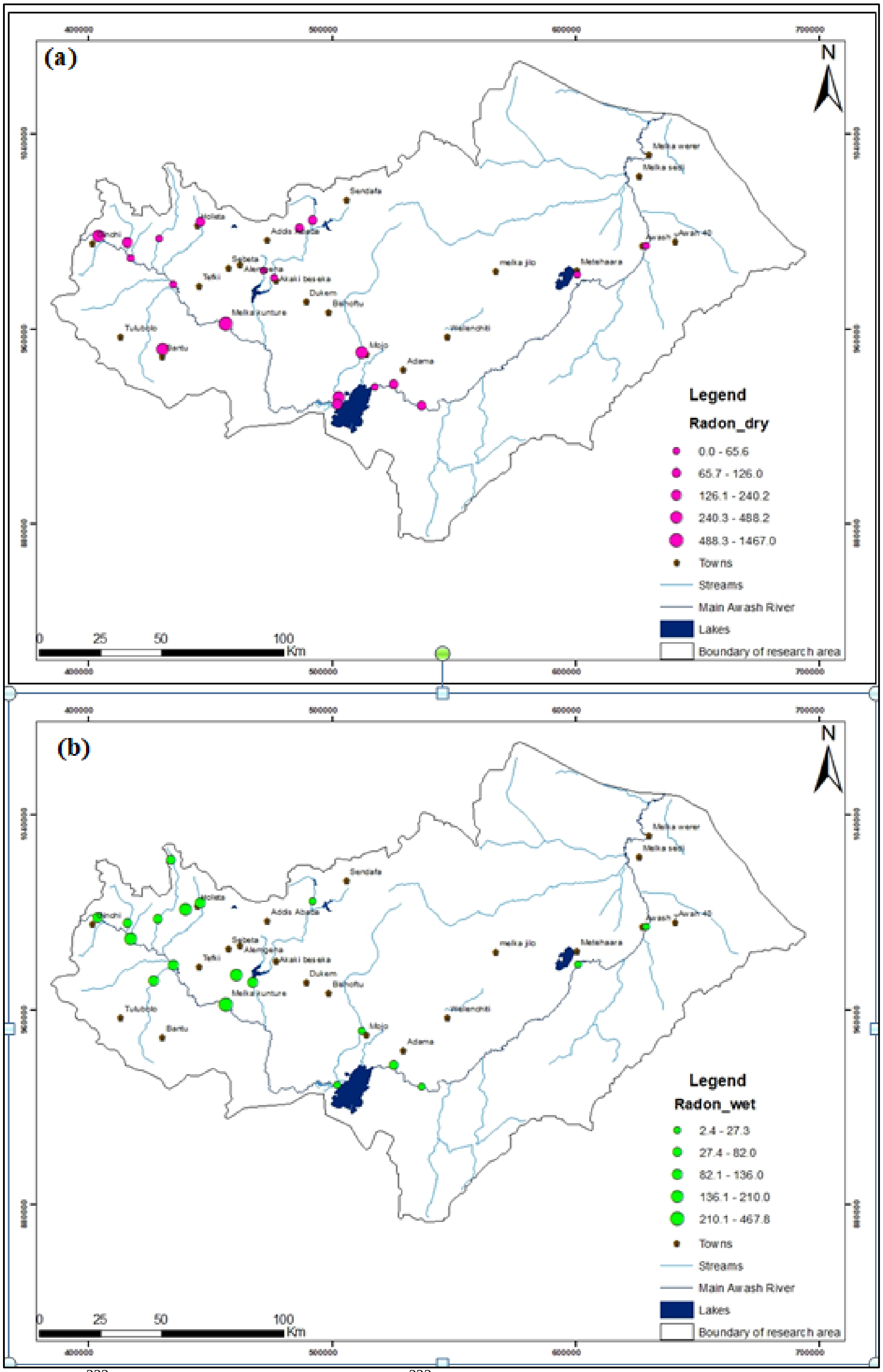


Figure 16: ^{222}Rn concentration map showing ^{222}Rn distribution for in-situ measurements conducted during the dry (a) and wet (b) seasons.

Table 2: ^{222}Rn in-situ measured values in different water sources during the dry season

Locality	**UTME**	**UTMN**	**^{222}Rn, Bq/L**	**Source**
Ginchi	400482	999171	318.7	Spring
Ginchi	404232	998125	354.7	Awash main river
Wolenkomi	416279	995470	240.2	Stream
Meti	429166	997165	65.6	Stream
Kore	417489	988936	53.1	Awash main river
Holeta	446133	1003882	91.1	Stream
Bantu	430751	951845	488.2	Stream
Jawaro kora	433416	959506	660.2	Borehole
Awash Belo	435097	978088	24	Awash main river
Melka Kunture	456231	962375	204814	Borehole
Melka Kunture	456505	962163	1467	Awash main river
Boneya	460900	976902	227011	Spring
Legetafo	486762	1001259	87.3	Stream
Legedadi	492113	1004605	113	Stream
Akaki	476236	980995	38.4	Stream
Akaki	471917	984042	11	Stream
Modjo	512216	950283	357.2	Stream
Meki	502212	929184	220.8	Awash main river
Koka	517568	936294	65.7	Awash main river
Wonji	525291	937127	126	Awash main river
Awash Melkasa	536744	928425	118	Awash main river
Beseka	600916	982375	39.9	lake
Awash 7	629117	993984	20	Awash main river

Table 3: ^{222}Rn in situ measured values in different water sources during the wet season

Location	**UTME**	**UTMN**	**^{222}Rn, Bq/L**	**Source**
Ginchi	404089	997852	107	Awash main river
Wolonkomi	416186	995306	61.8	stream
Kore	417433	988934	182	Awash main river
Meti	428728	997244	42.9	stream
Addisalem	440007	1001102	187	stream
Berga (Jalo)	433938	1021386	82	stream
Holeta river	446133	1003882	97.4	stream
Asgori	426967	971988	136	stream
Teji	435097	978088	112	Awash main river
Melka Kunture	456505	962163	467.8	Awash main river

Location	UTME	UTMN	^{222}Rn, Bq/L	Source
Melka Kunture	456231	962375	1287	Borehole
Boneya	460858	974217	210	stream
Legedadi	492112	1004620	18	stream
LLAPW6	499681	1008600	1165	Borehole
SANFPW14	481124	989901	610.2	Borehole
Aba Samuel Lake	467718	971109	119	Awash main river
Modjo River	512300	951295	7.67	stream
Koka inlet	502212	929184	2.44	Awash main river
Wonji	525291	937127	39.3	Awash main river
Awash Melkasa	536744	928425	27.3	Awash main river
Metehara	601183	978438	17.5	Awash mail river
Awash 7	629117	993984	6.62	Awash mail river

Furthermore, the ^{222}Rn in tap water showed a distinct spatial pattern that mirrors the source of the pipe water Figure 15c. A high ^{222}Rn was observed in the southern sub-city and locally in all the sub cities reflecting a groundwater source. The northern and northeastern region shows a low ^{222}Rn, owing to sources from the two water dominated northern sub-cities (Yeka, Bole, and Gulele) indicate that the source of pipe water is from solitary wells and that the addition of groundwater into the pipe network is from the newly developed Legedadi well-field. All in all, the EC, δ^{18}O, and ^{222}Rn patterns reflect the source water composition, which mirrors the City Administration's map of the tap water sources, as shown in Figure 15c.

4.5 Electrical Conductivity (EC) and temperature of the study area

The EC and temperature measurements from 109 deep boreholes collected at 2 meters depth intervals during drilling were plotted as a Heatmap in Figure 17. The average EC and temperature Heatmap plots with depth were constructed based on systematically taken measurements as listed from upstream to downstream regions (Becho, Sebeta Tefki, South Ayat, Addis Ababa, Akaki, Ada'a, and Alliadege well-fields).

EC values show an increasing trend with depth and follow this trend in all areas except in Addis Ababa, Akaki, and Alliadege well-fields. For instance, in Addis Ababa city, the average EC value is higher at shallow levels at the depth of 30 m (884 μS/cm) probably showing input from polluted surface waters into the shallow groundwater from the urban and industrial sources. From 30 m up to 350 m depths, the EC value at Addis Ababa follows a natural trend and gradually increases with depth. Whereas, in the deep layers below 350m, EC decreases to 320 μS/cm due to dilution.

As we move from South Ayat to Akaki there is an increase in EC. Except for the relatively high EC value at shallow depth in the Akaki well field (up to 30 m), EC increases with depth in both well-fields.

EC is expected to get higher along the groundwater flow path from upstream to downstream. Considering the Akaki well field located immediately downstream of Addis Ababa, this well field is expected to have higher EC compared to the Addis Ababa region. However, EC values do not show an increasing pattern from Addis Ababa to Akaki. The average value of EC measurements at Akaki located downstream of Addis Ababa city showed lower values (735 μS/cm) compared with the average EC value at Addis Ababa pocket wells (827 μS/cm). Ada'a area EC value is low and noticeably different from the rest of the other well-fields.

Further downstream at Alliadege plain, the boreholes drilled at the Alliadege well-field showed that the very shallow (<30 m) groundwater system has slightly higher EC (1500 μS/cm) than the deeper system (1011 μS/cm). This implies there are two distinct groundwater flow systems in the region recharged by different sources.

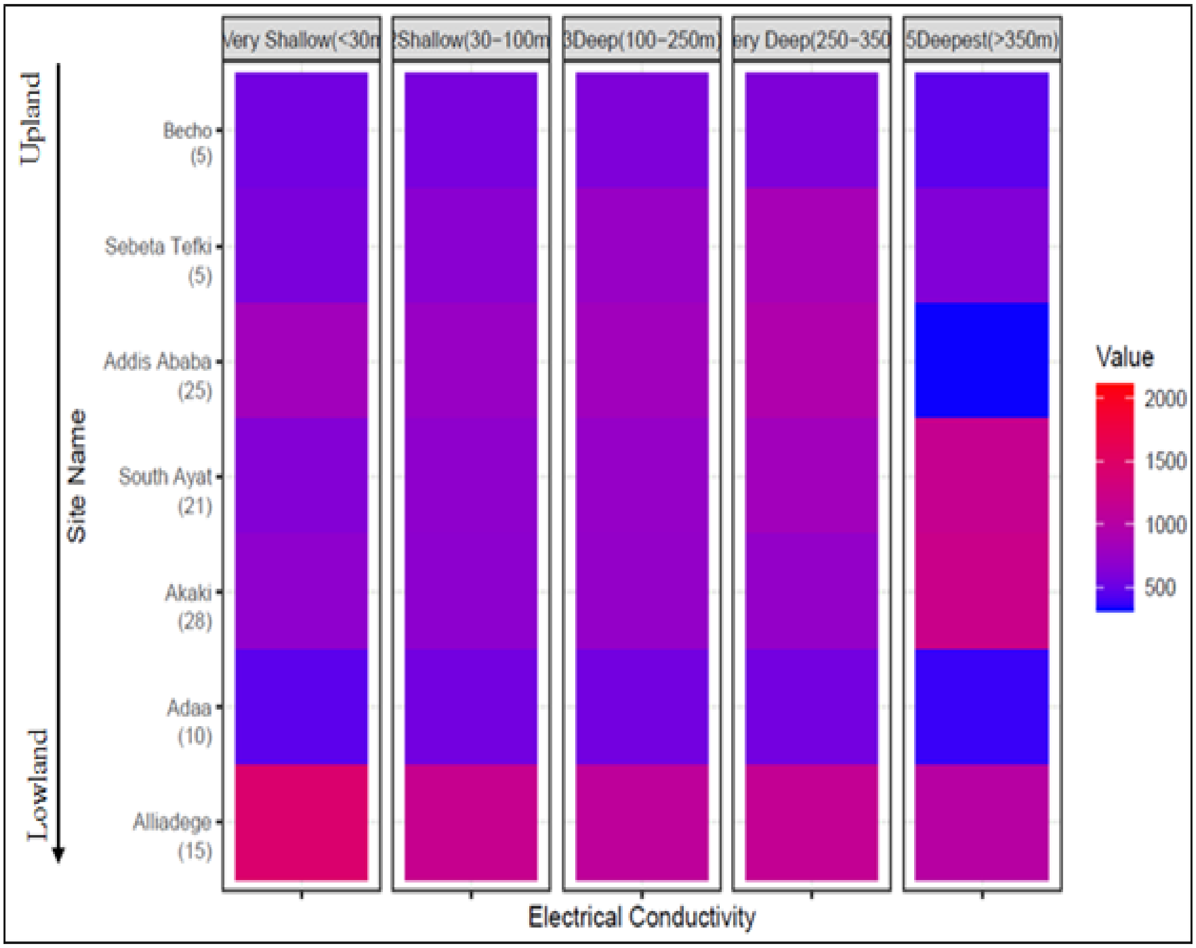


Figure 17: Heatmap of the EC profile (the numbers in the bracket indicate the number of boreholes from which the vertical profile record was taken).

Temperature variation is observed with depth in all the locations except Ada'a and Addis Ababa Figure 18. As expected due to the geothermal gradient, the temperature is generally increasing with depth. At Ada'a plain there is no significant variation in temperature with depth (23.7 ^{0}C). Uniquely at Addis Ababa, the temperature gradually increases from the surface (13 ^{0}C) to 350m depth (24.3 ^{0}C) and suddenly drops after 350m (13.2 ^{0}C). A similar pattern is observed from the EC measurement at Addis Ababa. Fast-moving regional groundwater flow passing through highly permeable geological formations referred to as hydrological windows (Kebede *et al.*, 2008) may cause low temperature and EC in the deeper groundwater systems.

Except for the low-temperature anomalies noted at Ada'a (23.7 ^{0}C), the temperature gradually increases as we move from the upstream B ho area (24.1 ^{0}C) to the downstream Alliadege plain (35.1 ^{0}C).

At Sebeta Tefki, the temperature value is higher (25.5 ^{0}C) at shallow depth (<30 m) compared with the temperature from 30 to 100m depth (24.2 ^{0}C). below 100 m depth, the temperature follows the natural geothermal gradient. Geothermal hot springs are roughly aligned northwest-southeast along the Ambo-Wenchi-Butajira lineaments (Abebe *et al.*, 1998). The lineaments are fed by dykes and aligned volcanic plugs which favor the formation of hypothermal springs in the region (Kebede, 2013). Sebeta-Tefki area is located in this region, and the high temperature is observed in the very shallow wells is related to the hypothermal springs from the dykes and plugs.

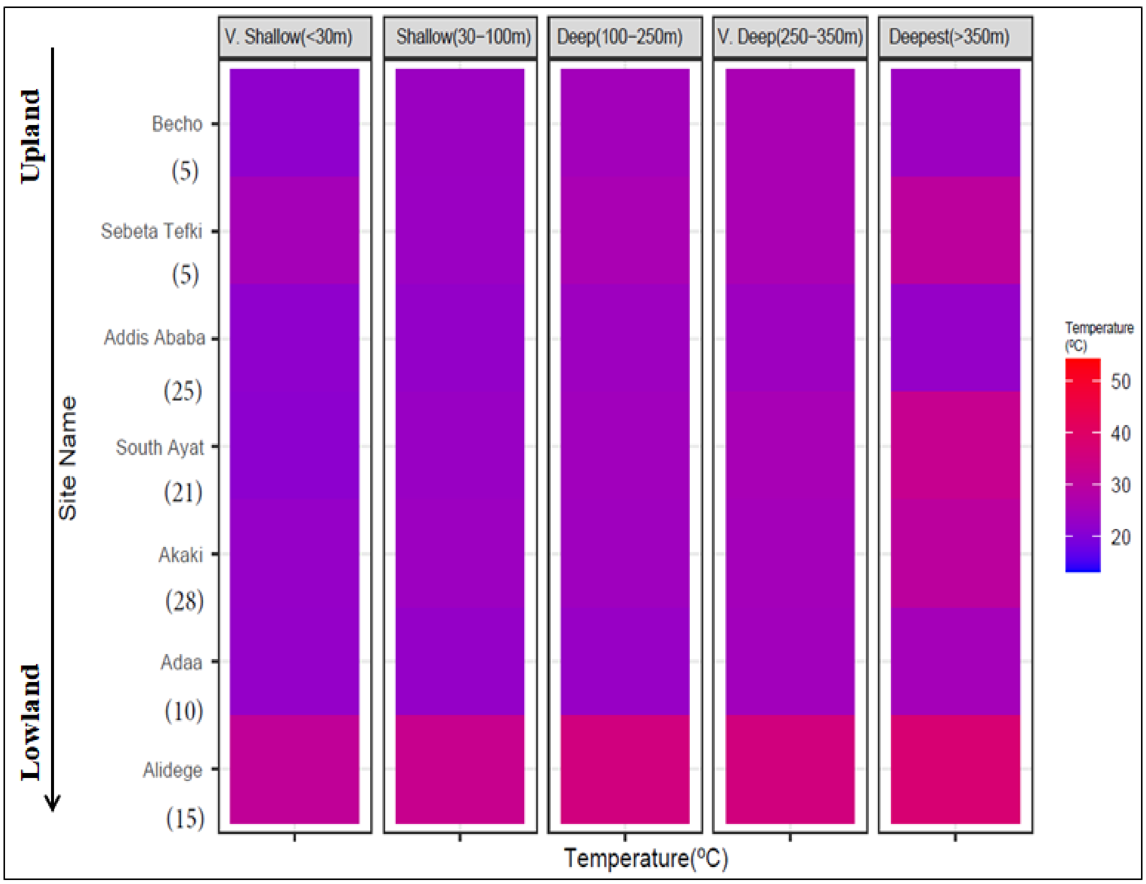


Figure 18: Heatmap of temperature profile (the numbers in the bracket indicate the number of boreholes from which the vertical profile temperature record was taken)

Moreover, the EC value of the tap water samples ranged between 100 and 670 µS/cm. The Inverse Distance weighting (IDW) method was used to make a spatial interpolation and produce a spatial distribution map. The distribution shows a distinct spatial variation, which mirrored the variation in the source water composition Figure 15a. Two major regions can be recognized from Figure 15a. The tap water in the southern part of the city showed high EC values, compared to that in the northern part. The high EC in the southern sector mirrors that the tap water source is from the Akaki well-fields (Akaki 1, Akaki 2, Akaki 3, and Old Akaki), located to the south of the city. The northern part of the city showed low EC values, which mirrors sources coming from the two surface water reservoirs (Legedadi R and Gefersa R). The EC pattern also distinguished the presence of local groundwater sources within the surface water-dominated pipe networks in the northern part of the city. For example, in the north-west and northeast of the Yeka sub-city and east of the Bole sub-city Figure 15a, the local high EC values reflect that the source of water is from the solitary boreholes and the newly-developed Ledeadi well-field. The intermediate EC value observed in the Kolfe-Keraniyo sub-city Figure 15a mirrors the mixture of water from the solitary shallow boreholes and water from the Gefersa Reservoir.

The hourly monitoring of tap water at the five sites reveals variability in the EC, even when the water source is attributed to a single source. In the surface water sourced Yeka sub-city (Site RS1 in Figure 23), a diurnal variation in EC was noted for the first 4 days, after which the EC jumped by about 30 µS/cm. While the water temperature variation can explain the diurnal variation, the cause of the jump on the fifth day was unclear Figure 23. One plausible explanation may be that the jump in EC marks the transitory passage of the borehole water injected into the system. The long-term (3-month) hourly EC in the surface water-sourced tap water (Site RS2 in Figure 23b) shows daily, seasonal, and other erratic variations. Similar to the RS1 site, the RS2 site shows a diurnal variation Figure 23. The EC declined from around 190 µS/cm in June (a dry month) to around 100 µS/cm in the wet month of August.

The decline in the EC mirrors the decline of the EC in the source water, owing to the dilution of the reservoir water by rainfall. Site RS2 also shows erratic EC values. The first one is the very high outlier EC that was observed on three occasions (EC > 200 μS/cm). The outlier values were observed following pipe water interruptions and reconnection incidents. The outlier EC values thus reflect stagnation or the infiltration of contaminants into the pipe network, following the negative pressure that developed. The second erratic feature was the high variability in EC at Site RS2 in the month of September Figure 23b; the cause of this high variability could not be established.

The two groundwater-sourced sites (BH1 and BH2) showed a significant EC variation Figure 23c, d. In BH1, the pump was operated based on the users' water demand. Variations in the EC were linked to the pump operation hours. The EC is generally low at the start of pumping and increases during peak water use. The second site BH2 showed different EC patterns, after and before the days of water interruption, following a power cut. The higher EC on May 4 and 5 reflected water coming from a deeper level of the aquifer, while the low EC observed on May 8 reflected water coming from the shallow aquifer layers, which was caused by the aquifer recovery on May 6 and 7, following the power cut. The site sourced from the mixing of spring water (SP1) and the surface reservoir water (Legedadi R) Figure 23e showed a diurnal EC variation, which mirrored the mixing proportion between the two sources. The EC varied between 35 and 120 μS/cm Figure 23e, with the low EC end member reflecting the water coming from the spring and the higher EC member, which reflected the water originating from the Legedadi reservoir.

Another notable feature is the fact that borehole-sourced sites (BH1, BH2) showed the highest instability in EC values Figure 23c, d, compared to the surface water-sourced sites (RS1, RS2). The high variability in solitary well-sourced sites probably reflects variations in the degree of pumping and subsequent variations in the layer of the aquifer from which water is pumped in that particular instance. The surface water reservoir sourced pipes showed relatively greater water quality stability, with noticeable seasonal changes and an occasional significant departure Figure 23b. The outlier values in surface water-sourced sites may be due to the infiltration of contaminants into the pipe network.

The EC of the groundwater (boreholes and well fields) varied between 400 and 700 μS/cm. The shallow aquifers generally showed a lower EC than the deeper aquifers Figure

23. The two surface water reservoirs showed EC values ranging between 100 and 170 μS/cm, which were low in the rainy summer (June–September) and high in the dry winter (October–May). The cold springs supplying the northern part of the city showed an EC value that ranged from 40 to 70 μS/cm.

4.6 Groundwater contour map of the study area

Hydraulic head patterns can be used to identify groundwater flow paths (Bresciani *et al.*, 2018). There are several ways the shape of the hydraulic head contours can be examined to investigate the relationship between the groundwater and surface water features. Besides the powerful use of radon as groundwater tracers, one of the analyses is by looking at the shape of the hydraulic head contours adjacent to a river to identify losing and gaining river conditions. Besides, widely spaced hydraulic head contours indicate the focused recharge area due to highly permeable formation (Bresciani *et al.*, 2018).

Accordingly, the hydraulic head contours constructed using ArcMap 10.8 software with groundwater level data records from more than 330 wells show the groundwater flows from the Northern and Eastern escarpments towards the rift.

There may be uncertainties in the piezometric map Figure 19 constructed from unevenly distributed water wells. However, some conclusions can be drawn from the figure. Groundwater contours show a flow pattern following the general topography. The hydraulic gradient is high in most parts of the area. However, the wider curvature of the head contour (low hydraulic gradient) observed at Ada'a and Akaki is an indication of local recharge Figure 19 and results from the high hydraulic conductivity of the quaternary basalts underlying the areas. The wider hydraulic head contour map shows that the Akaki and Ada'a areas become locally recharged by highly permeable formation mirroring the evidence from the EC and the isotopic composition. The convergence of contours to the streams in the highland areas (around Addis Ababa) reveals groundwater discharging into the streams.

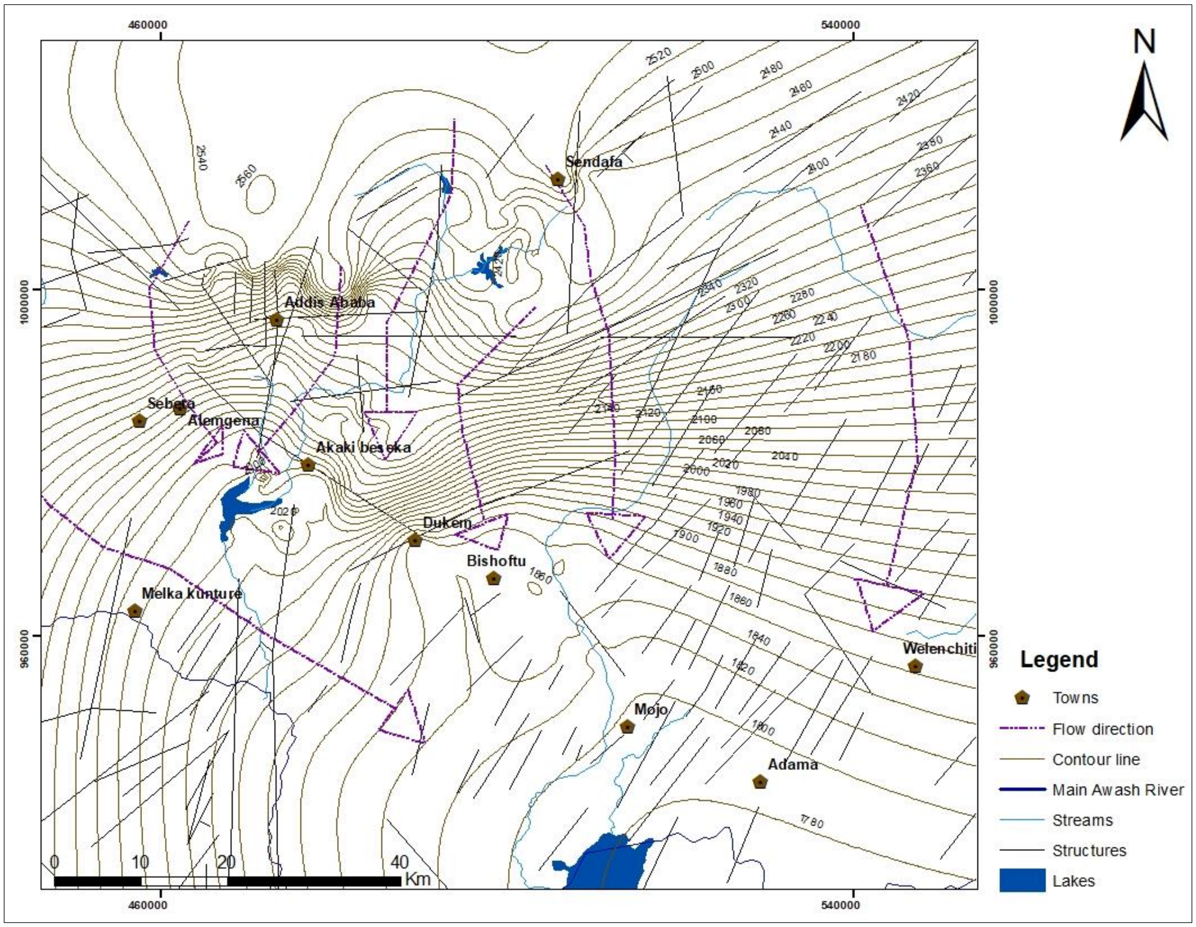


Figure 19: The groundwater contour map showing the wider hydraulic head contours at Akaki and Ada'a well-fields

5. Discussion

5.1 Occurrence of emerging organic contaminants and trace element

EOCs concentration and detection frequency is very high in rivers and shallow groundwater system of the Awash River basin, but very low in deep wells and surface water reservoirs. The disposal of industrial and municipal wastes without adequate treatment results in a higher number of emerging organic compounds in the Awash River samples Figure 7.

At Addis Ababa, tap water samples taken at Jemo-1 and Jemo-2 sites (the tap water is coming from shallow groundwater wells drilled within the condominium area) showed the impact of urbanization due to the dense population in the low-cost houses and the industries located nearby. Moreover, at Addis Ababa, the Paulos tap water sample sourced from the Gefersa reservoir is affected by pollutants from urban, industry, and agriculture. As this tap water is sourced from the Gefersa reservoir, it is expected to have the same organic compounds. However, the urban sources of organic compounds are observed due to the pipe network on the path from its source to the tap. At Addis Ababa, the Kotebe sample sourced from the shallow groundwater has only organic compounds sourced from agriculture. Given the area is residential currently; the detected organic compound from the agricultural source can be legacy pollution from agricultural applications, because the area has been agricultural land for many years. For the Bole tap water, only agricultural contaminants are observed as its source (Legedadi reservoir) comes from an upstream area surrounded by agricultural land Figure 7.

Comparing the concentration of EOCs, it can be seen that the Awash River in Adama has a very high concentration of emerging contaminants associated with industrial sources (31.34µ g/L), which is brought on by a number of industries located in the town of Adama. Similar to this, the factories in the immediate vicinity of Jemo area are also a potential source for the higher level of EOCs (22.2 µg/L) observed in the tap water at Jemo1. As evidenced by the concentration of EOCs predominately connected to urban sources in the remaining water samples collected from urbanized areas (shallow groundwater system and tap water) Figure 7. The Metehara sugar plantation may also be the source of agricultural EOCs, resulting in higher concentrations in the Awash River samples in the Metehara area and Awash town (downstream of Metehara) (Demissie and Gheewala, 2019).

Fluoride and Chloride concentrations are higher in deep groundwater systems due to geogenic sources (Tekle-haimanot *et al.*, 2006; Ayenew, 2008). Higher measurements were also recorded in rivers and shallow groundwater systems in major cities like Addis Ababa, Mojo, and Adama likely as a result of anthropogenic water pollution (Colombani *et al.*, 2018a). A recent study in Addis Ababa city also revealed anthropogenic sources of fluoride intake through food or drinks, which led to significantly raised concentration of fluoride in urine and in human slurry waste which was linked to higher concentrations of fluoride in the tributary streams of Awash River (Colombani *et al.*, 2018a).

Major cations and anions, and some heavy metals, decrease along the Awash River from Addis Ababa city towards downstream settlements, which may have been caused by dilution from several tributary streams Figure 9 and Figure 10. Other recent studies have shown that stream flows from the escarpment have relatively freshwater quality with low TDS value (Degefu., Lakew., Tigabu, 2013; Kebbede, 2016; Kassegne and Leta, 2020).

5.2 Spatial variation of emerging organic contaminants and heavy metals

The qualitative EOCs results in the Awash River show that there were more organic compounds found in the area downstream of Addis Ababa (n=23) compared to the area upstream of the capital (n=2, Figure 2), which is related to contamination from municipal and industrial waste discharged into the river in Addis Ababa and neighboring towns. The number of EOCs decreases beyond Aba Samuel Lake, likely due to the lake's attenuation effect for some EOCs.

Similarly, the Koka dam also served to attenuate organic compounds. Higher numbers of organic compounds are present in the Koka Dam inlet than at its outlet. Industrial wastes to the Mojo River contribute to the detection of a greater number of EOCs at the inlet of Koka dam, and declining of EOCs at the outlet of the dam is as a result of the attenuation effect of the dam due to the fact that the dams act as a trap for pollutants in the sediment that accumulated inside the reservoir (Watkins *et al.*, 2019; Maavara *et al.*, 2020) dilution and degradation may also play role.

The semi-quantitative result of EOCs reveals that from upstream to downstream of Awash River (Adama to Metehara towns), the overall number of emerging organic compounds appeared more or less similar, with observed variation in the sources of organic compounds (industrial, urban and agricultural). Organic compounds associated with industry decreased from Adama towards Metehara because more industries are located in Adama than downstream, while the impact of agricultural contaminants increases at Metehara, which is related to sugar plantations in Metehara. This impact of sugar plantation is also observed in the local shallow groundwater system in the Metehara area, in part due to the connection between surface and shallow groundwater systems (Kebede *et al.*, 2021; Hailu *et al.*, 2023).

With the exception of the low concentrations in the River Awash at Ginchi (Upstream of Addis Ababa) the concentration of heavy metals also displays a general decreasing pattern from upstream to downstream sites. The trend of heavy metal concentration and EOC results are similar; upstream locations (such as Addis Ababa and Akaki) are more heavily contaminated by anthropogenic pollutants than downstream areas. These overall trends broadly reflect the land use changes as you move down the catchment.

The concentration of heavy metals in the River Awash in the Mojo area is higher; this is likely due to the influence of industry in this region (the Mojo area is known for its extensive industries). Heavy metal concentrations then gradually decrease until Adama (the Adama sample was taken from the Awash River treatment plant, which provides drinking water for the Adama city). However, the higher concentration at Adama may be related to the chemicals used to treat the Awash River Figure 10a.

The number of detection of EOCs and other chemical parameters in the upper Awash River basin (upstream of the study area) is relatively higher than in the middle Awash River basin (downstream of the study area). This is likely linked to the expansion of urbanization and industries found in the upper Awash River sub-basin which dispose of waste without proper treatment, leading to surface water contamination (Dinka, Loiskandl and Ndambuki, 2015).

5.3 Surface and groundwater interactions and fate of anthropogenic pollutants

The similarity in emerging contaminant loads between the river and shallow groundwater is attributed to the strong connectivity between the two systems, as evidenced by enriched water isotope signatures Figure 12 and ^{222}Rn result Figure 16. Tap water samples from shallow groundwater sources also had high concentrations of emerging organic compounds as a result of surface-groundwater interactions. Because of its connection to extensively polluted surface water, the shallow groundwater system typically shows higher concentrations of anthropogenic pollution than the deep groundwater system. This has implications for the vulnerability of shallow groundwater sources, particularly those in hydraulic connection to rivers and suggests that there is minimal EOC attenuation within the shallow groundwater system in close proximity to rivers in alluvial plains; this is consistent with other studies in Africa and elsewhere (Sorensen *et al.*, 2015; Richards *et al.*, 2021)

The shallow groundwater in Akaki is considerably contaminated with organic pollutants from urban and industrial activities depicted in Figure 7. This contamination is more sever in the Akaki River and its adjacent shallow groundwater within the catchment area than in the downstream location of Adama and Metehara. The primary cause of this heighted pollution level is the disposals of waste from municipal and industrial sources in Addis Ababa city which exceeds that in the downstream areas. This situation leads to a direct exchange between the polluted surface water and the shallow groundwater system (Kebede *et al.*, 2021; Hailu *et al.*, 2023), further exacerbate the pollution problem.

The conceptual schematic diagram Figure 21 illustrates how urbanization and industry impact the sources of water supply and the flow of contaminants from upstream to downstream. The exchange of contaminants between surface and shallow groundwater system is verified by the converged evidence by the EOCs and ^{222}Rn values Figure 20.

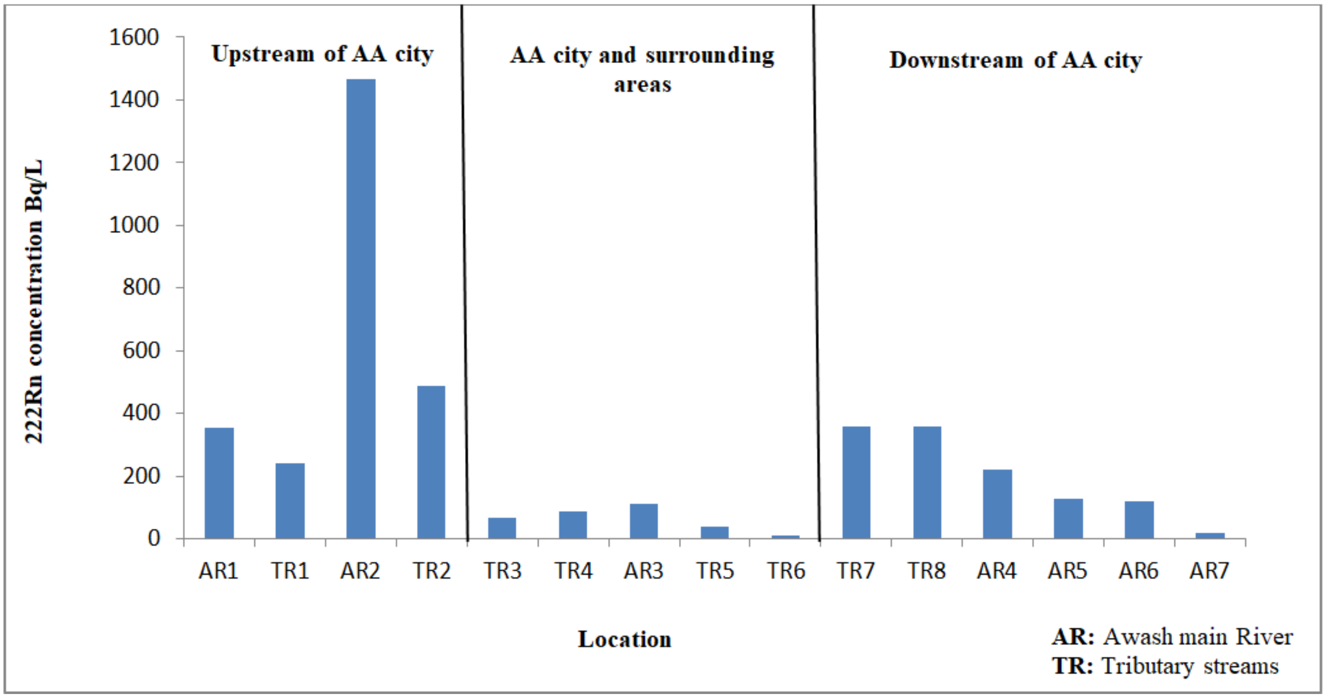


Figure 20: ^{222}Rn concentration in the main Awash River and its tributary streams from upstream towards downstream of the study area

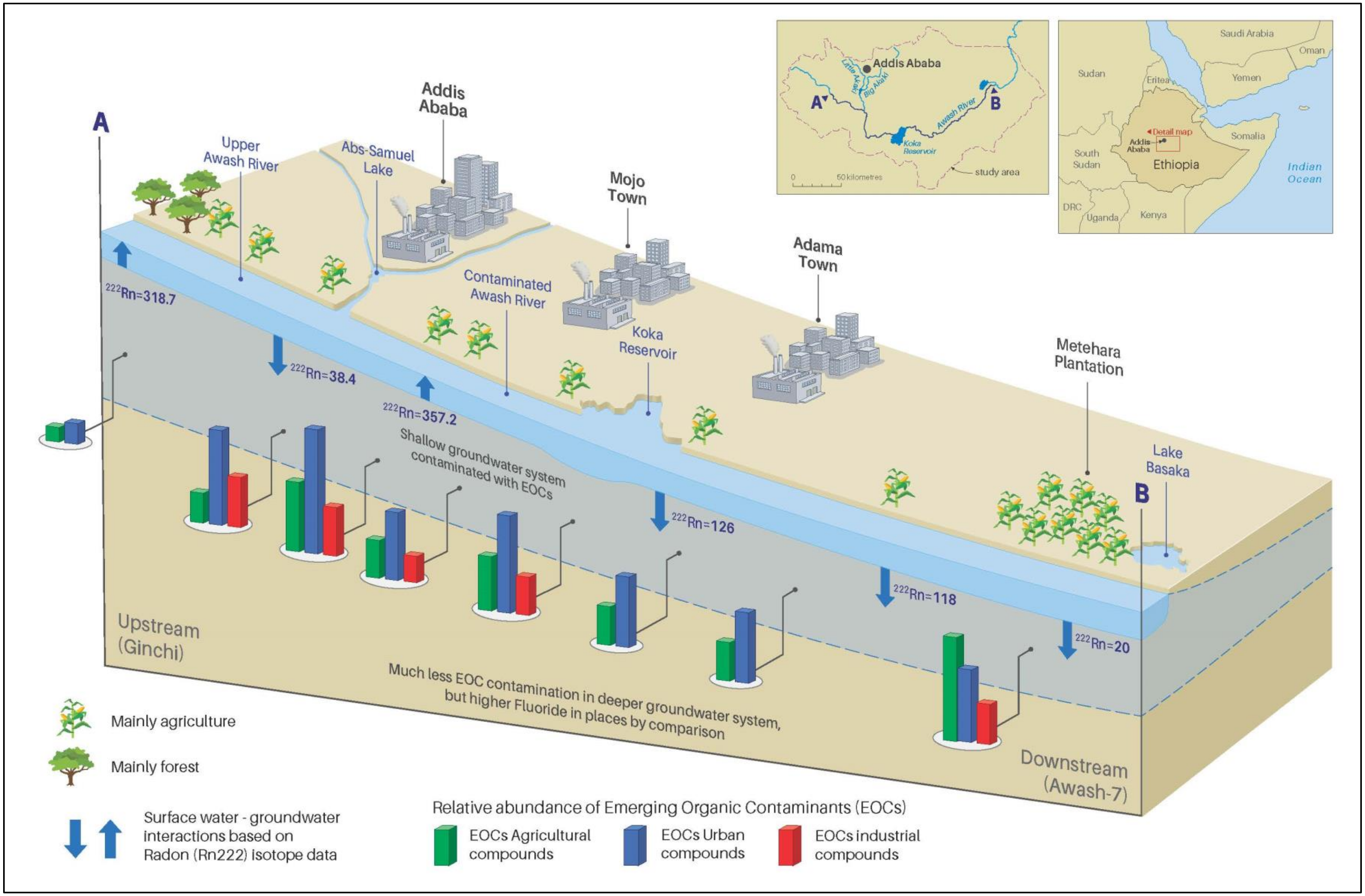


Figure 21: Conceptual diagram showing pollutions sources (urban, industrial, and agricultural), surface-groundwater interaction (indicated by and relative abundance of EOCs (credit: Kidist Hailu, Seifu Kebede, Behailu Birhanu and BGS © UKRI 2023).

5.4]The fate of emerging organic contaminants and heavy metals

Due to inappropriate industry and municipal waste disposals in Addis Ababa and its suburbs, the little and big Akaki Rivers are well known for being extremely polluted (Assegide *et al.*, 2022; Dessie *et al.*, 2022). Furthermore, the big and little Akaki Rivers converge directly at Aba Samuel Lake, which is where the significant concentration of contaminants are anticipated to be present (Yohannes and Elias, 2017; Assegide *et al.*, 2022; Dessie *et al.*, 2022). As a result, the number of EOCs, the heavy metal concentration and other chemical parameters like nitrate at the Aba Samuel Lake and at Big and little Akaki Rivers increased significantly Figure 7, Figure 9, and Figure 10.

Besides, artificial infrastructures (such as Koka Dam and Aba Samuel Lake) appear to act as places of attenuation for compounds sourced upstream. Higher numbers of EOCs are observed at little and Big Akaki River and Inlet of Ababa Samuel Lake, with the number of EOCs decline at the outlet of Ababa Samuel Lake. Similar pattern is observed at the inlet and outlet of Koka dam. Both infrastructures (Aba Samuel and Koka) have similar-impact on other chemical parameters including nitrates. The higher residence times of surface waters in the dams and physical-chemical and biochemical (sorption and degradation) process may act to reduce the concentrations and numbers of compounds detected at outlet points.

5.5 Groundwater flow dynamics

The stable isotope results of the research area taken from different well-fields located at highland, midland and lowland show that there may be more than one flow system in the region of each of the well-fields, not only one continuous regional groundwater flow connecting the highland recharge zones to the lowland discharging points (Ayenew, Demlie and Wohnlich, 2008; Kebede, Travi and Asrat, 2008; Yitbarek *et al.*, 2012b; Azagegn *et al.*, 2015a) Figure 1. But, rather dominated by a mix of both regional groundwater flow from the highlands and compartmentalized shallow groundwater aquifers replenished by local recharge evidenced by vertical profiling of electrical conductivity Figure 17.

The isotopic signature at Becho shows a depleted $^{2}H/^{18}O$ signature of both deep (No 7 in Table 1) and shallow (No 1 in Table 1) boreholes, indicating the Becho aquifer is connected to the regional groundwater flow system. The low EC value from the shallow to the deep groundwater system is also consistent with the depleted isotopes at Becho. Becho area is a flood plain characterized by thick silt and clay soils (5 to 15 m) (Kebede, 2013), which may impede local groundwater recharge. The involvement of local recharge contributing to the upland region seems insignificant.

The midland part of the investigated area (Legedadi, South Ayat, Addis Ababa, Akaki, and Ada'a (Bishoftu and Mojo area)) signifies a groundwater flow system of heterogeneous nature. The western side of Akaki and Addis Ababa city showed a more enriched $^{2}H/^{18}O$ signature Figure 22**Error! Reference source not found.**. This indicated that the aquifer is mainly recharged by local rains and streams. The isotopic signature of most of the boreholes drilled on the western side of Addis and Akaki is plotted close to the weighted mean isotopic composition of rainfall in Addis Ababa city Figure 22 signifying local recharge by rains and the streams.

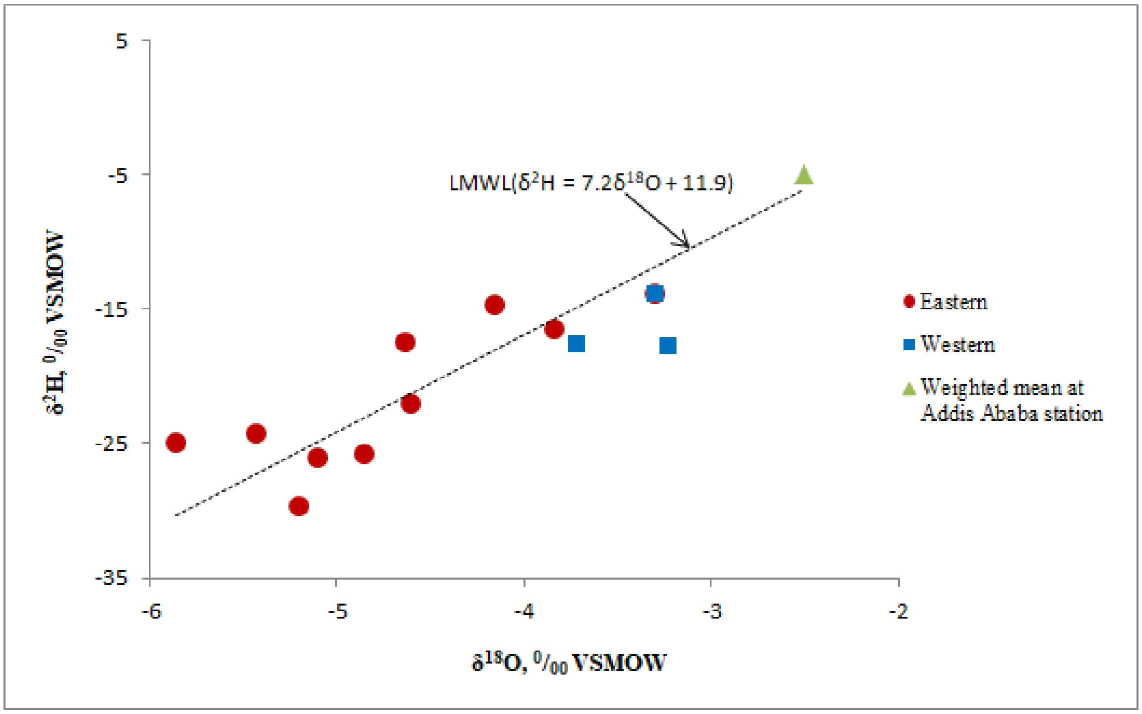


Figure 22: The δ18O-δ2H plot of the borehole samples taken from the eastern and western sides of Addis Ababa (AA) and Akaki

On the contrary, the boreholes drilled on the eastern side of Addis Ababa and Akaki portray a depleted $^{2}H/^{18}O$ signature Figure 22 as a result of structurally controlled regional groundwater flow characteristics(Kebede *et al.*, 2008). For instance, the high depletion in Legedadi and South Ayat (No 13 in Table 1) located on the East of Akaki shows that the recharge source is from the regional flow system.

The lower EC value at the deeper groundwater system (below 350 m depth) in Addis Ababa may reflect a lateral inflow of groundwater from the highlands through fractured bedrocks (could be connected with regional recharge source), while the upper groundwater system (above 350 m depth) following the natural trend of EC with depth could be recharged by a local source. This may be due to a distinct groundwater recharge source for the upper and lower aquifer system.

In the meantime, the relatively low average EC value recorded in Akaki area than in the upstream of it (Addis Ababa area) could be the result of a disconnected groundwater flow system from the plateau towards the rift.

Aquifers in Bishoftu show high $\delta^{18}O/\delta^{2}H$-values compared to the South Ayat, an area immediately North East of Bishoftu but separated by the large Yerer Trachyte dome. The difference in isotope pattern may indicate the disconnection between the two aquifer systems. The regional flow from the highland on the western side was revealed to be hindered by Trachytic domes forming local groundwater divides (Yitbarek, 2009).

The average EC value of boreholes at Ada'a entirely shows a signature of groundwater dilution (500 μS/cm) in all the groundwater systems regardless of depth. This shows the groundwater recharge is mainly from local sources. The stable isotopic signature of groundwater samples from the deep boreholes at Mojo in the Ada'a plain indicated low $\delta^{18}O/\delta^{2}H$-values. This implies that the Mojo aquifers are connected to recharge originating from the highlands as regional subsurface flow.

There are two distinct groundwater flow systems in the lowland Alliadege plain. The shallow boreholes' isotopic composition indicated high $\delta^{18}O/\delta^{2}H$-values (No 43 in Table 1), whereas the deep boreholes showed low δ-values (No 45 in Table 1). The high isotopic composition of shallow groundwater at Alliadege could be due to the mixing of the groundwater with the Awash River. The mix of the lower Awash River with the groundwater is manifested by the relatively high isotopic signature downstream at Alliadege. The isotopic signature of Awash River shows enriched $^{18}O/^{2}H$ (Kebede *et al.*, 2021). However, compared with the well-fields upstream (No 38 in Table 1), the deep groundwater system of the Alliadege plain shows high $\delta^{18}O/\delta^{2}H$-values (No 45 in Table 1). This could be related to the short distance travel of water from the adjacent escarpment. The relatively low EC value (1011 μS/cm) of the deep groundwater registered at Alliadege also confirms the low residence time. Our ^{222}Rn measurements proved that the lower Awash River is a losing river to the groundwater where Alliadege plain is located. The low ^{222}Rn concentrations (2000 Bq/m^{3}) in the downstream part of the main Awash River is an indication that the groundwater is recharged by the river. The head contours downstream of Awash River also showed a curvature pointing in the downstream direction due to the mounding induced by groundwater recharge from the Awash River.

Even though the deep groundwater portrays an isotopically enriched, unlike the depleted isotopic signature (No 19 in Table 1) on the eastern side of Addis Ababa and Akaki where the deeper system is connected to the continuous regional flow from the plateau, and the deep groundwater at Alliadege is comparatively enriched (No 45 in Table 1).

Besides, the EC measurements of the lowland at Alliadege show a decreasing pattern with depth. The higher EC (1533 μS/cm) at shallow depth is due to leaching from the top layer (alluvial lacustrine deposit). The deeper groundwater showed lower EC values (1011 μS/cm). The low EC and relatively enriched isotopes reflect the groundwater may not travel a long distance, but rather recharged by very close recharge zones from the adjacent escarpments. Had the lowland deeper groundwater system been recharged from the regional groundwater flow, the EC measurements would have resulted in higher EC as a result of long-distance travel and high residence time. (Kebede, 2013) has also confirmed that the shallow groundwater in this region is recharged by seepage from the Awash River and the subsurface inflow from adjacent highlands

5.6 Groundwater recharge zone protection

The isotope analyses and EC measurements proved that the investigated area is characterized by both shallow groundwater systems fed by local recharge sources and deep systems connected to the regional flow from the plateau. The shallow groundwater systems (i.e., Addis Ababa, Akaki, Ada'a (Bishoftu, Mojo)) are located where the land use and land cover are dominantly urban settlements and industrial zones. The conversion of farmlands and shrub-lands to high urbanization and industrialization is also noticed in the past couple of decades (Tadese *et al.*, 2020)

Addis Ababa city and Akaki areas are highly polluted areas due to poor waste management practices from urban and industrial sources (Yohannes and Elias, 2017). This poor waste management practice leads to the contamination of shallow groundwater points by anthropogenic pollutants. The pollution is manifested by higher EC of shallow boreholes at Addis Ababa pocket wells (884 μS/cm) and Akaki (837 μS/cm). The potential conversion of farm-lands to urban settlements and industrial zones in the Ada'a plain (Bishoftu and Mojo areas) poses a threat to the shallow groundwater resources.

5.7 Implications for water resource management and climate resilience

The impact of drought on groundwater security has received much less attention (Calow *et al.*, 2010). However, climate variability and the change influences groundwater systems (MacDonald and Calow, 2009; Taylor *et al.*, 2013). According to (Lapworth *et al.*, 2013), shallow aquifers containing young groundwater are most susceptible to inter-annual climate variability whereas older water is resilient to current climate change. (Macdonald *et al.*, 2019) also stated relatively deeper (boreholes) are more climate-resilient than the shallow (springs and hand-dug wells) groundwater systems.

In this study, both EC measurements with vertical profiling of depth and systematically taken isotope samples from the well-fields aligned along the upland to the lowland areas were used to distinguish the shallow and deep groundwater systems. The shallow groundwater systems in most of the area are dependent on local recharge sources and the deep systems are recharged by groundwater transfer from the highland. The scale of groundwater recharge is very important to characterize the resilience of groundwater supplies to both increased abstraction and climate change (Macdonald *et al.*, 2021).

Especially in the hotspot areas (Addis Ababa, Akaki, and Adaa) where there is high groundwater abstraction for domestic and industrial uses (Birhanu *et al.*, 2021), both shallow and deep systems supply the ever-increasing demand. The shallow groundwater systems are evidenced by enriched isotopic signals at Addis Ababa (No 20 in Table 1), Akaki (No 26 in Table 1), and Adaa plain (No 33 in Table 1).

According to (Demlie *et al.*, 2007), a groundwater level decline has already been observed in the Akaki well-field. Since the shallow systems are more vulnerable to climate change and variability (Lapworth *et al.*, 2013; Taylor *et al.*, 2013), more stress may be imposed on the groundwater supply sources for the major urban settlements and industries in the future.

5.8 EC, $\delta^{18}O$–$\delta^{2}H$, and ^{222}Rn as tracers of the water source in the pipe network

EC, $\delta^{18}O$–$\delta^{2}H$, and ^{222}Rn effectively distinguished tap water sources. The tracers could also show the presence of locally injected borehole water in otherwise surface water-dominated pipe networks. In the groundwater-sourced suburbs, the tap water showed a generally depleted $\delta^{18}O$, a high EC, and a measurable amount of ^{222}Rn. The taps connected to shallow boreholes show an enriched $\delta^{18}O$, compared to the deep groundwater-sourced taps. The tap waters sourced from surface water reservoirs show a relatively enriched $\delta^{18}O$, a low EC, and a ^{222}Rn content that was below detection (<30 Bq/m3). This work reveals that such tracers can effectively is criminate the water sources in pipe networks offering the opportunity to use the tracers as complementary tools in urban pipe system water quality monitoring studies and monitoring design.

5.9 ^{222}Rn as a water residence time indicator

Urban water engineers conventionally use chlorine-based decay equations or hydraulic models to estimate the water residence time. Chlorine-based pipe water residence time computations are prone to error because of the non-conservative nature of chlorine. Depending on the water temperature and the initial concentration, chlorine interacts with the pipe wall and leads to a non-constant decay rate, which adds errors to the residence time computations (Tinker *et al.*, 2009; Bhadula *et al.*, 2021; Geng *et al.*, 2022).

One of the important findings of the current research is that ^{222}Rn can be used as a potential tracer to determine the residence time of pipe water, potentially complementing chlorine decay or hydraulic model-based estimations. The advantages of ^{222}Rn include its non-reactive nature and its half-life, which is within the usual water residence time in urban pipe networks. We propose the simple radioactivity equation (Equation 1: modified from http://www-naweb.iaea.org/napc/ih/documents/global_cycle/vol%20i/cht_i_06.pdf to estimate the residence time.

$$^{222}Rn_t = {}^{222}Rn_o e^{-\lambda t}$$

Where $^{222}Rn_t$ is the composition at the downstream end of the pipe network, ^{222}Rno is the initial concentration of ^{222}Rn at the point of entry in the upstream location λ is radon decay constant and is 0.181/day, and t is the time it takes for the water (residence time) to flow from the upstream entry point to the downstream point.

The disadvantage of ^{222}Rn may be its loss to degassing in the pipe network if there are storage reservoirs between the two ends of the pipe for which the residence time estimation is required. Degassing may lead to a loss of ^{222}Rn, and it may thus overestimate the residence time if Equation 1 is to be used. The residence time may be estimated easily under conditions where degassing is negligible. Degassing may be negligible if a large volume of water flows through the pipes daily and if the number of secondary reservoirs is limited. Furthermore, substantial infiltration and exfiltration of air into and from the pipe network can also alter the ^{222}Rn content, which may lead to an overestimation of residence time. Assuming that there is no loss by degassing, no addition of new water into the pipe network, and insignificant infiltration and exfiltration of air, the age equation (Equation 1) can easily be used to compute the residence time.

For our study, it was unrealistic to assume that degassing in the pipe network was negligible if the entire network was considered. Thus, instead of computing the residence time across the entire pipe network, we isolated a specific pipe section with a known pipe layout with no storage to estimate the residence time of water flow from the upstream end to the downstream point. We selected six different transects connecting the upstream and downstream points. The pipe transects along which the age determination has been computed are shown in Figure 15c (transects a–a′, a–b, b–b′, c–c′, d–d′, and e–e′). We took the ^{222}Rn in the upstream and downstream sites as $^{222}Rn_o$ and $^{222}Rn_t$, respectively, and computed the residence time between the two sites.

A quick look into the ^{222}Rn pattern observed in the groundwater-sourced suburbs Figure 15c shows a generally declining trend as one moves into the city center from the well-fields in the southern and south-western parts of the city. The residence time estimated by using Equation 12 along the selected transect and the salient features of the selected pipe transect, are presented in **Table 4**. We do not have independent sources of evidence to validate the estimation. The Addis Ababa Urban Water Utility estimates that 3 days is the mean residence time of water in the entire pipe network (Personal communication), which suggests the reasonability of the estimates made for the selected pipe section. Apart along section a–a′, there is a good correlation (R2 = 0.75) between the mean residence time and the length of the pipe, which further confirms the reasonableness of the ^{222}Rn-based estimates.

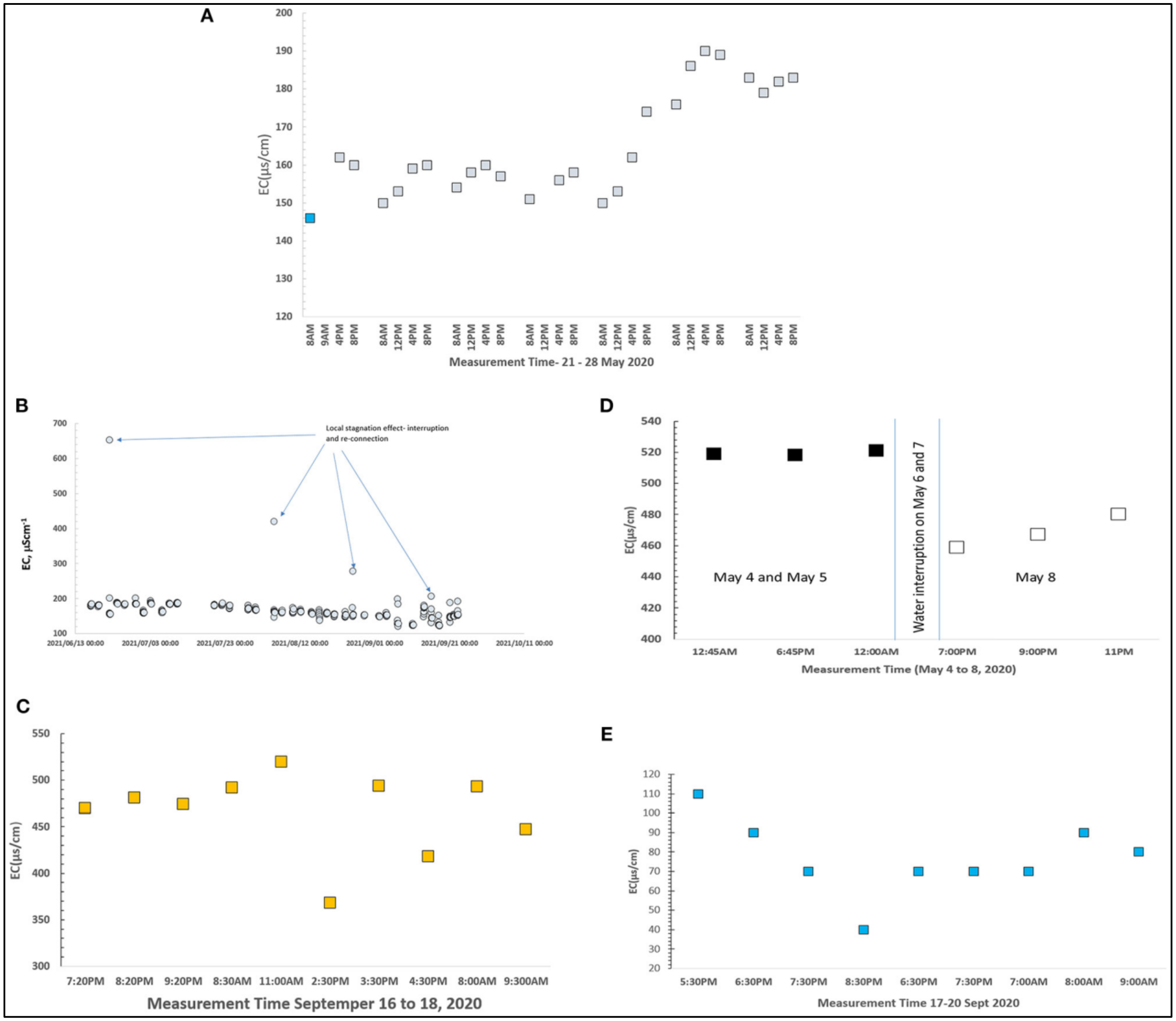


Figure 23: EC variation at sites RS1 (A), RS2 (B), BH2 (C), BH1 (D), and SP1 (E). The timing of the measurement of the EC values are given, along with the figures

5.10 Stability of the piper water composition

Using EC as an index of the water quality, we demonstrated that all the tap water showed a significant temporal variation, which potentially implies a temporal chemistry variation in the water. The variations has been observed on an hourly, daily, weekly, and seasonal time scale. Groundwater-sourced sites showed the highest temporal variations compared to surface-water and reservoir-sourced sites. Erratic changes in the EC of the water were noted in the surface water-sourced sub-city. These erratic variations are most likely attributed to stagnation and the infiltration of contaminated water into the pipe network following pipe water interruptions. The snapshot survey demonstrates that the chemical composition of tap water varies in response to the water sources. It also demonstrates that the spot water samples may not represent the long-term water quality properties of tap water. Solitary borehole-sourced tap water showed the highest degree of quality fluctuation. The stoppage of boreholes as a result of power outages was the primary cause of water quality fluctuation in borehole-sourced sites. Surface water-sourced tap waters also showed water quality fluctuations in response to diurnal variations in the temperature, water interruptions, and the infiltration of ambient contaminated water into the pipes.

Table 4: ^{222}Rn based residence time estimation for the selected section of pipes in Addis Ababa.

Transect in Figure 3C	**R_0 (Bq/m^3)**	**R_t (Bq/m^3)**	**Pipe length (km)**	**Estimated residence time (days)**
a-a’	1.250±122	441±68	2.2	5.72
a-b	1.250±122	412±66	6.7	6.10
b-b’	412±66	179±48	7.2	4.56
e-e’	1.064±111	799±99	4.5	1.57
e’-f	799±99	666±91	1.2	1.00

5.11 Management implication

Environmental tracers have been proven to be an effective tool for back-tracking the origins of tap water and for providing supplementary information on the residence time of pipe water. Back-tracking the tap water to its source should provide important supplementary information for managing the water quality risks. The temporal monitoring of tap water shows the presence of unstable water quality at multiple time scales. The water quality of the monitored sites, at any given time, is not only the result of the composition of the source water but it is also affected by the mixing of water sources, the degree of pumping, the water-flow interruptions, stoppages, the reconnection of borehole pumps, etc. The instability in the composition of pipe water reveals the need to consider these variations in the design of urban water quality monitoring. The National guideline determines the number and frequency of monitoring based on the population density. The current work demonstrates that monthly sampling may not effectively capture water quality variations. More frequent monitoring may be needed in cities supplied by solitary boreholes. Monitoring the water quality also needs to be done following water interruptions, as an interruption may lead to compositional changes due to the infiltration of extraneous substances into the pipe network. In addition to the known water quality degraders, such as a high residence time and negative pressure in the pipe network, the current work demonstrates that the urban pipe water quality may be tied to the urban energy supply, as water quality changes can happen in response to borehole stoppages and reconnection as a result of electricity cuts.

6. Conclusion and recommendation

6.1 Conclusion

The main objective of this research is to characterize EOCs in the water supply sources (boreholes, river, and surface water reservoirs) and tap water in the upper and middle Awash River sub-basins. Hydro-chemical parameters are used to validate the water quality status. Environmental isotopes of ^{2}H, ^{18}O, and ^{222}Rn were applied to track the exchange of contaminants between surface and groundwater systems. Groundwater dynamics using EC and temperature were applied to understand the fate of contaminants along the flow path.

More than 100 emerging organic compounds were detected in all water sources (Awash River, tap water, and surface water reservoirs, shallow and deep groundwater). High EOCs are detected in the river and shallow groundwater systems and tap water originated from shallow groundwater systems than the deep groundwater system. The shallow groundwater system is polluted due to the direct connection with the river which is highly contaminated with anthropogenic contaminants from municipalities, industries, and agriculture. The analysis of hydro-chemical parameters (major ions and heavy metals) concentration also follows the same pattern as the EOCs, showing that the shallow groundwater system is more contaminated than the deep groundwater system and that this exchange of contaminants between surface and groundwater system is confirmed by the environmental isotope analysis.

Due to the increasing urban population and buildup of industries, the upper Awash River sub basin is more contaminated than the Middle Awash River sub basin. Conversely, contamination from agricultural uses is more frequently seen downstream as a result of extensive Metehara plantation in the middle Awash River sub basin. The Koka dam and Aba Samuel Lake seem to serve as points of pollution attenuation.-Due to the artificial infrastructures, the downstream of the area is relatively less contaminated than the upstream.

The groundwater flow systems characterized based on recorded vertical profiling of EC and Temperature with depth in 2 meters interval. We have systematically organized the isotope samples taken from shallow (<150m), intermediate (150-300m), and deep (>300m) groundwater drilling depths at upland (Becho area), midland (Addis Ababa, Akaki, Bishofu, Mojo), and lowland (Alliadege plain) regions of the upper and middle Awash River sub-basins. Dry and wet season's ^{222}Rn in situ measurements and piezometric evidence were also used to supplement the EC-Temperature and analysis of isotopes of water molecules ($\delta^{18}O$, $\delta^{2}H$).

The converging evidence from the multiple methodological approaches show that the Awash River cannot simply be represented by a singular and continuous flow system connecting the highland recharge zones to the lowland discharging points. Rather, the groundwater flow system is characterized by a spectrum of flow systems including i. both shallow and deep aquifers dominantly recharged by the regional groundwater flow from the plateau (Becho area), ii. Aquifers, where the shallow systems are compartmentalized (largely recharged by local sources), and the deep systems, are connected to the regional groundwater flow (Legedadi, eastern side of Addis Ababa and Akaki), iii. Deep groundwater systems recharged by the adjacent escarpments (Alliadage plain). As was shown by enriched isotopic signals and piezometric evidence, the shallow groundwater system at Alliadege is recharged by the Awash River.

This study is strong evidence that environmental tracers (18-Oxygen, Deuterium, ^{222}Radon) and hydro-chemical proxies (EC, Temp) are very powerful tools for groundwater flow characterization of complex geological and hydrogeological settings.

Environmental tracers, such as water isotopes ($\delta^{18}O$–$\delta^{2}H$), radon (^{222}Rn), and Electrical conductivity (EC), used for backtracking the sources of water, for estimating the residence time of water and for monitoring the instability of the water quality in an urban pipe network. The tracers have effectively discriminated between surface water sourced pipe water from those sourced from groundwater. The groundwater-sourced sites have been further discriminated into shallow groundwater vs. deep groundwater. The use of the ^{222}Rn decay equation provided reasonable age values for the selected known sections of the pipe. To avoid complications from unaccounted radon rise, storage, and sink, we have isolated a specific pipe section with a known pipe layout with no storage, rise, and sink in order to estimate the residence time of water flow from the upstream end to the downstream point.

We established that groundwater was the predominant water source for the c the southern part of the Addis Ababa city. In contrast, surface water sources dominated the northern part of the city. By using EC and ^{222}Rn, the presence of water originating from solitary boreholes was identified in the surface water dominated pipe network in the northern part of the city. Water residence time varied from a few hours to 1–6 days. Surface water sourced (reservoir) pipe networks show a seasonal trend and have relatively high water quality stability, except when it shows outlier values following pipe water interruptions and reconnections. Small diurnal variations in chemistry are noted for the surface water sourced networks. Solitary borehole-sourced pipe waters show a high water quality variation, probably in response to the degree of pumping and pump stoppages and restarts, following electricity disruptions. This reveals the potential link between the energy supply and water quality in urban settings.

6.2 Recommendation

The characterization of EOCs in the water supply sources revealed new organic contaminant concentration with potential health implications in the water supply sources that have not been previously tested. The contaminants may be associated with hazardous substances for the environment and human health.

Therefore, assessing the health effect of EOCs is important for regulating water quality. Moreover, many self-supplied water sources are being used in the Awash River basin due to the rising demand for water that only consider safe water in customary hydro-chemical parameters. However, this research reveals how it’s crucial to raise awareness on these emerging organic contaminants. Additional samples for emerging contaminant analysis with seasonal variation will help to identify more organic compounds and be used to understand the seasonal variability impact on loads of EOCs. Furthermore, it will be helpful to collect a samples at the inlet, inside and outlet of the dam (Aba Samuel and Koka dam) and analyze the concentration of the organic compounds to clearly demonstrate how the concentration of organic compounds are affected by the infrastructure due to sedimentation in the dam.

Except for the upland (Becho area), and deep groundwater systems in the midland and lowland, most of the shallow groundwater prospect sites in the investigated area are recharged by local sources. These important local recharge zones such as Addis Ababa pocket wells, Akaki well-fields, and Ada’a plain are located in highly urbanized and where there is an expansion of industrial zones. Since these well-fields are the water supply sources of major settlements and industries in the region, the highest attention should be given to protecting the groundwater resources from potential contamination.

There is an intensive exploration of the groundwater in the upper Awash to supply the increasing population growth and industrial demands. Deep groundwater drilled has been done for irrigation abstraction. This tendency of exploiting more and more of the groundwater resource is based on the idea that there is more water coming from the plateau in addition to the local recharge sources. This being one side of the reality, enough care should be taken regarding the practice which may lead to unsustainable groundwater abstraction. Anecdotal evidence showed that there is already a sign of groundwater decline in the most important well-field supplying Addis Ababa city (Akaki well-field). Since the regions where the major urban settlements are located depend on shallow groundwater systems vulnerable to climate change and variability, mechanisms should be in place to develop climate-resilient urban water supply schemes.

The heterogeneity of the groundwater flow systems in the volcanic aquifers of central Ethiopia should be carefully noted to properly conceptualize and define the boundary conditions in the hydrological and hydrogeological models. In this study, both aquifers connected to the continuous flow from the plateau and locally recharged compartmentalized shallow aquifers are observed with noticeable variation in the shallow and deeper groundwater systems.

Since the nonreactive nature of ^{222}Rn and its half-life is suitable for the estimation of water residence time in the urban pipe network, the impact of (a) degassing of ^{222}Rn, (b) ingress of gasses into the pipe networks and, (c) radioactivity that may arise from the pipe wall, must be the target of future research. Sediment deposition inside pipe walls serving as a source of ^{222}Rn is the other complicating factor that needs further research.

1. References

AAWSA (2011) 'Groundwater Resources Development on Prospective Sites'.

Abebe, T. *et al.* (1998) 'The Yerer-Tullu Wellel volcanotectonic lineament: A transtensional structure in central Ethiopia and the associated magmatic activity', *Journal of African Earth Sciences*, 26(1), pp. 135–150. Available at: https://doi.org/10.1016/S0899-5362(97)00141-3.

Adeba, D. (2015) 'Assessment of water scarcity and its impacts on sustainable development in Awash basin , Ethiopia', *Sustainable Water Resources Management*, 1(1), pp. 71–87. Available at: https://doi.org/10.1007/s40899-015-0006-7.

Adeba, D., Kansal, M.L. and Sen, S. (2015) 'Assessment of water scarcity and its impacts on sustainable development in Awash basin, Ethiopia', *Sustainable Water Resources Management*, 1(1), pp. 71–87. Available at: https://doi.org/10.1007/s40899-015-0006-7.

Agunbiade, F.O. and Moodley, B. (2016) 'Occurrence and distribution pattern of acidic pharmaceuticals in surface water, wastewater, and sediment of the Msunduzi River, Kwazulu-Natal, South Africa', *Environmental Toxicology and Chemistry*, 35(1), pp. 36–46. Available at: https://doi.org/10.1002/etc.3144.

Ali, N., Sardar, K. and Ihsanullah, K. (2018) 'Human Health Risk Assessment Through Consumption of Organophosphate Pesticide - Contaminated Water of Peshawar', *Exposure and Health*, 10(4), pp. 259–272. Available at: https://doi.org/10.1007/s12403-017-0259-5.

Assegide, E. *et al.* (2022) 'Impacts of Surface Water Quality in the Awash River Basin, Ethiopia: A Systematic Review', *Frontiers in Water*, 3(March). Available at: https://doi.org/10.3389/frwa.2021.790900.

Ayenew, T. (2008) 'The distribution and hydrogeological controls of fluoride in the groundwater of central Ethiopian rift and adjacent highlands', *Environmental Geology*, 54(6), pp. 1313–1324. Available at: https://doi.org/10.1007/s00254-007-0914-4.

Ayenew, T., Demlie, M. and Wohnlich, S. (2008) 'Journal of African Earth Sciences Hydrogeological framework and occurrence of groundwater in the Ethiopian aquifers', 52, pp. 97–113. Available at: https://doi.org/10.1016/j.jafrearsci.2008.06.006.

Ayenew, T., Kebede, S. and Alemyahu, T. (2008) 'Environmental isotopes and hydrochemical study applied to surface water and groundwater interaction in the Awash River basin', *Hydrological Processes*, 22(10), pp. 1548–1563. Available at: https://doi.org/10.1002/hyp.6716.

Azagegn, T. *et al.* (2015a) 'Journal of African Earth Sciences Litho-structural control on interbasin groundwater transfer in central Ethiopia', *Journal of African Earth Sciences*, 101, pp. 383–395. Available at: https://doi.org/10.1016/j.jafrearsci.2014.10.008.

Azagegn, T. *et al.* (2015b) 'Litho-structural control on interbasin groundwater transfer in central Ethiopia', *Journal of African Earth Sciences*, 101, pp. 383–395. Available at: https://doi.org/10.1016/j.jafrearsci.2014.10.008.

Bai, X. *et al.* (2018) 'Chemosphere Occurrence , distribution , and seasonality of emerging contaminants in urban watersheds', *Chemosphere*, 200, pp. 133–142. Available at: https://doi.org/10.1016/j.chemosphere.2018.02.106.

Balakrishna, K. *et al.* (2017) ‘A review of the occurrence of pharmaceuticals and personal care products in Indian water bodies’, *Ecotoxicology and Environmental Safety*, 137(October 2016), pp. 113–120. Available at: https://doi.org/10.1016/j.ecoenv.2016.11.014.

Bayabil, H.K., Teshome, F.T. and Li, Y.C. (2022) ‘Emerging Contaminants in Soil and Water’, *Frontiers in Environmental Science*, 10(March), pp. 1–8. Available at: https://doi.org/10.3389/fenvs.2022.873499.

Bhadula, R.C. *et al.* (2021) ‘Ageing of pipe induced chlorine concentration decay: A one dimensional mass transfer modeling’, *Materials Today: Proceedings*, 46(xxxx), pp. 10761–10765. Available at: https://doi.org/10.1016/j.matpr.2021.01.670.

Birhanu, B. *et al.* (2021) ‘Impact of Natural and Anthropogenic Stresses on Surface and Groundwater Supply Sources of the Upper Awash Sub-Basin , Central’, 9(May). Available at: https://doi.org/10.3389/feart.2021.656726.

Bowen, G.J. *et al.* (2007) ‘Stable isotope ratios of tap water in the contiguous United States’, *Water Resources Research*, 43(3), pp. 1–12. Available at: https://doi.org/10.1029/2006WR005186.

Boyd, C. (2014) *Water Quality An Introduction Second Edition*. Available at: https://doi.org/1010079783319174464.

Bresciani, E. *et al.* (2018) ‘Using hydraulic head , chloride and electrical conductivity data to distinguish between mountain-front and mountain-block recharge to basin aquifers’, (2004), pp. 1629–1648.

Büyükuslu, H. *et al.* (2018) ‘Indoor and tap water radon (222Rn) concentration measurements at Giresun University campus areas’, *Applied Radiation and Isotopes*, 139, pp. 285–291. Available at: https://doi.org/10.1016/j.apradiso.2018.05.027.

Calow, R.C. *et al.* (2010) ‘Ground water security and drought in Africa: Linking availability, access, and demand’, *Ground Water*, 48(2), pp. 246–256. Available at: https://doi.org/10.1111/j.1745-6584.2009.00558.x.

Cartwright, I. *et al.* (2017) ‘A review of radioactive isotopes and other residence time tracers in understanding groundwater recharge : Possibilities , challenges , and limitations’, *Journal of Hydrology*, 555, pp. 797–811. Available at: https://doi.org/10.1016/j.jhydrol.2017.10.053.

Chavez, A., Davis, S.N. and Sorooshian, S. (1994) ‘Estimation of mountain front recharge to regional aquifers: 1. Development of an Analytical Hydroclimatic Model’, *Water Resources Research*, 30(7), pp. 2157–2167. Available at: https://doi.org/10.1029/93WR03369.

Cherry, F. and (1979) *Groundwater*.

Clark, I. (no date) *Groundwater Geochemistry and Isotopes*.

Colombani, N. *et al.* (2018a) ‘Assessment of the anthropogenic fluoride export in Addis Ababa urban environment (Ethiopia)’, *Journal of Geochemical Exploration*, 190(September 2017), pp. 390–399. Available at: https://doi.org/10.1016/j.gexplo.2018.04.008.

Colombani, N. *et al.* (2018b) ‘Assessment of the anthropogenic fluoride export in Addis Ababa urban environment (Ethiopia)’, *Journal of Geochemical Exploration*, 190(2017), pp. 390–399. Available at: https://doi.org/10.1016/j.gexplo.2018.04.008.

Cook, P.G., Land, C. and Osmond, G. (no date) ‘A GUIDE TO REGIONAL FLOW IN FRACTURED ROCK AQUIFERS’.

Cook, P.G., Wood, C. and White, T. (2008) 'Groundwater inflow to a shallow , poorly-mixed wetland estimated from a mass balance of radon', pp. 213–226. Available at: https://doi.org/10.1016/j.jhydrol.2008.03.016.

Damkjaer, K. *et al.* (2018) 'Occurrence, removal and risk assessment of steroid hormones in two wastewater stabilization pond systems in Morogoro, Tanzania', *Chemosphere*, 212, pp. 1142–1154. Available at: https://doi.org/10.1016/j.chemosphere.2018.08.053.

Dassi, L., Zouari, K. and Faye, S. (2005) 'Identifying sources of groundwater recharge in the Merguellil basin (Tunisia) using isotopic methods : implication of dam reservoir water accounting', pp. 114–123. Available at: https://doi.org/10.1007/s00254-005-0069-0.

Degefu., Lakew., Tigabu, T. (2013) 'THE WATER QUALITY DEGRADATION OF UPPER AWASH RIVER, ETHIOPIA *Fasil Degefu, Aschalew Lakew, Yared Tigabu and Kibru Teshome', 6(1), pp. 58–66.

Demissie, E. and Gheewala, S.H. (2019) 'Life cycle assessment of ethanol production from molasses in Ethiopia', *Journal of Sustainable Energy & Environment*, 10, pp. 1–7.

Demlie, M. *et al.* (2007) 'Groundwater recharge in the Akaki catchment , central Ethiopia : evidence from environmental isotopes (d 18 O , d 2 H and 3 H) and chloride mass balance', 818(October 2006), pp. 807–818. Available at: https://doi.org/10.1002/hyp.

Demlie, M., Wohnlich, S. and Ayenew, T. (2008) 'Major ion hydrochemistry and environmental isotope signatures as a tool in assessing groundwater occurrence and its dynamics in a fractured volcanic aquifer system located within a heavily urbanized catchment , central Ethiopia', pp. 175–188. Available at: https://doi.org/10.1016/j.jhydrol.2008.02.009.

Dessie, B.K. *et al.* (2022) 'Physicochemical characterization and heavy metals analysis from industrial discharges in Upper Awash River Basin, Ethiopia', *Toxicology Reports*, 9(June), pp. 1297–1307. Available at: https://doi.org/10.1016/j.toxrep.2022.06.002.

Dimova, N.T. and Burnett, W.C. (2011) 'Evaluation of groundwater discharge into small lakes based on the temporal distribution of radon-222', *Limnology and Oceanography*, 56(2), pp. 486–494. Available at: https://doi.org/10.4319/lo.2011.56.2.0486.

Dinka, M.O., Loiskandl, W. and Ndambuki, J.M. (2015) 'Hydrochemical characterization of various surface water and groundwater resources available in Matahara areas, Fantalle Woreda of Oromiya region', *Journal of Hydrology: Regional Studies*, 3, pp. 444–456. Available at: https://doi.org/10.1016/j.ejrh.2015.02.007.

Edmunds, W.M., Carrillo-Rivera, J.J. and Cardona, A. (2002) 'Geochemical evolution of groundwater beneath Mexico City', *Journal of Hydrology*, 258(1–4), pp. 1–24. Available at: https://doi.org/10.1016/S0022-1694(01)00461-9.

Eliku, T. and Leta, S. (2018) 'Spatial and seasonal variation in physicochemical parameters and heavy metals in Awash River , Ethiopia', *Applied Water Science*, 8(6), pp. 1–13. Available at: https://doi.org/10.1007/s13201-018-0803-x.

Fetter, C.. (2014) *Hydrogeology, Applied Edition, Fourth*.

Fetter, C.W. (1992) *Contaminant hydrogeology*, *Contaminant hydrogeology*. Available at: https://doi.org/10.1016/0016-7037(93)90162-p.

Foster, S. *et al.* (2020) 'Securing the critical role of groundwater for the resilient water-supply of urban Africa', *Water Policy*, 22(1), pp. 121–132. Available at: https://doi.org/10.2166/wp.2020.177.

Freyer, K. *et al.* (no date) 'Determination of 222 Rn in Groundwater - Recent Applications for the Investigation of River Bank Infiltration Hochschule fur Technik und Wirtschaft Dresden', (8).

Galindo-miranda, J.M. *et al.* (2019) 'Occurrence of emerging contaminants in environmental surface waters and their analytical methodology – a review', pp. 1871–1884. Available at: https://doi.org/10.2166/ws.2019.087.

Gat, J.R. (1971) 'Comments on the Stable Isotope Method in Regional Groundwater Investigations', *Water Resources Research*, 7(4), pp. 980–993. Available at: https://doi.org/10.1029/WR007i004p00980.

Geng, B. *et al.* (2022) 'Control of maximum water age based on total chlorine decay in secondary water supply system', *Chemosphere*, 287(P2), p. 132198. Available at: https://doi.org/10.1016/j.chemosphere.2021.132198.

Gogoi, A. *et al.* (2018) 'Occurrence and Fate of Emerging Contaminants in Water Environment : A Review Groundwater for Sustainable Development Occurrence and fate of emerging contaminants in water environment : A review', *Groundwater for Sustainable Development*, 6(March), pp. 169–180. Available at: https://doi.org/10.1016/j.gsd.2017.12.009.

Gudissa, L. (2010) 'Analysis of Subsurface Contaminant Transport in', 10(7).

Gutentag, E.D. *et al.* (1984) 'Geohydrology of the High Plains Aquifer in Parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming.', *Geological Survey Professional Paper (United States)* [Preprint].

Hague, T. (2013) 'Issues Paper Water Governance Capacity Awash Basin , Central Ethiopia review on Content , Institutional , Relational layer', (April), pp. 1–18.

Hailu, K. *et al.* (2023) 'Regional groundwater flow system characterization of volcanic aquifers in upper Awash using multiple approaches , central Ethiopia volcanic aquifers in upper Awash using multiple approaches ', *Isotopes in Environmental and Health Studies*, pp. 1–21. Available at: https://doi.org/10.1080/10256016.2023.2222221.

Hem, J.D. (1985) 'Study and interpretation of the chemical characteristics of natural water.', *US Geological Survey Water-Supply Paper*, 2254.

Houtman, C.J. (2010) 'Emerging contaminants in surface waters and their relevance for the production of drinking water in Europe', 8168. Available at: https://doi.org/10.1080/1943815X.2010.511648.

Jameel, Y. *et al.* (1969) 'Water Resources Research', *JAWRA Journal of the American Water Resources Association*, 5(3), pp. 2–2. Available at: https://doi.org/10.1111/j.1752-1688.1969.tb04897.x.

Jesus, V. De *et al.* (2014) 'ScienceDirect Occurrence of pharmaceuticals in a water supply system and related human health risk assessment', 2, pp. 1–10. Available at: https://doi.org/10.1016/j.watres.2014.10.027.

K'oreje, K.O. *et al.* (2016) 'Occurrence patterns of pharmaceutical residues in wastewater, surface water and groundwater of Nairobi and Kisumu city, Kenya', *Chemosphere*, 149, pp. 238–244. Available at: https://doi.org/10.1016/j.chemosphere.2016.01.095.

Karroum, M. *et al.* (2017) 'Science of the Total Environment Geochemical processes controlling groundwater quality under semi arid environment : A case study in central Morocco', 609, pp. 1140–1151. Available at: https://doi.org/10.1016/j.scitotenv.2017.07.199.

Kassegne, A.B. and Leta, S. (2020) 'Assessment of physicochemical and bacteriological water quality of drinking water in Ankober district, Amhara region, Ethiopia', *Cogent Environmental Science*, 6(1). Available at: https://doi.org/10.1080/23311843.2020.1791461.

Kebbede (2016) 'The State of Freshwaters in Ethiopia', pp. 137–188. Available at: https://www.academia.edu/21567831/The_State_of_Freshwaters_in_Ethiopia.

Kebede, S. *et al.* (2008) 'Groundwater origin and flow along selected transects in Ethiopian rift volcanic aquifers', *Hydrogeology Journal*, 16(1), pp. 55–73. Available at: https://doi.org/10.1007/s10040-007-0210-0.

Kebede, S. (2013) *Groundwater in Ethiopia: Features, numbers and opportunities*. Available at: https://doi.org/10.1007/978-3-642-30391-3.

Kebede, S. *et al.* (2021) 'Regional-scale interactions between groundwater and surface water under changing aridity : evidence from the River Awash Basin , Ethiopia ABSTRACT', *Hydrological Sciences Journal*, 00(00), pp. 1–14. Available at: https://doi.org/10.1080/02626667.2021.1874613.

Kebede, S., Travi, Y. and Asrat, A. (2008) 'Groundwater origin and fl ow along selected transects in Ethiopian rift volcanic aquifers', pp. 55–73. Available at: https://doi.org/10.1007/s10040-007-0210-0.

Kebede, S., Travi, Y. and Stadler, S. (2010) 'Groundwaters of the Central Ethiopian Rift: Diagnostic trends in trace elements, δ18O and major elements', *Environmental Earth Sciences*, 61(8), pp. 1641–1655. Available at: https://doi.org/10.1007/s12665-010-0479-5.

Kebede, S. and Zewdu, S. (2019) 'Use of 222Rn and δ18O-δ2H isotopes in detecting the origin of water and in quantifying groundwater inflow rates in an alarmingly growing lake, Ethiopia', *Water (Switzerland)*, 11(12). Available at: https://doi.org/10.3390/w11122591.

Keraga, A., Kiflie, Z. and Nigussie, A. (2017) 'Evaluating water quality of Awash River using water quality index', (June 2018). Available at: https://doi.org/10.5897/IJWREE2017.0736.

Keraga, A.S., Kiflie, Z. and Engida, A.N. (2017) 'Spatial and temporal water quality dynamics of Awash River using multivariate statistical techniques', 11(November), pp. 565–577. Available at: https://doi.org/10.5897/AJEST2017.2353.

Kermia, A.E.B., Fouial-Djebbar, D. and Trari, M. (2016) 'Occurrence, fate and removal efficiencies of pharmaceuticals in wastewater treatment plants (WWTPs) discharging in the coastal environment of Algiers', *Comptes Rendus Chimie*, 19(8), pp. 963–970. Available at: https://doi.org/10.1016/j.crci.2016.05.005.

Khatri, N. and Tyagi, S. (2015) 'Influences of natural and anthropogenic factors on surface and groundwater quality in rural and urban areas', *Frontiers in Life Science*, 8(1), pp. 23–39. Available at: https://doi.org/10.1080/21553769.2014.933716.

Lapworth, D.J. *et al.* (2012) 'Emerging organic contaminants in groundwater: A review of sources, fate and occurrence', *Environmental Pollution*, 163, pp. 287–303. Available at: https://doi.org/10.1016/j.envpol.2011.12.034.

Lapworth, D.J. *et al.* (2013) 'Residence times of shallow groundwater in West Africa: Implications for hydrogeology and resilience to future changes in climate', *Hydrogeology Journal*, 21(3), pp. 673–686.

Available at: https://doi.org/10.1007/s10040-012-0925-4.

Lapworth, D.J. *et al.* (2018) ‘Deep urban groundwater vulnerability in India revealed through the use of emerging organic contaminants and residence time tracers *’, 240, pp. 938–949. Available at: https://doi.org/10.1016/j.envpol.2018.04.053.

Lapworth, D.J. *et al.* (2019) ‘Developing a groundwater watch list for substances of emerging concern : a European perspective Developing a groundwater watch list for substances of emerging concern : a European perspective’.

Li, P. (2016) ‘Groundwater Quality in Western China : Challenges and Paths Forward for Groundwater Quality Research in Western China’, *Exposure and Health*, 8(3), pp. 305–310. Available at: https://doi.org/10.1007/s12403-016-0210-1.

Maavara, T. *et al.* (2020) ‘River dam impacts on biogeochemical cycling’, *Nature Reviews Earth and Environment*, 1(2), pp. 103–116. Available at: https://doi.org/10.1038/s43017-019-0019-0.

Macdonald, A.M. *et al.* (2019) ‘Groundwater and resilience to drought in the Ethiopian highlands’, *Environmental Research Letters*, 14(9). Available at: https://doi.org/10.1088/1748-9326/ab282f.

Macdonald, A.M. *et al.* (2021) ‘Mapping groundwater recharge in Africa from ground observations and implications for water security OPEN ACCESS Mapping groundwater recharge in Africa from ground observations and implications for water security’.

MacDonald, A.M. and Calow, R.C. (2009) ‘Developing groundwater for secure rural water supplies in Africa’, *Desalination*, 248(1–3), pp. 546–556. Available at: https://doi.org/10.1016/j.desal.2008.05.100.

Mageshkumar, P. and Vennila, G. (2020) ‘Assessment of errors in water quality data using ion balancing methods - A case study from Cauvery River , South India’, 49(January), pp. 57–62.

Manning, A.H. and Solomon, D.K. (2003) ‘Using noble gases to investigate mountain-front recharge’, *Journal of Hydrology*, 275(3–4), pp. 194–207. Available at: https://doi.org/10.1016/S0022-1694(03)00043-X.

Manning, A.H. and Solomon, D.K. (2005) ‘An integrated environmental tracer approach to characterizing groundwater circulation in a mountain block’, *Water Resources Research*, 41(12), pp. 1–18. Available at: https://doi.org/10.1029/2005WR004178.

Mcgrane, S.J. (2016) ‘Impacts of urbanisation on hydrological and water quality dynamics , and urban water management : a review water management : a review’, *Hydrological Sciences Journal*, 61(13), pp. 2295–2311. Available at: https://doi.org/10.1080/02626667.2015.1128084.

Mechal, A. *et al.* (2017) ‘Dynamique de l’écoulement des eaux souterraines dans le système aquifère complexe du bassin de la Rivière Gidabo (Rift éthiopien): une approche multi-proxy’, *Hydrogeology Journal*, 25(2), pp. 519–538. Available at: https://doi.org/10.1007/s10040-016-1489-5.

Mohan, B. *et al.* (2019) ‘Science of the Total Environment Health and ecological risk assessment of emerging contaminants (pharmaceuticals , personal care products , and arti fi cial sweeteners) in surface and groundwater (drinking water) in the Ganges River’, 646, pp. 1459–1467. Available at: https://doi.org/10.1016/j.scitotenv.2018.07.235.

MoWR (2008) ‘Evaluation of Groundwater Resource potential of Ada’a-Becho Plains’, *Ministry Of Water Resources Water DAMS HPP WTP*, I(October), pp. 2–3.

MoWR (2011) *Ethiopia : Strategic Framework for Managed Groundwater Development. Federal Democratic Republic of Ethiopia, Ministry of Water Resources*.

Murray, Kyle E., Thomas, S.M. and Bodour, A.A. (2010) 'Prioritizing research for trace pollutants and emerging contaminants in the freshwater environment', *Environmental Pollution*, 158(12), pp. 3462–3471. Available at: https://doi.org/10.1016/j.envpol.2010.08.009.

Murray, Kyle E, Thomas, S.M. and Bodour, A.A. (2010) 'Prioritizing research for trace pollutants and emerging contaminants in the freshwater environment', *Environmental Pollution*, 158(12), pp. 3462–3471. Available at: https://doi.org/10.1016/j.envpol.2010.08.009.

Myers, A.C., Finnegan, P.J. and Breedlove, J.D. (1999) 'Analysis of Water-Level Data and Ground-Water Flow Modeling at Fort Riley , Kansas', (July).

Nagode, K. *et al.* (2022) 'Multi-Isotope Characterization of Water in the Water Supply System of the City of Ljubljana, Slovenia', *Water (Switzerland)*, 14(13), pp. 1–16. Available at: https://doi.org/10.3390/w14132064.

Ngumba, E., Gachanja, A. and Tuhkanen, T. (2016) 'Occurrence of selected antibiotics and antiretroviral drugs in Nairobi River Basin, Kenya', *Science of the Total Environment*, 539, pp. 206–213. Available at: https://doi.org/10.1016/j.scitotenv.2015.08.139.

Odendaal, C. *et al.* (2015) 'An LC-MS/MS based survey of contaminants of emerging concern in drinking water in South Africa', *South African Journal of Science*, 111(9–10), pp. 1–6. Available at: https://doi.org/10.17159/sajs.2015/20140401.

Pereira, L.C. *et al.* (2015) 'A perspective on the potential risks of emerging contaminants to human and environmental health', pp. 13800–13823. Available at: https://doi.org/10.1007/s11356-015-4896-6.

Praamsma, T. *et al.* (2009) 'Using stable isotopes and hydraulic head data to investigate groundwater recharge and discharge in a fractured rock aquifer', *Journal of Hydrology*, 366(1–4), pp. 35–45. Available at: https://doi.org/10.1016/j.jhydrol.2008.12.011.

Richards, L.A. *et al.* (2021) 'Emerging organic contaminants in groundwater under a rapidly developing city (Patna) in northern India dominated by high concentrations of lifestyle chemicals *', *Environmental Pollution*, 268, p. 115765. Available at: https://doi.org/10.1016/j.envpol.2020.115765.

Rimayi, C. *et al.* (2018) 'Contaminants of emerging concern in the Hartbeespoort Dam catchment and the uMngeni River estuary 2016 pollution incident, South Africa', *Science of the Total Environment*, 627, pp. 1008–1017. Available at: https://doi.org/10.1016/j.scitotenv.2018.01.263.

Rodriguez-Narvaez, O.M. *et al.* (2017) 'Treatment technologies for emerging contaminants in water: A review', *Chemical Engineering Journal*, 323, pp. 361–380. Available at: https://doi.org/10.1016/j.cej.2017.04.106.

Van Rooijen, D. and Taddesse, G. (2009) 'Urban sanitation and wastewater treatment in Addis Ababa in the Awash Basin, Ethiopia', *Water, Sanitation and Hygiene: Sustainable Development and Multisectoral Approaches - Proceedings of the 34th WEDC International Conference* [Preprint].

Sakura, Z.E.S.Y. and Aslam, M.A.M. (2005) 'The use of temperature , stable isotopes and water quality to determine the pattern and spatial extent of groundwater flow : Nagaoka area , Japan', pp. 650–651. Available at: https://doi.org/10.1007/s10040-005-0475-0.

Schaller, M.F. and Fan, Y. (2009) 'River basins as groundwater exporters and importers : Implications for water cycle and climate modeling', 114(February). Available at: https://doi.org/10.1029/2008JD010636.

Schmidt, A. *et al.* (2008) 'Continuous and discrete on-site detection of radon-222 in ground- and surface waters by means of an extraction module', *Applied Radiation and Isotopes*, 66(12), pp. 1939–1944. Available at: https://doi.org/10.1016/j.apradiso.2008.05.005.

Schubert, M. *et al.* (2008) 'In situ determination of radon in surface water bodies by means of a hydrophobic membrane tubing', 43, pp. 111–120. Available at: https://doi.org/10.1016/j.radmeas.2007.12.017.

Serre, N. and Karuppannan, S. (2018) 'Journal of African Earth Sciences Groundwater quality assessment using water quality index and GIS technique in Modjo River Basin , central Ethiopia', *Journal of African Earth Sciences*, 147(June), pp. 300–311. Available at: https://doi.org/10.1016/j.jafrearsci.2018.06.034.

Sonder, K. (2015) 'The Water of the Awash River Basin : a Future Challenge to Ethiopia', (January).

Sorensen, J.P.R. *et al.* (2015) 'Emerging contaminants in urban groundwater sources in Africa', *Water Research*, 72, pp. 51–63. Available at: https://doi.org/10.1016/j.watres.2014.08.002.

Stefanakis, A.I. (2017) 'A Review of Emerging Contaminants in Water ':, (December 2015). Available at: https://doi.org/10.4018/978-1-4666-9559-7.ch003.

Strydom, T. *et al.* (2021) 'The use of radon (Rn222) isotopes to detect groundwater discharge in streams draining table mountain group (tmg) aquifers', *Water SA*, 47(2), pp. 194–199. Available at: https://doi.org/10.17159/wsa/2021.v47.i2.10915.

Stuart, M.E. *et al.* (2014) 'Science of the Total Environment Fingerprinting groundwater pollution in catchments with contrasting contaminant sources using microorganic compounds', *Science of the Total Environment, The*, 468–469, pp. 564–577. Available at: https://doi.org/10.1016/j.scitotenv.2013.08.042.

Subedi, B. *et al.* (2015) 'A pilot study on the assessment of trace organic contaminants including pharmaceuticals and personal care products from on-site wastewater treatment systems along Skaneateles Lake in New York State, USA', *Water Research*, 72, pp. 28–39. Available at: https://doi.org/10.1016/j.watres.2014.10.049.

Taddese, G., Sonder, K. and Peden, D. (2003) 'The water of the Awash River Basin: A Future Challenge to Ethiopia.International Livestock Research Institute, Addis Ababa.', (January).

Tadese, M. *et al.* (2020) 'Mapping of land-use/land-cover changes and its dynamics in Awash River Basin using remote sensing and GIS', *Remote Sensing Applications: Society and Environment*, 19(July), p. 100352. Available at: https://doi.org/10.1016/j.rsase.2020.100352.

Tadesse, G., Peden, D. and McCornick, P. (2005) 'Extent and significant use of low quality water in agriculture: The case of Addis Ababa Catchments the upland of the Awash Basin', *Addis Ababa, Ethiopia*, pp. 1–12. Available at: http://www.iwmi.cgiar.org/Assessment/files/word/publications/Workshoppapers/ExtentSignificantUse.doc.

Taylor, R.G. *et al.* (2013) 'Ground water and climate change', *Nature Climate Change*, 3(4), pp. 322–329. Available at: https://doi.org/10.1038/nclimate1744.

Tekle-haimanot, R. *et al.* (2006) 'The geographic distribution of fluoride in surface and groundwater in Ethiopia with an emphasis on the Rift Valley', 367, pp. 182–190. Available at: https://doi.org/10.1016/j.scitotenv.2005.11.003.

Thabayneh, K.M. (2015) 'Measurement of 222Rn concentration levels in drinking water and the associated health effects in the Southern part of West bank - Palestine', *Applied Radiation and Isotopes*, 103, pp. 48–53. Available at: https://doi.org/10.1016/j.apradiso.2015.05.007.

Tinker, S.C. *et al.* (2009) 'Drinking water residence time in distribution networks and emergency department visits for gastrointestinal illness in Metro Atlanta, Georgia', *Journal of Water and Health*, 7(2), pp. 332–343. Available at: https://doi.org/10.2166/wh.2009.022.

Toth, J. (1962) 'A theory of groundwater motion in small drainage basins in central Alberta, Canada', *Journal of Geophysical Research*, 67(11), pp. 4375–4388.

USGS (2019) 'Chapter 6.3. Specific Conductance', *U.S. Geological Survey Techniques and Methods*, 2019(9-A6.3). Available at: https://doi.org/10.3133/tm9A6.3.

Wahi, A.K. *et al.* (2008) 'Geochemical Quantification of Semiarid Mountain Recharge', 46(3), pp. 414–425. Available at: https://doi.org/10.1111/j.1745-6584.2007.00413.x.

Wanda, E.M.M. *et al.* (2017) 'Occurrence of Emerging Micropollutants in Water Systems in Gauteng , Mpumalanga , and North West Provinces , South Africa', pp. 8–20. Available at: https://doi.org/10.3390/ijerph14010079.

Watkins, L. *et al.* (2019) 'The effect of dams on river transport of microplastic pollution', *Science of the Total Environment*, 664, pp. 834–840. Available at: https://doi.org/10.1016/j.scitotenv.2019.02.028.

White, D. *et al.* (2019) 'Tracking changes in the occurrence and source of pharmaceuticals within the River Thames , UK ; from source to sea *', *Environmental Pollution*, 249, pp. 257–266. Available at: https://doi.org/10.1016/j.envpol.2019.03.015.

Wilson, J.L. and Guan, H. (2004) 'Mountain-Block Hydrology and Mountain-Front Recharge *'.

Winter, T.C. *et al.* (1998) 'Ground Water U . S . Geological Survey Circular 1139'.

Xabadia, A., Esteban, E. and Martinez, Y. (2021) 'Contaminants of Emerging Concern : A Review of Biological and Economic Principles to Guide Water Management Policies', pp. 387–430. Available at: https://doi.org/10.1561/101.00000138.

Yitbarek (2009) 'Université de Poitiers ANDARGE YITBAREK BAYE Hydrogeological and hydrochemical framework of complex volcanic system in the Upper Awash River basin , Central Ethiopia : with special emphasis on inter-basins groundwater transfer between Blue Nile and Awash'.

Yitbarek, A. *et al.* (2012a) 'Hydrogeological and hydrochemical framework of Upper Awash River basin, Ethiopia: With special emphasis on inter-basins groundwater transfer between Blue Nile and Awash Rivers', *Journal of African Earth Sciences*, 65, pp. 46–60. Available at: https://doi.org/10.1016/j.jafrearsci.2012.01.002.

Yitbarek, A. *et al.* (2012b) 'Journal of African Earth Sciences Hydrogeological and hydrochemical framework of Upper Awash River basin , Ethiopia : With special emphasis on inter-basins groundwater transfer between Blue Nile and Awash Rivers', *Journal of African Earth Sciences*, 65, pp. 46–60. Available at: https://doi.org/10.1016/j.jafrearsci.2012.01.002.

Yohannes, H. and Elias, E. (2017) 'Contamination of Rivers and Water Reservoirs in and Around Addis Ababa City and Actions to Combat It'.

Youse, H. *et al.* (2018) 'Journal of African Earth Sciences Groundwater pollution potential evaluation in

Khorramabad-Lorestan Plain , western Iran', 147(December 2017), pp. 647–656. Available at: https://doi.org/10.1016/j.jafrearsci.2018.07.017.

Zlatanović, L., van der Hoek, J.P. and Vreeburg, J.H.G. (2017) 'An experimental study on the influence of water stagnation and temperature change on water quality in a full-scale domestic drinking water system', *Water Research*, 123, pp. 761–772. Available at: https://doi.org/10.1016/j.watres.2017.07.019.

Published articles

Journal of Hydrology: Regional Studies 54 (2024) 101869

Contents lists available at ScienceDirect

Journal of Hydrology: Regional Studies

journal homepage: www.elsevier.com/locate/ejrh

Tracing contaminants of emerging concern in the Awash River basin, Ethiopia

Kidist Hailu[a,*], Seifu Kebede[b], Behailu Birhanu[a], Dan Lapworth[c]

[a] *School of Earth Sciences, Addis Ababa University, Addis Ababa P O BOX 1176, Ethiopia*
[b] *Center for Water Resources Research, School of Agricultural Earth and Environmental Sciences, University of KwaZulu Natal, Pietermaritzburg 3201, South Africa*
[c] *British Geological Survey, Maclean Building, Crow marsh Gifford, Wallingford, Oxford shire OX10 8BB, UK*

A R T I C L E I N F O

Keywords:
Awash River Basin
Emerging contaminants
Environmental isotopes
Groundwater quality
Surface and groundwater interaction

A B S T R A C T

Study region: Awash River basin, Central Ethiopia

Study focus: The study focuses on characterization of Emerging Organic Contaminants (EOCs) in the Awash River basin. Characterization of the EOCs was supplemented by chemical analysis of samples from river, boreholes, tap water, and surface water reservoirs. Analyses of environmental isotopes (δ 2 H, δ 18 O, and 222Rn) were used to investigate the exchange of contaminants between surface and groundwater supply sources.

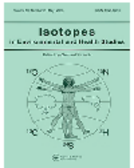
New hydrological insights for the region: More than 100 EOCs are identified in all water supply sources. The EOCs are linked to agricultural applications, urban, and industrial sources. Based on the analysis of chemical and environmental tracers, the deep groundwater has greater protection from contamination than the river and the shallow groundwater. The heavy metal analysis prevails the same. The shallow aquifers are affected by urban, industrial, and agricultural pollutants. Attributed to the different contaminant sources, distinct variations in terms of compound types were observed at different locations. Water supply sources located upstream are dominated by urban and industrial contaminants while compounds from agricultural applications dominate the downstream sites. Artificial infrastructures serve as attenuation points for urban and industrial sourced compounds. Characterization of EOCs showed new contaminant loads in the water supply sources, which haven't been tested before, with potential impact on human and wider environmental health, and may necessitate a revision of the customary water quality test and monitoring practices.

1. Introduction

The state of water quality (physical, chemical, and biological) has been continuously altered by natural and human activities (Chaudhry and Malik, 2017; Owa, 2013). Consequently, water quality deterioration has become one of the primary issues in the world (Adeba, 2015; Austin, 2010; Khatri and Tyagi, 2015; Li, 2016; Serre and Karuppannan, 2018; Youse et al., 2018). The most common human influence on water quality is the introduction of disease-causing chemicals and organisms due to industrialization and agricultural applications (fertilizers, manures, and pesticides) (Boyd, 2014; Khatri and Tyagi, 2015). However, in recent decades, emerging contaminants (natural and synthetic organic compounds) affecting freshwater quality have become a rising concern with adverse

* Corresponding author.
E-mail address: kidisthailut@gmail.com (K. Hailu).

https://doi.org/10.1016/j.ejrh.2024.101869
Received 12 December 2023; Received in revised form 10 June 2024; Accepted 13 June 2024
Available online 26 June 2024



Isotopes in Environmental and Health Studies

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/gieh20

Regional groundwater flow system characterization of volcanic aquifers in upper Awash using multiple approaches, central Ethiopia

Kidist Hailu, Behailu Birhanu, Tilahun Azagegn & Seifu Kebede

To cite this article: Kidist Hailu, Behailu Birhanu, Tilahun Azagegn & Seifu Kebede (2023): Regional groundwater flow system characterization of volcanic aquifers in upper Awash using multiple approaches, central Ethiopia, Isotopes in Environmental and Health Studies, DOI: 10.1080/10256016.2023.2222221

To link to this article: https://doi.org/10.1080/10256016.2023.2222221

Published online: 16 Jun 2023.

frontiers | Frontiers in Water

TYPE Community Case Study
PUBLISHED 13 March 2023
DOI 10.3389/frwa.2023.1066055

OPEN ACCESS

EDITED BY
Wan Hanna Melini Wan Mohtar,
Universiti Kebangsaan Malaysia, Malaysia

REVIEWED BY
Teh Sabariah Abd Manan,
Universiti Malaysia Terengganu, Malaysia
Nadeem Khan,
Jamia Millia Islamia, India

*CORRESPONDENCE
Seifu Kebede
KebedeGurmessa5@ukzn.ac.za

SPECIALTY SECTION
This article was submitted to
Water and Climate,
a section of the journal
Frontiers in Water

RECEIVED 10 October 2022
ACCEPTED 23 February 2023
PUBLISHED 13 March 2023

CITATION
Kebede S, Hailu K, Siraj A and Birhanu B (2023) Environmental isotopes ($\delta^{18}O$–$\delta^{2}H$, ^{222}Rn) and electrical conductivity in backtracking sources of urban pipe water, monitoring the stability of water quality and estimating pipe water residence time. *Front. Water* 5:1066055.
doi: 10.3389/frwa.2023.1066055

Environmental isotopes ($\delta^{18}O$–$\delta^{2}H$, ^{222}Rn) and electrical conductivity in backtracking sources of urban pipe water, monitoring the stability of water quality and estimating pipe water residence time

Seifu Kebede[1]*, Kidist Hailu[2], Abdulhafiz Siraj[2] and Behailu Birhanu[2]

[1]Center for Water Resources Research, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa, [2]School of Earth Sciences, Addis Ababa University, Addis Ababa, Ethiopia

This study demonstrates the use of environmental tracers (Water isotopes-$\delta^{18}O$–$\delta^{2}H$, Radon-^{222}Rn, and Electrical Conductivity-EC) as complementary tools for backtracking the water source, estimating pipe water residence time, and monitoring the instability of the water quality. Using the capital of Ethiopia, Addis Ababa, as a case study site, we demonstrate that water isotopes ($\delta^{18}O$ and$\delta^{2}H$) effectively backtrack the tap water to its source (springs, reservoirs, shallow aquifers, or deep aquifers). ^{222}Rn is shown to be effective for discriminating groundwater-sourced pipe networks from those that are dominated by surface waters. Our reconnaissance survey reveals that ^{222}Rn, a tracer previously not considered to determine the pipe water residence time, can be used effectively to determine pipe water residence time in groundwater-sourced pipe networks. We recommend further research to explore the capability of ^{222}Rn as a robust indicator of the pipe water residence time in an urban piped water network. The tracers reveal that 50% of the city obtains its water from groundwater and that the groundwater-sourced areas of the city show the highest water quality instability. The water quality in groundwater-sourced pipes varies depending on pumping stoppage owing to power interruptions. Surface water-sourced pipe water shows seasonal variations in water quality, with occasional large deviations from the normal trends following flow interruptions.

KEYWORDS
Isotopes ($\delta^{18}O$–$\delta^{2}H$), radon (^{222}Rn), tap water, residence time, water quality, backtracking

1. Introduction

Urban water managers need to track the water source in the pipe network and to monitor and modify its quality between the points of treatment and use. It is necessary to track the sources of tap water, as the associated quantity (e.g., water source depletion) and quality risks (e.g., source pollution) differ between the various sources (Wet et al., 2020). For example, groundwater is believed to be more resilient to short-term droughts and less

Appendix

Annex 1: Detected Emerging Organic compounds in water samples (Qualitative analysis)

Source of samples	Source of compounds	Sample site	Substance	Category
Awash main course	Agricultural	Teji	sulfamethoxazole	Veterinary drug; Antibiotic
			metalaxyl	Pesticide; Fungicide; Veterinary drug
		Aba Samuel	sulfamethoxazole	Veterinary drug; Antibiotic
			imidacloprid	Pesticide; Insecticide; Veterinary drug
			dimethoate	Pesticide; Insecticide
			propoxur	Pesticide; Insecticide
			pyroxsulam	Pesticide; Herbicide
		Adama treated	pyroxsulam	Pesticide; Herbicide
			metalaxyl	Pesticide; Fungicide; Veterinary drug
		Melkasa	sulfamethoxazole	Veterinary drug; Antibiotic
			imidacloprid	Pesticide; Insecticide; Veterinary drug
			pyroxsulam	Pesticide; Herbicide
	Urban	Ginchi	Cathine	Pharmaceuticals
		Teji	Paracetamol	Pharmaceuticals
		Aba samuel	Metformin	Pharmaceuticals
			Acesulfame	Artificial Sweetener (K salt)
			lamivudine	Pharmaceuticals
			cimetidine	H2-Blocker
			cathine	Pharmaceuticals
			lidocaine	Anesthetic; Antiarrhythmic
			tramadol	Equine drug; Potent analgesic
			bisphenol S	Endocrine disruptor
			10,11-dihydrocarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
			atazanavir	HIV protease inhibitor
			Paracetamol	Pharmaceuticals
			10-hydroxycarbazepine	Pharmaceuticals
			8-hydroxyefavirenz	Pharmaceuticals

Source of samples	Source of compounds	Sample site	Substance	Category
			diclofenac	Nonsteroidal anti-inflammatory drug
		Adama treated	Metformin	Pharmaceuticals
			Paracetamol	Pharmaceuticals
			bisphenol S	Endocrine disruptor
			10,11-dihydrocarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
		Melkasa	Carbamazepine	Equine drug; Anticonvulsant
			Metformin	Pharmaceuticals
			Paracetamol	Pharmaceuticals
			10,11-dihydrocarbazepine	Pharmaceuticals
	Industry	Ginchi	Triethylphosphate	Solvent, flame retardant
		Aba samuel	5-methylbenzotriazole	Corrosion inhibitor
			4-methylbenzotriazole	Corrosion inhibitor
			Triethylphosphate	Solvent, flame retardant
Tributary river to Awash	Agricultural	Big Akaki	sulfamethoxazole	Veterinary drug; Antibiotic
			dimethoate	Pesticide; Insecticide
			propoxur	Pesticide; Insecticide
			imidacloprid	Pesticide; Insecticide; Veterinary drug
			pyroxsulam	Pesticide; Herbicide
		little Akaki	sulfamethoxazole	Veterinary drug; Antibiotic
			propoxur	Pesticide; Insecticide
			Imidacloprid	Pesticide; Insecticide; Veterinary drug
			pyroxsulam	Pesticide; Herbicide
			dimethoate	Pesticide; Insecticide
		Mojo river	Imidacloprid	Pesticide; Insecticide; Veterinary drug
			metalaxyl	Pesticide; Fungicide; Veterinary drug
	Urban	Big Akaki	Metformin	Pharmaceuticals
			cimetidine	H2-Blocker
			cathine	Pharmaceuticals
			lidocaine	Anesthetic; Antiarrhythmic
			tramadol	Equine drug; Potent analgesic

Source of samples	Source of compounds	Sample site	Substance	Category
			10,11-dihydrocarbazepine	Pharmaceuticals
			10-hydroxycarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
			diclofenac	Nonsteroidal anti-inflammatory drug
			Acesulfame	Artificial Sweetener (K salt)
			paracetamol	Pharmaceuticals
			bisphenol S	Endocrine disruptor
			8-hydroxyefavirenz	Pharmaceuticals
			atazanavir	HIV protease inhibitor
		little Akaki	Cotinine	Stimulant drug
			pseudoephedrine	Pharmaceuticals
			Metformin	Pharmaceuticals
			acesulfame	Artificial Sweetener (K salt)
			lamivudine	Pharmaceuticals
			paracetamol	Pharmaceuticals
			cathine	Pharmaceuticals
			lidocaine	Anesthetic; Antiarrhythmic
			tramadol	Equine drug; Potent analgesic
			bisphenol S	Endocrine disruptor
			10,11-dihydrocarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
			8-hydroxyefavirenz	Pharmaceuticals
			atazanavir	HIV protease inhibitor
			10-hydroxycarbazepine	Pharmaceuticals
			diclofenac	Nonsteroidal anti-inflammatory drug
		Mojo river	Cathine	Pharmaceuticals
	Industry	Big Akaki	5-methylbenzotriazole	Corrosion inhibitor
			4-methylbenzotriazole	Corrosion inhibitor
		little Akaki	5-methylbenzotriazole	Corrosion inhibitor
			4-methylbenzotriazole	Corrosion inhibitor
			Triethylphosphate	Solvent, flame retardant
			tris-(2-chloroethyl) phosphate	Flame retardant
		Mojo river	5-methylbenzotriazole	Corrosion inhibitor
			4-methylbenzotriazole	Corrosion inhibitor

Source of samples	Source of compounds	Sample site	Substance	Category
Reservoir	Agriculture	koka inlet	Bentazone	Pesticide; Herbicide; Veterinary drug
			sulfamethoxazole	Veterinary drug; Antibiotic
			imidacloprid	Pesticide; Insecticide; Veterinary drug
			dimethoate	Pesticide; Insecticide
			metalaxyl	Pesticide; Fungicide; Veterinary drug
		koka outlet	sulfamethoxazole	Veterinary drug; Antibiotic
			pyroxsulam	Pesticide; Herbicide
			metalaxyl	Pesticide; Fungicide; Veterinary drug
	Urban	koka inlet	Metformin	Pharmaceuticals
			cathine	Pharmaceuticals
			tramadol	Equine drug; Potent analgesic
			bisphenol S	Endocrine disruptor
			10,11-dihydrocarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
		koka outlet	Metformin	Pharmaceuticals
			Paracetamol	Pharmaceuticals
			10,11-dihydrocarbazepine	Pharmaceuticals
			carbamazepine	Equine drug; Anticonvulsant
	Industry	koka inlet	5-methylbenzotriazole	Corrosion inhibitor
			Triethylphosphate	Solvent, flame retardant

Annex 2: Semi quantitative result of Emerging Organic Compounds

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
Deep well	Agricultural	Legedadi BH	LC MS	Trinexapac	0.023	µg/l	Pesticide; Plant growth regulator	19-Nov
		Awash BH		Trinexapac	0.012	µg/l	Pesticide; Plant growth regulator	19-Sep
	Urban	Legedadi BH		Bisphenol S	0.001	µg/l	Endocrine disruptor	19-Nov
		Awash BH	GC MS	N,N-Diethyl-m-toluamide	0.024	µg/l	DEET; Insect repellent	19-Sep
Shallow well	Agricultural	Akaki BH	LC MS	Atrazine	0.0005	µg/l	Pesticide; Herbicide; Veterinary drug	19-Nov
				Atrazine-desethyl (Desethylatrazine)	0.0006	µg/l	Pesticide; Herbicide; Degradation	
				Fluconazole	0.0032	µg/l	Pesticide; Antimycotic	
				Imidacloprid	0.0011	µg/l	Pesticide; Insecticide; Veterinary drug	
				Sulfamethoxazole	0.0085	µg/l	Veterinary drug; Antibiotic	
				Trinexapac	0.14	µg/l	Pesticide; Plant growth regulator	
		Adama BH	GC MS	Diphenylamine	0.012	µg/l	Pesticide; Fungicide; Veterinary drug	19-Sep
			LC MS	Cycluron	0.046	µg/l	Pesticide; Herbicide; Veterinary drug	
				Sulfamethoxazole	0.0005	µg/l	Veterinary drug; Antibiotic	
				Trinexapac	0.044	µg/l	Pesticide; Plant growth regulator	
				2-Phenoxypropionic acid	0.01	µg/l	Pesticides	
		Metehara BH		Atrazine	0.0009	µg/l	Pesticide; Herbicide; Veterinary drug	
				Atrazine-desethyl (Desethylatrazine)	0.036	µg/l	Pesticide; Herbicide; Degradation	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
				Atrazine-desisopropyl (Deisopropylatrazine)	0.0035	µg/l	Pesticide; Herbicide; Degradation	
				Sulfamethoxazole	0.0058	µg/l	Veterinary drug; Antibiotic	
				Thiophanate-methyl	0.012	µg/l	Pesticide; Fungicide; Veterinary drug	
				Trinexapac	0.097	µg/l	Pesticide; Plant growth regulator	
		Awash BH		Trinexapac	0.12	µg/l	Pesticide; Plant growth regulator	
	Urban	Akaki BH		Carbamazepine	0.002	µg/l	Equine drug; Anticonvulsant	19-Nov
				Sulfanilamide	0.014	µg/l	Antibiotic; Chemotherapeutic	
				Acesulfame (Acesulfame-K)	0.21	µg/l	Artificial Sweetener (K salt)	
				Bisphenol S	0.0005	µg/l	Endocrine disruptor	
				Phenobarbital	0.069	µg/l	Equine drug; Hypnotic; Anticonvulsant	
				Sucralose	0.093	µg/l	Artificial sweetener	
		Adama BH	GC MS	Dodecamethylcyclohexasiloxane (D6)	0.72	µg/l	Personal-care-products; Household; Industrial	19-Sep
			LC MS	Diphenhydramine	0.0014	µg/l	Equine drug; Antihistamine	
				Saccharin	0.003	µg/l	Pharmaceutical aid; Artificial Sweetener	
		Metehara BH		Acesulfame (Acesulfame-K)	0.16	µg/l	Artificial Sweetener (K salt)	
		Awash BH		Diphenhydramine	0.0047	µg/l	Equine drug; Antihistamine	
				Bisphenol S	0.002	µg/l	Endocrine disruptor	
	Industri	Akaki BH		Melamine	0.044	µg	Plasticizer	19-

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
	al					/l		Nov
	Industrial	Akaki BH		1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dicarboxylic acid	0.0062	µg/l	Reactive flame retardant	
		Akaki BH		Perfluoro Hexanoic Acid	0.0005	µg/l	Surfactant	
		Akaki BH		Perfluoro Octanoic Acid (PFOA)	0.0007	µg/l	Surfactant	
		Akaki BH		Perfluoro Pentanoic Acid	0.001	µg/l	Surfactant	
		Akaki BH		Perfluorobutane sulfonate	0.11	µg/l	Surfactant	
		Akaki BH		Perfluorohexane sulfonate	0.013	µg/l	Surfactant	
		Adama BH	GC MS	Cyclohexanone	0.08	µg/l	Solvent; Precursors to Nylon 6,6 and Nylon 6	19-Sep
		Adama BH	LC MS	Perfluoro Octanoic Acid (PFOA)	0.0004	µg/l	Surfactant	
		Metehara BH		Perfluoro Pentanoic Acid	0.0003	µg/l	Surfactant	
		Metehara BH		Perfluorobutane sulfonate	0.0098	µg/l	Surfactant	
		Metehara BH		Perfluorohexane sulfonate	0.019	µg/l	Surfactant	
		Metehara BH		Perfluoropentane sulfonate	0.046	µg/l	Surfactant	
Tap water	Agricultural	Addis Ababa Paulos	LC MS	Propiconazole	0.0008	µg/l	Pesticide; Fungicide; Veterinary drug	19-Nov
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.14	µg/l	Pesticide; Herbicide	
				Bromoxynil	0.0004	µg/l	Pesticide; Herbicide	
		Addis Ababa Kotebe		Azoxystrobin	0.0032	µg/l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.0088	µg/l	Pesticide; Herbicide; Veterinary drug	
				Fluoxastrobin	0.003	µg/l	Pesticide; Veterinary drug	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
				Propiconazole	0.015	µg/l	Pesticide; Fungicide; Veterinary drug	
				Pyroxsulam	0.0027	µg/l	Pesticide; Herbicide	
				Tebuconazole (Terbuconazole)	0.0036	µg/l	Pesticide; Fungicide	
				Thiacloprid	0.0006	µg/l	Pesticide; Insecticide; Veterinary drug	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.069	µg/l	Pesticide; Herbicide	
				Bentazone	0.05	µg/l	Pesticide; Herbicide; Veterinary drug	
		Addis Ababa Bole		Azoxystrobin	0.0036	µg/l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.0088	µg/l	Pesticide; Herbicide; Veterinary drug	
				Fluoxastrobin	0.0032	µg/l	Pesticide; Veterinary drug	
				Oxadiazon	0.001	µg/l	Pesticide; Herbicide; Veterinary drug	
				Propiconazole	0.018	µg/l	Pesticide; Fungicide; Veterinary drug	
				Pyroxsulam	0.0026	µg/l	Pesticide; Herbicide	
				Tebuconazole (Terbuconazole)	0.0049	µg/l	Pesticide; Fungicide	
				Thiabendazole	0.0003	µg/l	Pesticide; Veterinary drug; Anthelmintic	
				Trinexapac	0.024	µg/l	Pesticide; Plant growth regulator	
				Bentazone	0.054	µg/l	Pesticide; Herbicide; Veterinary drug	
		Addis Ababa Jemo 1		Aminocarb	0.06	µg/l	Pesticide; Insecticide; Veterinary drug	19-Sep

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
		Addis Ababa Jemo 2		Aminocarb	0.036	µg/l	Pesticide; Insecticide; Veterinary drug	
				Flufenacet (Fluthiamide) (BAY FOE 5043)	0.0019	µg/l	Pesticide; Herbicide	
				Bromoxynil	0.0026	µg/l	Pesticide; Herbicide	
	Urban	Addis Ababa Paulos		Acetaminophen (Paracetemol)	0.006	µg/l	Eterinary drug; Equine drug; Analgesic	19-Nov
				Bisphenol S	0.003	µg/l	Endocrine disruptor	
				Saccharin	0.025	µg/l	Pharmaceutical aid; Artificial Sweetener	
				Sucralose	0.034	µg/l	Artificial sweetener	
		Addis Ababa Jemo 1	GC MS	Dodecamethylcyclohexasiloxane (D6)	0.8	µg/l	Personal-care-products; Household; Industrial	19-Sep
			LC MS	Amantadine	0.0025	µg/l	antidyskinetic medicine	
				Cocaine	0.01	µg/l	Stimulant; Drug of Abuse	
				Aspirin (Acetylsalicylic acid)			pharmaceuticals	
				Azelaic acid	0.1	µg/l	pharmaceuticals	
				Saccharin	0.14	µg/l	Pharmaceutical aid; Artificial Sweetener	
				Triclosan	0.024	µg/l	Antiseptic; Bactericide	
		Addis Ababa Jemo 2		Amantadine	0.004	µg/l	Antidyskinetic medicine	
				Benzoylecgonine	0.001	µg/l	metabolite of cocaine	
				Cocaine	0.014	µg/l	Stimulant; Drug of Abuse	
				Fluoxetine	0.002	µg/l	Antidepressant; Equine drug	
				Aspirin			pharmaceuticals	

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
				(Acetylsalicylic acid)				
				Azelaic acid	0.1	µg/l	pharmaceuticals	
				Bisphenol S	0.004	µg/l	Endocrine disruptor	
				Ibuprofen	0.035	µg/l	Nonsteroidal anti-inflammatory; Analgesic	
				Saccharin	0.085	µg/l	Pharmaceutical aid; Artificial Sweetener	
				Sucralose	0.09	µg/l	Artificial sweetener	
				Triclosan	0.03	µg/l	Antiseptic; Bactericide	
	Industrial	Addis Ababa Paulos		Triphenyl phosphate (TPPA)	0.2	µg/l	Flame retardant; Plasticizer	19-Nov
		Addis Ababa Jemo 1	GC MS	Bromodichloromethane	1.5	µg/l	Volatile Solvent	19-Sep
				Chlorodibromomethane	4	µg/l	Volatile Solvent	
				Bromoform	7.2	µg/l	Volatile Solvent	
				1,1-Dimethyl-3-chloropropanol	4.8	µg/l	Solvent	
				2- Methyl-3-bromo-2-butanol	3	µg/l	Solvent	
				1-Bromo-2-methyl-2-butanol	0.7	µg/l	Solvent	
			LC MS	Dihexyl Phthalate (DnHP)	0.12	µg/l	Plasticizer	
				hate (TPPA)	0.77	µg/l	Flame retardant; Plasticizer	
				Perfluoro Pentanoic Acid	0.01	µg/l	Surfactant	
		Addis Ababa Jemo 2		Dihexyl Phthalate (DnHP)	0.1	µg/l	Plasticizer	
				Triphenyl phosphate (TPPA)	0.87	µg/l	Flame retardant; Plasticizer	
				Perfluorohexane sulfonate	0.043	µg/l	Surfactant	
Surface	Agricult	Legedadi	LC	Azoxystrobin	0.0054	µg	Pesticide;	19-

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
water dam	ural	dam	MS			/l	Fungicide; Veterinary drug	Nov
				Boscalid (Nicobifen)	0.0098	µg /l	Pesticide; Herbicide; Veterinary drug	
				Fluoxastrobin	0.0039	µg /l	Pesticide; Veterinary drug	
				Oxadiazon	0.0023	µg /l	Pesticide; Herbicide; Veterinary drug	
				Propiconazole	0.025	µg /l	Pesticide; Fungicide; Veterinary drug	
				Pyroxsulam	0.0029	µg /l	Pesticide; Herbicide	
				Thiacloprid	0.0006	µg /l	Pesticide; Insecticide; Veterinary drug	
				Bentazone	0.067	µg /l	Pesticide; Herbicide; Veterinary drug	
		Gefersa dam		Propiconazole	0.0008	µg /l	Pesticide; Fungicide; Veterinary drug	
				Trinexapac	0.055	µg /l	Pesticide; Plant growth regulator	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.073	µg /l	Pesticide; Herbicide	
	Industrial			Triphenyl phosphate (TPPA)	0.014	µg /l	Flame retardant; Plasticizer	
Awash main course	Agricultural	Adama	GC MS	Hexachlorocyclopentadiene	0.024	µg /l	Pesticide; Intermediate	19-Sep
			LC MS	Azoxystrobin	0.003	µg /l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.0025	µg /l	Pesticide; Herbicide; Veterinary drug	
				Clopidol	0.0002	µg /l	Veterinary drug; Coccidiostatic	
				Cycluron	0.0015	µg /l	Pesticide; Herbicide; Veterinary drug	
				Diuron	0.0001	µg	Pesticide;	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
						/l	Herbicide	
				Epoxiconazole (BAS 480F)	0.0007	µg /l	Pesticide; Fungicide; Veterinary drug	
				Fluconazole	0.012	µg /l	Pesticide; Antimycotic	
				Fluopicolid	0.0004	µg /l	Pesticide; Fungicide	
				Griseofulvin	0.001	µg /l	Pesticide; Mycotoxin; Antimycotic	
				Imidacloprid	0.013	µg /l	Pesticide; Insecticide; Veterinary drug	
				Metalaxyl	0.011	µg /l	Pesticide; Fungicide; Veterinary drug	
				Metolachlor	0.0007	µg /l	Pesticide; Herbicide; Veterinary drug	
				Penconazole	0.0001	µg /l	Pesticide; Fungicide; Veterinary drug	
				Propiconazole	0.0094	µg /l	Pesticide; Fungicide; Veterinary drug	
				Pyroxsulam	0.0084	µg /l	Pesticide; Herbicide	
				Tebuconazole (Terbuconazole)	0.0058	µg /l	Pesticide; Fungicide	
				Thiamethoxam	0.0007	µg /l	Pesticide; Insecticide; Veterinary drug	
				Trinexapac	0.085	µg /l	Pesticide; Plant growth regulator	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.22	µg /l	Pesticide; Herbicide	
				Bentazone	0.007	µg /l	Pesticide; Herbicide; Veterinary drug	
				Bromoxynil	0.0024	µg /l	Pesticide; Herbicide	
				Iprodione (Glycophen)	0.073	µg /l	Pesticide; Fungicide	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
		Metehara 1		Ametryn (Ametrex)	0.0013	µg /l	Pesticide; Herbicide; Veterinary drug	
				Atrazine	0.0025	µg /l	Pesticide; Herbicide; Veterinary drug	
				Azoxystrobin	0.0032	µg /l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.0024	µg /l	Pesticide; Herbicide; Veterinary drug	
				Chlorantraniliprole	0.0007	µg /l	Pesticide; Insecticide	
				Dimethoate	0.0005	µg /l	Pesticide; Insecticide	
				Dimethomorph	0.003	µg /l	Pesticide; Fungicide	
				Diuron	0.0002	µg /l	Pesticide; Herbicide	
				Epoxiconazole (BAS 480F)	0.0009	µg /l	Pesticide; Fungicide; Veterinary drug	
				Fluconazole	0.011	µg /l	Pesticide; Antimycotic	
				Fluopicolid	0.0008	µg /l	Pesticide; Fungicide	
				Griseofulvin	0.001	µg /l	Pesticide; Mycotoxin; Antimycotic	
				Imidacloprid	0.014	µg /l	Pesticide; Insecticide; Veterinary drug	
				Metalaxyl	0.01	µg /l	Pesticide; Fungicide; Veterinary drug	
				Metolachlor	0.001	µg /l	Pesticide; Herbicide; Veterinary drug	
				Propiconazole	0.0094	µg /l	Pesticide; Fungicide; Veterinary drug	
				Pyroxsulam	0.0082	µg /l	Pesticide; Herbicide	
				Sulfamethoxazole	0.15	µg	Veterinary drug;	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
						/l	Antibiotic	
				Tebuconazole (Terbuconazole)	0.0052	µg/l	Pesticide; Fungicide	
				Thiamethoxam	0.0005	µg/l	Pesticide; Insecticide; Veterinary drug	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.16	µg/l	Pesticide; Herbicide	
				Bentazone	0.0088	µg/l	Pesticide; Herbicide; Veterinary drug	
				Fipronil	0.0009	µg/l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Fipronil sulfon (M& B 46136)	0.0007	µg/l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Flubendiamide	0.0004	µg/l	Pesticide; Insecticide	
				Fludioxonil	0.0005	µg/l	Pesticide; Fungicide; Veterinary drug	
				Iprodione (Glycophen)	0.072	µg/l	Pesticide; Fungicide	
		Metehara 2		Ametryn (Ametrex)	0.0017	µg/l	Pesticide; Herbicide; Veterinary drug	
				Atrazine	0.0027	µg/l	Pesticide; Herbicide; Veterinary drug	
				Azoxystrobin	0.0032	µg/l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.0027	µg/l	Pesticide; Herbicide; Veterinary drug	
				Diazinon (Dimpylate)	0.0009	µg/l	Pesticide; Insecticide	
				Dimethoate	0.0004	µg/l	Pesticide; Insecticide	
				Dimethomorph	0.003	µg/l	Pesticide; Fungicide	

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
				Dimetridazole	0.0044	µg/l	Nitroimidazole; Veterinary drug	
				Diuron	0.0002	µg/l	Pesticide; Herbicide	
				Epoxiconazole (BAS 480F)	0.0009	µg/l	Pesticide; Fungicide; Veterinary drug	
				Fluconazole	0.011	µg/l	Pesticide; Antimycotic	
				Fluopicolid	0.0008	µg/l	Pesticide; Fungicide	
				Fluoxastrobin	0.0002	µg/l	Pesticide; Veterinary drug	
				Griseofulvin	0.001	µg/l	Pesticide; Mycotoxin; Antimycotic	
				Imidacloprid	0.014	µg/l	Pesticide; Insecticide; Veterinary drug	
				Metalaxyl	0.01	µg/l	Pesticide; Fungicide; Veterinary drug	
				Metolachlor	0.001	µg/l	Pesticide; Herbicide; Veterinary drug	
				Propiconazole	0.0082	µg/l	Pesticide; Fungicide; Veterinary drug	
				Propoxur (baygon)	0.0028	µg/l	Pesticide; Insecticide	
				Pyroxsulam	0.0078	µg/l	Pesticide; Herbicide	
				Sulfamethoxazole	0.15	µg/l	Veterinary drug; Antibiotic	
				Chlorantraniliprole	0.0006	µg/l	Pesticide; Insecticide	
				Tebuconazole (Terbuconazole)	0.0055	µg/l	Pesticide; Fungicide	
				Thiamethoxam	0.0005	µg/l	Pesticide; Insecticide; Veterinary drug	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.15	µg/l	Pesticide; Herbicide	
				Bentazone	0.009	µg	Pesticide;	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
						/l	Herbicide; Veterinary drug	
				Chlorantraniliprole	0.0006	µg/l	Pesticide; Insecticide	
				Fipronil	0.0009	µg/l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Fipronil sulfide	0.0004	µg/l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Fipronil sulfon (M& B 46136)	0.0009	µg/l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Flubendiamide	0.0006	µg/l	Pesticide; Insecticide	
				Fludioxonil	0.0006	µg/l	Pesticide; Fungicide; Veterinary drug	
				Iprodione (Glycophen)	0.062	µg/l	Pesticide; Fungicide	
		Awash 7	GC MS	Atrazine	0.019	µg/l	Pesticide; Herbicide; Veterinary drug	
				Ametryn	0.007	µg/l	Pesticide; Herbicide; Veterinary drug	
			LC MS	Atrazine	0.0029	µg/l	Pesticide; Herbicide; Veterinary drug	
				Azoxystrobin	0.0032	µg/l	Pesticide; Fungicide; Veterinary drug	
				Boscalid (Nicobifen)	0.002	µg/l	Pesticide; Herbicide; Veterinary drug	
				Dimethoate	0.0013	µg/l	Pesticide; Insecticide	
				Dimethomorph	0.0026	µg/l	Pesticide; Fungicide	
				Diuron	0.0001	µg/l	Pesticide; Herbicide	
				Epoxiconazole	0.0009	µg	Pesticide;	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
				(BAS 480F)		/l	Fungicide; Veterinary drug	
				Fluconazole	0.01	µg /l	Pesticide; Antimycotic	
				Fluopicolid	0.0007	µg /l	Pesticide; Fungicide	
				Fluoxastrobin	0.0001	µg /l	Pesticide; Veterinary drug	
				Griseofulvin	0.001	µg /l	Pesticide; Mycotoxin; Antimycotic	
				Imidacloprid	0.014	µg /l	Pesticide; Insecticide; Veterinary drug	
				Metalaxyl	0.01	µg /l	Pesticide; Fungicide; Veterinary drug	
				Metolachlor	0.0017	µg /l	Pesticide; Herbicide; Veterinary drug	
				Propiconazole	0.0088	µg /l	Pesticide; Fungicide; Veterinary drug	
				Propoxur (baygon)	0.0027	µg /l	Pesticide; Insecticide	
				Pyroxsulam	0.0075	µg /l	Pesticide; Herbicide	
				Sulfamethoxazole	0.14	µg /l	Veterinary drug; Antibiotic	
				Tebuconazole (Terbuconazole)	0.0047	µg /l	Pesticide; Fungicide	
				Trinexapac	0.023	µg /l	Pesticide; Plant growth regulator	
				2,4-D / 2,4-Dichlorophenoxyacetic acid	0.2	µg /l	Pesticide; Herbicide	
				Bentazone	0.0083	µg /l	Pesticide; Herbicide; Veterinary drug	
				Fipronil	0.0008	µg /l	Pesticide; Acaricide; Insecticide; Veterinary drug	
				Fipronil sulfon (M& B 46136)	0.0008	µg /l	Pesticide; Acaricide;	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
							Insecticide; Veterinary drug	
				Flubendiamide	0.0005	µg/l	Pesticide; Insecticide	
				Fludioxonil	0.0006	µg/l	Pesticide; Fungicide; Veterinary drug	
				Iprodione (Glycophen)	0.068	µg/l	Pesticide; Fungicide	
	Urban	Adama	GC MS	Dodecamethylcyclohexasiloxane (D6)	1.1	µg/l	Personal-care-products; Household; Industrial	
				N,N-Diethyl-m-toluamide	0.016	µg/l	DEET; Insect repellent	
				Caffeine	0.029	µg/l	Psychoactive stimulant drug	
			LC MS	10,11-Dihydroxycarbazepine or 10,11-Dihydroxycarbamazepine	0.029	µg/l	Anticonvulsant	
				Atazanavir	0.0008	µg/l	HIV protease inhibitor	
				Carbamazepine	0.0043	µg/l	Equine drug; Anticonvulsant	
				Iohexol	0.006	µg/l	pharmaceuticals	
				Acesulfame (Acesulfame-K)	0.46	µg/l	Artificial Sweetener (K salt)	
				Saccharin	0.005	µg/l	Pharmaceutical aid; Artificial Sweetener	
				Sucralose	0.13	µg/l	Artificial sweetener	
		Metehara 1	GC MS	N,N-Diethyl-m-toluamide	0.025	µg/l	DEET; Insect repellent	
			LC MS	Atazanavir	0.003	µg/l	HIV protease inhibitor	
				Carbamazepine	0.0058	µg/l	Equine drug; Anticonvulsant	
				Carbendazim (Azole)	0.0034	µg/l	Chemotherapeutic	
				Cotinine	0.01	µg	Stimulant drug	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
						/l		
				Iohexol	0.0068	µg/l	pharmaceuticals	
				Lamotrigine	0.0003	µg/l	Equine drug; Anticonvulsant	
				Sulfanilamide	0.0063	µg/l	Antibiotic; Chemotherapeutic	
				Tramadol	0.0006	µg/l	Equine drug; Potent analgesic	
				Acesulfame (Acesulfame-K)	0.52	µg/l	Artificial Sweetener (K salt)	
				Chlorothiazide	0.0002	µg/l	Equine drug; Diuretic	
				Hydrochlorothiazide	0.0012	µg/l	Equine drug; Diuretic	
				Sucralose	0.11	µg/l	Artificial sweetener	
				Triclosan	0.0015	µg/l	Antiseptic; Bactericide	
		Metehara 2	GC MS	N,N-Diethyl-m-toluamide	0.328	µg/l	DEET; Insect repellent	
			LC MS	Atazanavir	0.0043	µg/l	HIV protease inhibitor	
				Carbamazepine	0.0057	µg/l	Equine drug; Anticonvulsant	
				Carbendazim (Azole)	0.0024	µg/l	Chemotherapeutic	
				Cotinine	0.011	µg/l	Stimulant drug	
				Iohexol	0.0065	µg/l	pharmaceuticals	
				Sulfanilamide	0.0056	µg/l	Antibiotic; Chemotherapeutic	
				Tramadol	0.0006	µg/l	Equine drug; Potent analgesic	
				Acesulfame (Acesulfame-K)	0.54	µg/l	Artificial Sweetener (K salt)	
				Chlorothiazide	0.0002	µg/l	Equine drug; Diuretic	
				Sucralose	0.12	µg/l	Artificial sweetner	

Source of samples	**Source of compounds**	**Sample site**	**Test**	**Substance**	**Approximate amount**	**Unit**	**Category**	**Date of sampling**
		Awash 7		Atazanavir	0.0026	µg/l	HIV protease inhibitor	
				Carbamazepine	0.005	µg/l	Equine drug; Anticonvulsant	
				Cotinine	0.01	µg/l	Stimulant drug	
				Diclofenac	0.0032	µg/l	Nonsteroidal anti-inflammatory drug	
				Iohexol	0.006	µg/l	pharmaceuticals	
				Sulfanilamide	0.0049	µg/l	Antibiotic; Chemotherapeutic	
				Tramadol	0.0005	µg/l	Equine drug; Potent analgesic	
				Acesulfame (Acesulfame-K)	0.6	µg/l	Artificial Sweetener (K salt)	
				Aspirin (Acetylsalicylic acid)		µg/l	pharmaceuticals	
				Hydrochlorothiazide	0.001	µg/l	Equine drug; Diuretic	
				Saccharin	0.006	µg/l	Pharmaceutical aid; Artificial Sweetener	
				Sucralose	0.12	µg/l	Artificial sweetener	
	Industrial	Adama	GC MS	Bromodichloromethane	16	µg/l	Volatile Solvent	
				Bromoacetonitrile	0.069	µg/l	Alkalytic agent	
				Chlorodibromomethane	3.9	µg/l	Volatile Solvent	
				Bromoform	0.14	µg/l	Volatile Solvent	
				Cyclohexanone	0.11	µg/l	Solvent; Precursors to Nylon 6,6 and Nylon 6	
				Dibromoacetonitrile	0.23	µg/l	Metalworking fluids	
				Acetophenone	3.2	µg	Catalyst; Flavour	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
						/l	and fragrance agent	
				Tributyl phosphate	0.036	µg/l	Plasticizer; Solvent	
				di-n-butyl phthalate	7.1	µg/l	Plasticizer	
				Acetonitrile, dichloro	0.2	µg/l	Solvent	
				1,1-Dimethyl-3-chloropropanol	0.3	µg/l	Solvent	
			LC MS	Perfluoro Hexanoic Acid	0.0012	µg/l	Surfactant	
				Perfluoro Octanoic Acid (PFOA)	0.0007	µg/l	Surfactant	
				Perfluoro Pentanoic Acid	0.01	µg/l	Surfactant	
				Perfluorobutane sulfonate	0.018	µg/l	Surfactant	
				Perfluorohexane sulfonate	0.026	µg/l	Surfactant	
				Perfluorooctane sulfonate (PFOS)	0.0012	µg/l	Surfactant; Fire fighting foams	
		Metehara 1	GC MS	Tributyl phosphate	0.026	µg/l	Plasticizer; Solvent	
			LC MS	Perfluoro Heptanoic Acid	0.0006	µg/l	Surfactant	
				Perfluoro Hexanoic Acid	0.0009	µg/l	Surfactant	
				Perfluoro Octanoic Acid (PFOA)	0.0005	µg/l	Surfactant	
				Perfluoro Pentanoic Acid	0.001	µg/l	Surfactant	
				Perfluorobutane sulfonate	0.017	µg/l	Surfactant	
				Perfluorohexane sulfonate	0.02	µg/l	Surfactant	
				Perfluorooctane sulfonate (PFOS)	0.0004	µg/l	Surfactant; Fire fighting foams	
		Metehara 2	GC MS	Tributyl phosphate	0.036	µg/l	Plasticizer; Solvent	
			LC MS	Melamine	0.04	µg/l	Plasticizer	
				1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-	0.0042	µg/l	Reactive flame retardent	

Source of samples	Source of compounds	Sample site	Test	Substance	Approximate amount	Unit	Category	Date of sampling
				dicarboxylic acid				
				Perfluoro Heptanoic Acid	0.0009	µg/l	Surfactant	
				Perfluoro Hexanoic Acid	0.001	µg/l	Surfactant	
				Perfluoro Octanoic Acid (PFOA)	0.0007	µg/l	Surfactant	
				Perfluoro Pentanoic Acid	0.0013	µg/l	Surfactant	
				Perfluorobutane sulfonate	0.017	µg/l	Surfactant	
				Perfluorohexane sulfonate	0.021	µg/l	Surfactant	
				Perfluorooctane sulfonate (PFOS)	0.0007	µg/l	Surfactant; Fire fighting foams	
		Awash 7		Melamine	0.5	µg/l	Plasticizer	
				Perfluoro Heptanoic Acid	0.0007	µg/l	Surfactant	
				Perfluoro Hexanoic Acid	0.001	µg/l	Surfactant	
				Perfluoro Octanoic Acid (PFOA)	0.0006	µg/l	Surfactant	
				Perfluoro Pentanoic Acid	0.001	µg/l	Surfactant	
				Perfluorobutane sulfonate	0.017	µg/l	Surfactant	
				Perfluorohexane sulfonate	0.02	µg/l	Surfactant	
				Perfluorooctane sulfonate (PFOS)	0.0005	µg/l	Surfactant; Firefighting foams	

Annex 2: Vertical profiling data of Electrical conductivity and Temperature

Electrical conductivity and Temperature data at Becho area

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2	485	23.3			348	17.6	357	28.8	680	23.1
4	483	23.5			496	17.5	322	27.5	692	24
6	485	23.6			495	17.4	325	28.8	680	24.6
8	484	23.8			497	17.4	318	29.4	672	23.9
10	486	23.7			496	17.5	322	26.6	682	25.5
12	487	23.7			498	17.6	372	25.5	690	24.4
14	483	23.7			495	17.7	491	27.2	678	22.2
16	483	23.9			494	17.4	528	26.5	700	20.2
18	486	23.7			497	17.6	545	27.2	650	21
20	480	23.1	431		499	17.5	568	26.4	720	22.5
22	483	23.3	439		496	17.7	475	29.1	712	20.5
24	492	23.4	440		569	17.7	500	28.8	702	23.3
26	497	22	436		570	17.5	465	30.5	600	20
28	570	21.8	512		572	18.6	445	26.4	598	20.5
30	560	21.8	520		514	18.4	394	26.6	669	22.1
32	560	21.5	515		480	18.6	361	27.2	700	20.1
34	561	21.8	514		481	19.2	349	30	710	22.2
36	590	21.8	512		463	20.2	327	27.7	720	20
38	601	21.5	513		464	20.2	355	26.6	638	19.5
40	615	21.5	510		465	20.1	375	28.5	650	19
42	628	21.5	513		469	21.8	382	27.8	640	24.1
44	628	21.1			592	21	365	28.8	540	24.3
46	633	22.3	550	18.5	672	21	327	26.2	542	24.5
48	635	22.9	548	18.4	672	21.6	329	26.7	546	24.5
50	641	23.8	548	18.2	648	21.9	317	25.7	500	23
52	650	24.3	546	18.2	595	21.3	312	25.2	490	22.7
54	540	26.1	547	18.3	595	22.5	362	24.1	490	20.4
56	550	25.3	545	18.2	497	23	321	26.3	486	20.4
58	540	24.6	590	21.4	498	23	295	24.1	480	20.2
60	538	27.5	588	21.5	498	23.2	270	20.8	458	20.3
62	545	26.4	588	21.3	502	23.3	298	25.8	455	21.4
64	550	25.1	589	21.2	504	23	317	26.6	453	25.1
66	545	23.4	590	21.4	519	23.3	304	28.1	440	23.3

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
68	525	24.2	587	21.4	527	22.1	345	26.6	428	23.4
70	538	22.6	589	21.3	556	22.3	318	27.2	409	23.5
72	540	20.4	590	21.2	545	22	330	27	402	23.1
74	525	20.3	588	21.3	540	22.1	295	28.8	398	23.1
76	520	20.4	580	20.4	548	22.3	338	27.1	390	22.8
78	522	21.5	578	20.2	540	20.6	313	20.6	384	22.8
80	524	23.3	574	20.1	547	20.4	306	20.1	377	22.6
82	520	25.1	572	19.5	548	20.7	290	21.6	378	22.8
84	525	23.4	570	19.4	585	20.4	320	27.4	377	22.9
86	523	24.5	568	19.3	553	20.3	317	28.1	380	23.6
88	520	23.5	564	19.2	570	20.3	319	27.2	382	23.5
90	650	23.5	560	18.5	568	20.2	308	26.5	384	23.6
92	311	24.4	555	18.4	567	20.3	314	27.1	385	23.7
94	640	26.3	540	18.3	567	20.2	343	25.4	384	24.1
96	920	27.1	603	19.3	570	20.2	339	26.1	386	24.6
98	960	26.1	603	19.3	556	20.2	341	27.3	383	25
100	600	23.8	603	19.2	567	20.2	349	26.9	410	25
102	624	23.5	602	19.3	567	20.2	342	26.8	560	25.1
104	623	25.1	601	19.2	569	20.3	360	22.8	572	25.2
106	611	24.5	601	19.2	578	20.4	398	20.4	577	25.2
108	615	25.3	602	19.2	579	20.4	410	26.5	683	23.8
110	621	25.4	603	19.1	578	20.5	318	27.8	680	23.9
112	615	23.4	603	19.3	578	20.3	272	26.3	681	23.8
114	610	23.2	601	19.3	579	24.4	250	22.9	680	23.5
116	600	21.5	601	19.2	557	23.1	261	25.1	681	23.3
118	595	22.4	599	19.1	518	22.2	269	24.7	688	23.3
120	599	29.2	598	18.5	540	21.6	274	32.2	710	22.4
122	635	25.1	598	18.4	542	21.7	275	31.6	840	22.8
124	650	22.5	596	18.2	543	22.1	207	23.4	760	22.6
126	640	23.6	597	18.3	542	22.4	223	25.9	554	22.3
128	635	22.7	598	18.4	541	23.3	277	21.8	556	22.4
130	650	23.6	596	18.5	541	23.6	247	24.2	550	22.3
132	640	24.4	595	18.3	535	23.8	213	21.9	548	22.1
134	635	22.7	595	18.2	536	23.8	289	29.2	522	22.3
136	630	25.9	594	18.4	537	23.6	294	20.4	508	22.7
138	629	29.7	593	18.3	525	23.4	254	23.3	510	22.9
140	645	23.6	592	18.2	519	23.3	223	28.2	504	22.9
142	630	21.7	593	18.1	516	22.5	291	21.1	470	22.5
144	625	25.3	593	18.2	515	23.2	323	20.1	330	22
146	620	23.8	592	18.4	515	23	335	18.9	316	21.8
148	615	25.5	592	18.3	516	22.3	347	17.6	320	21.9

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
150	620	26.3	594	18.2	515	22.5	330	19.4	320	22.2
152	645	27.5	590	18.2	515	22.7	323	29.8	321	22.5
154	635	25.2	591	26.5	513	23.1	307	31.9	322	23
156	630	25	592	27	511	22.5	314	31.4	321	23.1
158	720	25.6	590	26.5	509	22.2	279	29	400	22.9
160	650	24.4	588	26.7	510	23.3	263	23.9	415	21.3
162	625	24.5	589	27	508	21.6	242	24.4	418	21.1
164	710	26.8	590	26.3	506	22.3	253	23.1	418	20.7
166	700	25.7	591	26	503	21.3	273	24.5	420	20.3
168	705	26.8	750	25.9	488	23	272	25.2	419	19.9
170	699	24.3	748	25.9	476	23.2	362	25.1	418	20
172	690	25	746	26.1	475	23	281	23.5	415	20.3
174	675	24.1	744	25	479	23.8	271	24.1	413	20.2
176	690	26.3	743	25.4	503	24.4	263	25.3	411	20.7
178	700	77.5	742	25	507	22.5	273	24.1	409	20.7
180	715	26.4	740	24.9	513	22.3	261	23.4	407	21.7
182	695	26.5	737	25.3	514	23	273	24.2	400	22.3
184	650	24.3	735	25.1	505	22.5	281	25.1	390	21.7
186	790	23.2	736	24.8	475	22.7	262	25.3	408	21.9
188	675	23.7	735	25.2	511	22.3	273	25.1	412	22.3
190	680	26	730	25	505	22.5	292	26.3	409	23.6
192	675	25.1	732	24.9	503	21.8	300	19.9	445	23.7
194	700	27.4	728	26	499	20.9	297	21.3	440	23.7
196	707	29.9	726	25.8	513	21.2	290	22.1	443	23.6
198	705	26.8	725	25.6	517	21.3	287	21.5	445	23.8
200	705	26.9	722	27	516	22.1	339	22.1	444	23.5
202	709	28.1	720	27.4	514	20.5	368	23.4	440	23.6
204	710	28.1	718	28.2	515	20.8	384	23.2	441	23.8
206	712	28.3	716	28.4	508	21	401	24.7	430	23.2
208	709	28.4	714	29	519	23.6	429	25.6	426	23.4
210	710	28.4	710	28.7	520	22.8	434	27.3	428	22.8
212	712	28.5	708	28.7	519	23.5	441	27	425	23
214	708	28.3	706	28.9	520	21.9	444	26.8	420	22.9
216	710	27.9	705	29	518	21.9	447	26.6	418	22.7
218	712	27.8	703	27.6	520	22.3	449	26.5	422	22.1
220	715	27.7	702	27.4	519	23	451	26.2	425	22.5
222	710	27.7	703	28	520	22.6	448	28.2	432	22.3
224	719	28.11	720	28.2	519	22.2	442	27.9	437	23.6
226	715	28.3	730	28	519	23	446	25.7	440	23.8
228	715	28.5	750	27.4	521	23.1	451	25.9	442	23.4
230	711	28.7	788	28.1	520	20.9	457	26.1	466	23.1

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
232	713	28.5	808	28	522	21.7	461	25.6	455	23.1
234	716	28.9	820	27.7	521	22.5	495	21.7	448	23.3
236	830	28.4	824	27.2	554	20.9	477	22.5	452	23
238	824	28.4	829	27.9	554	20.7	470	22.8	441	22.9
240	870	28.3	836	27.5	553	22.6	465	23.3	444	22.5
242	874	28.9	680	26.9	553	22.4	463	23.7	452	22.8
244	879	28.9	670	27.6	553	22	460	23.9	449	22.6
246	881	28.9	660	27.8	553	21.5	458	24.1	447	22.5
248	881	28.4	650	28	554	21.4	456	24.2	443	22.3
250	878	28.3	645	27.4	529	21.7	452	24.7	441	22.2
252	874	28.5	640	27.9	529	21.6	473	23.9	439	22.4
254	879	28.1	630	28.3	528	21.9	500	24.7	446	22.5
256	882	28.7	635	28.1	530	21.3	494	22.4	444	22.5
258	850	28.3	630	28	532	21.4	469	23.1	443	22.3
260	886	28.4	620	27.6	531	24.6	479	23.6	449	22.9
262	888	28.5	615	27.8	525	23.7	471	24.4	443	23.4
264	887	28.5	550	28	529	22.9	463	23.7	466	23.4
266	882	28.6	545	28.4	525	23.8	481	24.2	484	23.9
268	876	28.7	580	28.2	520	23.6	491	23.7	485	23.9
270	879	28.9	549	29.1	525	22.9	475	24.8	468	24.3
272	877	28.8	548	28.3	518	21.8	471	25.7	436	23.9
274	878	28.8	550	27	520	22.5	469	24.9	458	23.5
276	879	28.7	549	26.7	521	23	464	24.7	452	23.3
278	775	28.5	548	26.1	519	22.6	461	24.7	459	23.5
280	690	29.8	546	26.4	520	23.2	466	24.3	469	23.1
282	695	30.9	550	27.2	530	22.4	463	24.7	462	22.1
284	649	28.7	547	28.3	529	22.6	460	24.6	468	23
286	720	39.8	549	28.1	535	22.7	468	24.9	459	22.7
288	635	22.5	550	28.3	540	22.6	482	25	460	22.4
290	695	27.6	550	28.5	530	22.8	486	25.3	475	22.1
292	690	24.8	549	28.4	533	23	481	25.4	462	22.8
294	645	25.9	549	28.7	534	23.2	478	25.6	450	23.1
296	650	29.5	548	28.5	532	22.8	488	25.8	452	23.4
298	650	26.7	548	28.7	562	22.8	482	23.2	456	23.5
300	680	25.6	547	28.3	533	22.7	480	24.4	455	23.6
302	715	28.7	549	28.5	534	22.8	479	24.3	449	25.2
304	700	23.5	550	28.6	532	25.6	477	24.7	456	24.2
306	665	25.7	551	26.9	562	24.3	474	24.9	472	24.3
308	630	29.6	550	26.9	564	24.5	476	25.1	464	24.3
310	655	33.8	550	26.9	576	22.7	472	25.3	450	24.4
312	650	30.3	560	26.8	568	22.8	471	25.4	449	24.2

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
314	680	30.8	559	26.8	560	22.7	473	25.6	423	24.6
316	675	39.7	558	26.6	547	22.8	462	25.5	417	24
318	680	30.8	556	26.7	548	24.3	425	25.7	408	23
320	695	25.9	653	26.9	539	24.5	473	25.9	398	23.1
322	705	29.5	654	26.8	542	24.2	476	26.3	392	23.3
324	710	25.8	658	26.9	590	23.8	462	26.5	410	23.2
326	823	30.9	660	27.3	585	24.2	446	26.8	435	22.7
328	825	30.3	662	27.4	586	23.5	456	26.9	422	22.9
330	835	30.8	664	27.4	576	23.7	468	27.1	419	22.8
332	795	30.8	662	27.2	539	22.9	476	27.3	412	23.5
334	825	49.8	664	27.2	542	23	488	27.4	446	23.6
336	835	48.1	667	27.4	590	23.9	489	27.7	433	24.1
338	860	30.8	666	27.3	585	24.3	495	23.5	418	24.4
340	845	30.9	667	27.4	586	26.2	492	23.9	409	24.2
342	840	29.8	664	27.3	575	25.2	488	24.1	426	24.7
344	850	30.9	667	27.4	573	25.4	485	24.4	429	24.2
346	855	30.6	668	27.2	567	24.2	481	24.6	447	22.8
348	860	30.8	660	27.3	565	24.3	479	24.7	436	23.7
350	849	30.6	662	27.2	564	24.9	482	24.5	446	23.8
352	839	30.5	824	25.8	583	25.7			448	23.6
354	855	28.3	820	26.6	593	25.5			441	23.5
356	850	26.6	822	26.7	605	25.3			443	23.5
358	845	26.8	824	27.3	581	22..9			440	23.2
360	850	29.9	826	27.2	579	23.2			438	23.1
362	855	25.7	830	27.4	582	23.4			447	23.3
364	840	26.5	832	27.3	579	23.5			441	23.4
366	856	28.6	836	27.4	582	23.4			444	23.5
368	860	29.7	834	27.4	579	23.5			432	23.1
370	850	30.8	790	26.4	588	23.3			418	23
372	855	26.4	796	26.3	591	23.1			450	23.1
374	858	29.8	794	26.4	605	23.1			469	23
376	860	29.7	792	26.2	607	24.3			430	22.2
378	800	29.3	794	26.3	607	27.8			442	22.4
380	845	26.5	892	28.3	609	25.3			438	22.3
382	850	28.8	890	28.3	542	25.3			447	23
384	845	29.6	892	28.2	539	24.3			446	23
386	880	30.3	893	28.3	535	24.8			450	23.2
388	845	29.9	891	28.2	557	24.8			466	23.4
390	855	25.5	880	27.4	560	24			458	22.1
392			884	27.6	577	23.1			472	22.2
394			889	27.4	593	23.4			484	22

Depth, m	BBH1		BBH2		BBH3		BBH4		BBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
396			882	27.4	574	23.7			488	22.7
398			880	27.2	571	23.3			460	23
400			884	27.4					444	23.1
402			882	27.2					456	23
404			880	27.2					448	23
406			882	27.4					438	23
408			884	27.2					427	22.7
410			886	27.4					406	23.8
412			888	27.2					418	23.6
414			886	27.4					415	23.8
416			888	27.2					427	24.7
418			884	27.4					430	23.4
420			884	27.4					422	23.4
422									420	23.5
424									435	23
426									428	23.5
428									440	23.3
430									442	23
432									438	23.4
434									474	24.3
436									456	23.8

Electrical conductivity and Temperature data at Sebeta Tefki area

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2										
4										
6										
8										
10										
12	634	16.6								
14	630	17.1	532	20						
16	624	23.6	530	19						
18	621	24.8	536	20						
20	612	23.4	542	20						
22	616	22.8	548	21			520	28.1		
24	602	25.5	546	22			522	28.5		
26	594	20.3	580	21			561	24.9	531	28.5
28	602	24.6	618	23			560	26.2	535	27.5
30	610	26.2	632	23			542	28	604	24.9
32	608	27	660	27			523	26.4	589	26.1
34	600	28.8	720	24			528	24.9	509	28
36	618	29.1	780	25			551	25.4	532	26.5
38	630	26.3	760	28			545	26.5	545	24.9
40	614	21.5	782	23			552	24.6	554	24.4
42	593	19.2	800	24			552	24.8	583	26.3
44	580	23.2	820	23			561	26.4	562	26.1
46	572	19.8	826	22	473	26.8	544	26	590	24.6
48	582	23.8	796	23	467	29.5	583	25	623	26.5
50	595	21.7	790	28	508	31.1	590	26.4	612	24.1
52	590	19.1	810	30	535	28.3	583	24.8	584	24
54	600	21.8	747	22	511	26.8	560	24	632	20.2
56	578	21.7	756	22	621	25.9	566	23.1	588	24.3
58	576	25.7	743	23	546	25.4	584	25	526	25
60	570	22.2	782	23	580	26.1	612	24.8	583	24.6
62	580	21.8	840	24	541	25.3	623	24.2	600	25
64	624	22.9	856	24	590	25.8	632	26.8	613	24.9
66	628	21.8	795	21	520	23.6	588	26	706	24
68	629	22.3	776	22	514	22.7	600	25.3	604	24.2
70	626	22.2	769	20	458	24.1	613	24.9	662	20.6
72	631	21.6	804	24	490	24.6	611	25.2	609	22.3
74	648	20.2	836	23	526	24.7	622	26.2	782	23.2
76	667	21.1	843	24	430	23.6	604	24.9	504	23.1
78	663	21.3	832	24	510	23.2	608	24.8	559	23.8

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
80	671	20.3	802	22	486	22.7	605	24.7	619	23.8
82	645	20.7	792	23	476	23.1	647	25.6	725	24.8
84	652	21.8	837	24	563	24.1	691	24.5	628	24.7
86	613	20.2	839	24	541	23.1	662	23.6	671	25.6
88	651	22.1	869	23	561	23.7	678	23.8	625	24.4
90	654	21.4	843	24	531	26.1	698	24.1	664	24.5
92	665	21.9	820	24	563	25.1	700	24	641	22.8
94	642	22	780	22	571	23.7	706	23.6	648	23
96	652	23.2	743	25	569	24.1	718	25.6	678	24
98	649	23.9	752	21	516	23.9	725	24.5	652	24
100	639	24.2	694	20	554	24.2	782	26.3	704	23.6
102	665	25.3	688	20	523	24.7	671	28	680	25
104	634	24.1	702	18	519	23.2	628	25.4	706	24.5
106	622	23	698	19	531	25.4	664	25.9	694	26.3
108	659	24.9	690	19	561	24.1	678	24.6	726	28
110	656	24.8	741	20	528	24.5	726	23.5	755	25.4
112	628	24.1	738	20	521	23.7	729	24.8	748	25.9
114	636	25	752	23	519	23.4	731	25.2	707	24.6
116	668	23.4	760	22	545	22.8	728	23.9	700	23.5
118	658	23.9	754	23	523	22.6	700	24.4	639	24.8
120	677	24.7	770	25	517	22.9	718	24.6	621	24.9
122	659	24.7	774	25	513	22.4	726	25.2	600	25.2
124	633	24.9	772	23	521	24.1	706	24.6	709	26
126	624	24.3	790	24	516	24.3	696	25	624	23
128	682	23.8	796	24	519	23.5	678	25.5	627	26
130	683	23.8	801	21	510	23.7	701	25.7	701	23
132	684	23.5	810	23	501	23.1	710	24.9	655	23.6
134	676	23.2	798	24	509	22.7	780	24.6	650	24.6
136	668	23.3	812	22	512	22.4	698	25.2	660	24
138	658	23.5	820	23	551	21.1	699	25	672	23
140	679	23.2	815	26	541	23.9	709	25.1	665	22
142	666	24.3	812	26	533	24.1	704	24.8	662	22.5
144	674	23.9	800	26	519	21.9	721	24.7	658	22
146	653	24.3	796	25	527	23.7	714	25.1	668	23
148	675	24.4	806	26	541	24.7	711	25.3	673	23.3
150	668	28.5	804	25	531	25.1	715	26	686	23
152	656	28	824	23	540	25.1	762	25.4	655	24.4
154	672	26.2	829	24	541	25.2	674	25.2	655	24.8
156	662	26.4	840	23	539	25.2	701	25.3	642	25.1
158	682	27.9	836	24	542	25.2	716	25.4	663	25

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
160	685	26	830	24	541	25.1	736	24.9	700	25.2
162	639	26.3	823	24	543	25.3	731	24.8	649	24.6
164	629	22.6	809	26	540	25.3	729	23.4	680	24.9
166	654	18.2	814	26	534	25.1	762	24.8	708	25.7
168	684	19.2	817	26	542	25.3	724	25.1	710	25.5
170	685	22.5	813	26	541	25.3	728	24.9	788	25
172	666	20	831	25	542	25.2	732	24.2	779	25.2
174	657	22.1	842	26	541	25.1	746	24.86	781	25.4
176	687	20.9	848	24	540	25.3	742	24.9	788	25.3
178	654	21.4	843	24	542	25.3	762	25.01	759	25.7
180	677	18.9	832	25	543	25.3	751	25	778	25.5
182	673	18.5	839	25	544	25.4	811	25.3	784	25.5
184	666	23.3	828	22	543	25.3	817	24.6	812	24.9
186	654	24.9	840	23	547	25.2	814	25.3	818	26.3
188	659	24.1	846	23	545	25.2	816	25.4	816	26.4
190	661	31.2	852	24	546	25.2	808	26	814	27
192	657	30.4	849	25	543	25.2	794	26.3	808	27
194	647	29	839	25	547	25.3	802	27	789	26.9
196	668	24.2	818	21	546	25.3	807	26.9	804	26.7
198	664	26.2	842	22	546	25.2	796	26.7	794	27.6
200	694	32.8	694	19	544	25.3	809	27	780	27.6
202	706	22.3	645	23	547	25.1	811	27.3	802	26.4
204	722	21.2	609	24	546	25.2	792	28	779	27
206	728	22.1	622	22	545	25.3	778	27.6	780	27.4
208	684	21.9	628	25	546	25.2	775	26.9	775	26.9
210	714	19.3	616	23	546	25.3	782	27	795	26.5
212	689	22.9	650	24	547	25.2	768	27.2	802	27
214	696	24.1	680	23	544	25.3	791	27.6	811	27.2
216	706	24.3	692	20	543	25.2	793	27.1	816	26.9
218	720	22.9	709	22	545	25.3	789	27.23	725	28.7
220	714	21.5	737	22	542	25.2	803	27.32	658	29.5
222	721	18.2	726	24	544	25.3	801	27.5	668	29.7
224	718	20.2	742	24	546	25.3	800	27.47	632	29.9
226	713	22.6	780	23	547	25.2	806	27.42	616	32.1
228	720	23.4	784	20	546	25.3	802	27.46	604	32
230	722	22.9	769	20	548	25.3	811	27.52	624	32.1
232	715	21.6	792	23	551	25.2	816	27.56	634	31.8
234	716	23.3	860	21	546	25.2	807	27.38	636	31.3
236	688	24.3	828	21	547	25.2	807	27.18	644	31.8
238	663	25.5	939	20	545	25.2	806	27.26	641	31.9
240	670	20	1011	23	548	25.3	809	27.6	661	31.8

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
242	672	21.4	1038	21	541	25.3	810	27.68	684	31.9
244	669	24.3	1025	20	548	25.3	812	27.62	649	31.8
246	673	27.5	1040	19	549	25.3	811	27.6	650	31.9
248	709	28.1	1014	20	546	25.3	816	27.68	658	29.5
250	732	22.9	1022	20	546	25.2	814	28	699	32
252	715	23.1	1162	22	545	25.2	821	28.2	686	31.9
254	718	21.8	1156	22	550	25.2	821	28.01	649	31.3
256	715	22.9	1146	23	554	25.1	822	28.16	678	31.5
258	705	23.1	1176	23	547	25.1	832	28.21	682	28
260	709	22.4	1162	23	581	25.2	833	28.23	701	26.8
262	720	27.5	926	20	612	25.3	827	28.5	691	27
264	716	21.8	933	23	624	25.1	827	28.54	708	27.02
266	713	23.8	887	21	627	25.3	829	28.6	660	25.8
268	710	24.6	869	22	630	25.4	832	28.7	699	25.8
270	704	23.4	886	23	671	25.1	821	28.5	712	25.6
272	686	23.4	981	20	674	25.3	818	28.54	706	25
274	738	23.5	942	22	714	25.4	811	28.6	710	25.01
276	762	21.8	984	22	841	25.6	818	28.6	714	25.4
278	748	23.4	965	22	837	25.5	816	28.72	706	25.6
280	742	22.4	889	23	949	25.6	822	28.7	704	24.2
282	744	22.8	900	23	971	25.4	823	28.7	7118	24.1
284	749	21.9	870	22	978	26.2	820	28.8	699	28.7
286	738	23.1	910	21	981	26.1	820	28.9	694	27.6
288	742	23	892	23	980	26.4	823	27	672	27
290	754	25.7	894	24	987	26.1	818	27.6	669	27.4
292	760	26.6	853	24	984	25.7	806	28	681	25
294	756	26	848	22	991	25.1	802	28.1	684	26.7
296	746	26.4	978	22	991	25.1	811	28	674	28.1
298	740	21.4	982	24	993	21.3	800	27.6	677	28.2
300	744	23.8	969	23	990	24.1	818	27.5	650	30.6
302	758	22.3	962	24	991	23.4	822	28	676	31
304	876	22.2	992	23.4	984	23.3	817	27.4	656	31
306	890	25.2	942	21.8	990	23.3	818	27.6	682	31
308	824	24.8	904	22.9	971	23.3	816	27.7	701	29.8
310	789	25.9	894	24.7	981	23.3	820	28.3	711	30.1
312	830	26.1	892	25.4	975	23.4	821	28	684	30.8
314	907	23.5	869	24.2	980	23.5	821	28	657	31.4
316	884	22.9	872	24.6	987	23.6	821	28	714	31.2
318	902	24.4	836	23.9	984	25.4	820	28.3	708	30
320	920	23.8	892	23.4	985	23.2	823	28.02	788	29.8
322	910	23.2	886	23.1	989	23.4	828	28.12	785	29.7

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
324	903	21.1	846	23.6	993	23.3	823	28	779	29.6
326	922	26.1	846	24.2	995	23.2	816	28.7	697	28.1
328	924	27.2	872	24.6	962	24.5	814	28.4	677	26.1
330	923	20.8	894	23.2	971	24.4	820	28.3	664	30.4
332	932	18.9	890	23.9	968	24.3	809	28.6	699	28.4
334	774	23.9	872	23.1	969	24.2	811	28.7	702	26.8
336	779	29.6	883	24.5	978	24.4	812	28.1	698	26.1
338	790	22.3	894	24.8	975	24.5	823	28.4	696	26
340	851	22.5	910	22.1	964	24.6	829	28.5	677	28.4
342	848	28.3	926	21.8	971	24.8	818	28.3	682	28.8
344	840	24.5	930	20.2	973	24.6	823	28.6	691	28.1
346	836	23.2	950	21.3	978	24.7	825	28.3	701	28
348	853	26.3	942	22.8	973	24.7	823	28.3	712	28.6
350	853	25.4	953	21.9	968	24.6	827	28.4	701	28.7
352	720	23.4	932	24.2	969	24.7	823	28.5	695	29
354	728	26.6	935	24.6	971	24.9	821	28.4	699	29.06
356	810	26.3	923	23.7	974	25.3	830	28.7	698	28.96
358	830	24.9	930	23.4	973	25.2	829	28.6	705	28.6
360	780	22.3	932	22.6	971	25.1	826	28.5	710	29
362	736	23.9	934	23.5	973	25.3	827	28.5	718	28
364	722	24.3	937	24.2	974	25.4	829	28.6	715	29
366	721	21.9	935	21.7	975	25.3	827	28.7	720	29.1
368	726	25.8	922	24.4	973	24.7	834	28.6	713	29.4
370	722	21.3	920	20.8	971	24.3	832	28.5	719	29.3
372	724	23.6	846	26.4	971	24.1	834	28.61	717	29.5
374	729	25.3	862	24.6	974	24.5			714	29.4
376	735	22.8	853	25.3	971	24.3			711	29.9
378	790	28.6	832	24.6	973	24.7			702	28.8
380	814	25.4	829	24	973	24.1			709	28.6
382	800	24.9	830	23	974	24			713	29.1
384	846	24.4	810	21	980	24.2			720	29.9
386	842	23.8	839	22	978	23.8			715	30.1
388	848	21.8	847	21	978	23.7			712	30.4
390	854	24.1	824	22	979	23.6			718	28.8
392	825	26.4	828	24	981	23.5			762	30.1
394	790	27.4	816	26	986	23.5			766	29.4
396	783	25.3	842	25	988	23.6			768	29.6
398	742	22.3	854	23	985	23.4			761	29.4
400	726	25.3	848	21	989	23.5			758	29.7
402	736	26.2	862	23	986	23.5			754	30.2
404	760	25.6	882	25	985	23.6			753	29.9

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
406	738	28	878	24	987	23.5			738	30.1
408	754	25.6	868	22	989	23.4			782	30
410	740	26.2	802	24	989	23.5			781	28.8
412	720	25.1	782	26	986	23.4			719	29.4
414	786	26.3	774	20	988	23.5			725	29.8
416	746	30.3	781	19	986	23.5			723	29.6
418	794	30.4	784	18	989	23.5			716	29.7
420	800	29.4	769	22	989	23.4			718	28.7
422	792	26.9	783	22	987	23.4			698	30.2
424	784	27.1	791	23	985	23.5			669	30.1
426	768	27.8	772	24	988	23.5			692	31
428	772	26.4	764	24	987	23.4			718	30.3
430	783	28	743	24	988	23.4			756	30.1
432	758	26.4	769	24	988	23.5			791	29.7
434	764	26.3	764	25	986	23.5			748	29.4
436	792	26.4	775	26	989	23.5			772	30.1
438	798	26.3	759	26	987	23.4			798	30.6
440	754	24.8	746	25	987	23.5			807	30.12
442					989	23.6			810	28.2
444					989	23.6			832	30
446					989	23.5			864	30.1
448					987	23.6			882	28.9
450					987	23.6			906	29.6
452					981	26.1			900	29.1
454					1110	25.3			902	28.3
456					1212	24.9			901	28.9
458					1310	25.1			910	29.8
460					1120	23.7			916	29.4
462					1218	23.3			906	30
464					1292	24.5			916	29.6
466					1381	23.4			914	29.4
468					1258	23.9			918	29.8
470					1317	24.7			923	30
472					1278	25.9			921	29.9
474					1339	26.7			917	29.6
476					1378	26.4			918	29.5
478					1309	26.2			931	30
480					1296	25.3			926	29.87
482					1283	23.9			927	29.34
484					1278	23.2			938	29.67
486					1308	23.1			918	31

Depth, m	STBH1		STBH2		STBH3		STBH4		STBH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
488					1256	23.7			923	30
490					1344	23.4				
492					1148	24.2				
494					1278	24.7				
496					1138	24.4				
498					1089	24.9				
500					1183	25.3				
502					575	29.5				
504					570	29.5				
506					559	29.4				
508					582	29.7				
510					595	29.8				
512					612	29.8				
514					614	29.7				
516					618	28.7				
518					625	29.8				
520					616	29.7				
522					630	29.9				
524					635	29.8				
526					630	28.9				
528					629	28.4				
530					608	28.5				
532					603	30.9				
534					601	30.1				
536					613	30.2				
538					610	29.9				
540					614	30.1				
542					612	29.8				
544					616	30.1				
546					612	30.1				
548					609	29.9				
550					614	30.1				

Electrical conductivity and Temperature data at Addis Ababa area (1)

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2			750	27	1382	26.1			268	19.2
4	1018	27.5	840	26	1376	26.2	560	23	270	18.9
6	1019	27.6	850	25	1244	27.5	610	21.1	284	20.2
8	1000	25.7	860	28	1083	22.7	700	20.9	294	19.4
10	1010	25.6	870	27	1070	22.8	710	20.3	298	19
12	1070	25	880	25	987	27.3	720	21.2	340	19.5
14	1020	25	890	26	981	26.4	810	20.9	348	19.6
16	972	26	910	27	930	21.5	850	20.1	418	19.8
18	972	27.4	920	26	980	24.1	870	20.1	436	19.9
20	975	27.2	940	25	969	25.7	890	19.5	424	19.8
22	826	25	950	26	929	25.1	880	19.9	430	20
24	828	24	960	24	867	22.4	980	19.5	425	19.9
26	826	23	980	23	894	27.01	910	19.7	421	19.8
28	831	25	990	24	813	25.01	1020	19.5	433	20.3
30	834	26	1000	24	890	26.4	1120	19.7	423	20.5
32	810	25	1100	25	904	26.8	1160	24.3	521	19.9
34	770	24			924	27.4	1160	23.4	531	20
36	780	26			880	27.4	1190	24	537	20
38	796	26			987	24.3	1200	25.1	533	19.6
40	784	25			940	25.8	1130	20	532	19.4
42	786	25	1200	20	1018	28.5	1190	21	534	19.7
44	778	25	1300	22	970	27.4	1200	22	525	19.3
46	774	25	1250	23	899	26.3	1210	21.9	521	19.8
48	762	25	1220	24	947	25.8	1230	20.9	523	19.9
50	754	25	1230	25	968	26.3	1210	20.8	524	20.1
52	728	28	1310	20	925	25.4	1230	22.2	514	21
54	730	27	1210	21	916	25.6	1100	21.5	400	20.9
56	731	26	1230	25	891	26	1090	21.3	492	20.7
58	730	28	1200	23	869	26.1	1080	22.1	490	20.4
60	716	26	1210	22	870	26.3	1080	20.1	477	20.6
62	728	28	1190	22	824	28.3	1090	20.5	479	19.9
64	752	28	1210	23	855	29.3	1080	20.9	457	19.6
66	732	26	1210	24	903	26.5	1100	21.5	461	19.5
68	567	25	1190	25	824	25.5	1180	20.9	466	19.3
70	540	25	1170	26	792	25.7	1190	20.7	467	19.01
72	505	24	1180	26.5	777	26	1190	20.5	469	19
74	502	25	1070	25.4	812	26.9	1180	20.7	474	19
76	526	26	1080	24.1	733	24.1	1200	21.3	482	19.4
78	532	27	1090	23.5	752	24.1	1210	20.9	449	19.7
80	532	26	1070	25.1	785	25.2	1200	20.8	434	19.2
82	536	25	1220	26.1	753	27.3	1220	21.5	422	19.5
84	542	26	1110	26.5	752	26.9	1230	21.9	394	19.05

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
86	546	26	1090	25.7	771	25.1	1170	22.3	340	19.02
88			1100	25.6	708	27.2	1180	23.5	322	19.6
90			1120	25.9	677	26.1	1100	24.2	400	19.8
92			1060	26.1	659	26.2	1120	25.1	440	19.7
94			1040	27	637	27.3	1140	24.3	430	20
96			1030	26.9	613	25.7	1170	23.5	414	20.4
98			1000	26.7	616	26.6	1180	22.1	390	20.6
100			980	26.1	613	26.5	1190	21.7	380	20.3
102			990	26	621	26.5	1180	22.3	345	20
104					610	26.4	1190	21.5	333	19.9
106					615	26.5	1170	24.5	330	19.3
108					557	27.8	1180	20.3	309	21.1
110					567	26.7	1160	20.2	320	22
112					562	27.4	1170	20.1	330	20
114			1060	26.4	567	27.2	1190	23.1	324	21.1
116			1050	26.3	567	26.6	1180	21.9	332	19.8
118			1100	26.1	565	26.9	1150	23.2	312	19.9
120			1200	26.4	563	27	1140	24.6	308	18.9
122			1240	25	560	27.6	1120	25.2	330	19.01
124			1230	27	656	28.2	1130	25.1	331	19
126			1250	28	560	27.2	1100	24.1	330	19
128			1270	29	677	28.2	1130	25.1	308	20
130			1260	27	666	27	1120	25.4	306	20.4
132			1270	26	657	29.4	1250	24.3	324	20.6
134			1280	28	643	28.3	1140	23.6	324	20.1
136			1290	26	640	29.2	1200	23.9	319	19.7
138			1300	26.5	699	28.8	1130	25.6	304	19.8
140			1310	29.1	703	28.2	1140	25.8	334	19.8
142			1300	28.5	698	28.6	1140	25.6	340	19.8
144			1310	28.1	719	28.9	1130	26.3	341	19.6
146			1310	26	716	28.9	1120	26.8	348	18.9
148		25	1300	25	712	29.2	1130	25.6	450	18.7
150		25	1290	26	715	30.1	1140	25.4	456	18.34
152		25	1300	27	702	29.3	1150	25.9	459	18.65
154		25	1310	25.9	693	30	1140	26.1	460	18.89
156		25	1320	25.7	681	29.2	1140	25.3	330	19.01
158		25	1310	26.1	690	29	1130	25.2	330	19.06
160		26	1300	26.1	704	28.8	1150	25.7	318	19.42
162		26	1250	25.6	705	29	1140	25.9	333	18.93
164		25	1260	26.1	719	30	1130	25.8	327	19.3
166		26	1200	29.2	718	30	1120	25.8	325	20.01
168		26	1210	27.5	690	29.9	1130	26.3	334	20.02
170		26	1220	26.1	694	30.4	1140	26.1	326	20.45
172		23	1210	28.1	703	30.7	1120	25.7	332	21.01

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
174		23	1180	29.2	705	29.6	1130	25.6	337	21.6
176		23	1160	27.9	703	31.3	1120	26.7	312	21.7
178		23	1170	28.5	713	30.5	1130	25.2	336	21.4
180			1180	26.9	708	30.3	1130	24.1	324	21.05
182			1180	27.1	734	30.6	1140	24.6	324	21
184			1170	27.5	718	29.6			306	20.09
186			1160	27.6	746	30.8			306	20.4
188			1180	24.6	753	31.4			323	19.4
190			1190	23.5	738	31.2			304	19.6
192			1200	22.1	767	31.7	1140	25.9	326	19.4
194			1250	25.7	738	31.5	1130	25.9	480	19.4
196			1230	28.1	734	30.3	1150	25.9	332	19.06
198			1240	24.1	732	30.4	1160	25.3	330	19.1
200			1240	27.1	748	30.9	1130	24.2	320	19.2
202			1250	25.1	755	31	1140	25	316	18.85
204			1240	25.9	777	30.8	1150	25.7	327	19.45
206			1230	26.5	794	30.5	1150	27.9	322	19.95
208			1250	27.1	865	30.7	1250	26.1	335	20.1
210			1230	24.9	795	31	1180	25.3	325	20.1
212			1240	25.3	791	31.5	1190	24.5	327	20.1
214			1250	25.2	782	30.2	1200	23.4	326	20.1
216			1260	24.3	800	30.3	1230	23	320	20.7
218			1270	24.4	835	30.7	1250	24.5	325	19.7
220			1270	24.5	824	31.5	1300	24.3	318	20
222			1280	25.7	818	31.2	1350	24	316	20
224			1260	25.3	843	31.2	1360	22.3	314	20.1
226			1280	25.6	842	32.1	1370	23.9	312	20.2
228			1270	24.4	864	32.2	1390	23.6	306	19.9
230			1260	26.5	857	31.2	1380	23.5	306	19.8
232			1250	23.4	865	31.6	1390	23.1	304	19.85
234			1270	24.5	864	32	1400	22.5	317	19.9
236			1240	24.7	887	30.9	1350	22.6	318	19.9
238			1250	25.6	884	31.1	1340	22.9	317	19.3
240			1260	25.7	909	32	1370	23.5	328	20
242			1260	25.9	927	32	1400	21.5	322	20
244			1270	25.5	929	32	1450	20.9	324	20
246			1280	26.5	925	32.4	1460	21.8	324	20
248			1290	26.1	935	32.6	1470	21.3	322	19.8
250			1280	25.9	953	31.9	1450	21.4	322	20
252			1280	24.6	918	31.8	1500	22.5	326	19.8
254			1120	24.1	908	32.1			327	21
256			1130	25.3	942	31.9			328	21
258			1120	25.4	936	32			332	20.8
260			1140	24.3	924	32.6			329	20.4

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
262			1190	22.9	928	32.1			328	20.14
264			1230	23.1	917	31.5			328	20
266			1200	23.2	988	31.6			321	20
268			1160	24.5	1020	32.9			316	19.8
270			1120	25.9	1052	33.3			309	19.8
272			1110	28.8	1070	33				
274			1110	24.5	1020	33.2				
276			1100	25.6	1090	32.9				
278			1190	27.5	1076	32.6				
280			1130	24.3	1054	31.8				
282			1140	25.6	1065	34				
284			1120	26.3	1085	35				
286			1110	27.9	1052	35.2				
288			1160	26.9	1020	35.2				
290			1170	25.8	1134	35.6				
292			1180	25.7	1115	35				
294			1190	26.8	1109	35				
296			1200	28.1	1268	34.8	1800	21.3		
298			1210	29.1	1257	33.9	1900	22.4		
300			1190	24.9	1243	32.7	1850	23.6		
302			1140	25.2	1283	35.6	1750	22.3		
304			1180	24.8	1313	35.1	1800	21.9		
306			1190	25.4	1290	34.3	1790	23.2		
308			1230	25.6	1281	35.1	1780	23.4		
310			1240	26.1	1276	35.2	1850	24.1		
312			1260	26.3	1270	35.9	1900	23.2		
314			1290	26.6	1254	35.8	1900	21.3		
316			1280	27.1	1246	35.9	1970	20.9		
318	1176	28	1270	27.6	1258	36.6	1980	21.9		
320	1178	28	1250	27.5	1310	37.1	1960	21.8		
322	1179	26	1290	28	1319	37.6	1970	22.3		
324	1178	28	1280	28.5	1312	36.9	1840	21.8		
326	1181	27	1290	26.6	1042	31.7	1800	21.9		
328	1184	28	1310	25.9	1030	31.5	1830	20.5		
330	1181	28	1320	26.8	866	34.4	1800	21.8		
332	1182	28	1340	26.3	854	34.7	1810	22.3		
334	1184	29	1350	26.7	1166	34.6	1830	20.9		
336	1184	29	1360	26.9	1159	34.3	1840	21.5		
338	1186	29	1370	26.9	1159	33	1750	22.3		
340	1185	29	1360	26.8	1156	33.1	1780	22.9		
342	1185	26	1380	26.7	1170	34.9	1820	21.4		
344	1186	26	1370	26.5	1168	35.8	1830	20.9		
346	1187	27	1360	25.7	1170	35.8	1810	20.8		
348	1188	27	1380	26.2	1168	36.3	1830	21.3		

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
350	1188	27	1350	26.1	1164	37	1870	20.9		
352	1189	28	1360	26.3	1224	38.4	1820	23.1		
354	1188	28	1370	26.1	1208	38.2	1780	24.5		
356	1189	28	1360	25.9	1178	39.1	1750	22.6		
358	1188	28	1380	25.7	1154	38.7	1850	23.4		
360	1196	27	1390	25.9	1196	37.6	1840	22.9		
362	1195	28	1420	26.5	1166	38.1	1820	23.8		
364	1194	28	1460	27.3	1218	36.8	1820	23.8		
366	1192	28	1480	27.5	1227	35.8	1810	22.6		
368	1191	29	1500	27.1	1192	37.2	1800	22.7		
370	1192	29	1530	25.2	1248	38.4	1820	22.8		
372	1193	29	1520	25.1	1220	38.1	1830	22.9		
374	1192	27	1540	25	1240	38	1810	23.6		
376	1194	28	1550	25.1	1120	39.6	1750	24.1		
378	1195	27	1540	24.8	1140	39.7	1780	22.9		
380	1194	27	1530	24.9	1175	38.8	1790	22.8		
382	1196	28	1560	24.1	1230	38.1	1780	23.6		
384	1194	28	1530	25.3	1155	38.3	1800	23.6		
386	1214	27	1540	24.9	1184	39.3	1780	23.9		
388	1212	28	1550	26.1	1250	38.2	1790	23.6		
390	1210	28	1550	25.9	1290	39.6	1780	23.4		
392	1220	27	1540	25.8	1114	38.2	1790	23.8		
394	1221	28	1550	25.6	1252	39.8				
396	1223	27	1560	25.2	1327	36.6	1750	24.5		
398	1234	29	1570	24.3	1309	36.4	1740	24.6		
400	1235	28	1580	24.9	1319	37.9	1710	24.3		
402	1230	27	1570	24.6	1286	38.9	1720	24.2		
404	1231	28	1560	24.7	1268	39.1	1740	24.3		
406	1230	27	1550	24.5	1295	40.5	1700	23.4		
408	1208	29	1570	25.3	1316	40.2	1690	26.5		
410	1206	29	1560	25.1	1358	40.7	1680	27.5		
412	1202	28	1580	24.9	1340	39.8	1670	27.9		
414	1204	28	1560	24.7	1329	40.3	1660	28.3		
416	1206	27	1550	24.2	1367	38.9	1670	28.4		
418	1208	27	1540	24.1	1334	38.7	1670	28.5		
420	1204	28	1570	24.5	1291	38.6	1650	26.3		
422	1236	28	1550	24.9	1268	39.9	1640	27.6		
424	1238	27	1510	25.5	1207	40	1630	27.4		
426	1237	28	1490	25.1	1454	39.01	1620	27.3		
428	1236	28	1420	24	1437	40.1	1610	27.6		
430	1238	28	1490	24.3	1467	39.8	1640	26.9		
432	1230	28	1460	24	1396	39.9	1640	29.8		
434	1238	28	1470	24.1	1486	40	1630	29.1		
436	1240	28	1450	24.9	1454	40	1650	28.9		

Depth, m	AABH1		AABH2		AABH3		AABH4		AABH5	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
438	1242	28	1560	26.2	1487	40	1620	28.2		
440	1180	28	1470	29.1	1476	42.7	1630	27.1		
442	1090	28	1580	28.1	1470	42.3	1620	27.9		
444	1100	28	1590	27.4	1466	42.1	1610	28.3		
446	1120	25	1580	25.6	1474	43.4	1630	27.9		
448	1192	25	1570	28.1	1463	43.5	1640	28.3		
450	1194	26	1590	28.3	1490	42.7	1640	28.1		
452	1198	26	1570	28.4	1477	42.5	1620	28.9		
454	1199	26	1560	28.5	1454	42.6	1630	28.3		
456	1201	26	1570	28	1498	42.1	1620	28.4		
458	1204	26	1580	28.1	1499	43.3	1620	28.5		
460	1206	26	1590	29.5	1523	42.1	1610	27.5		
462	1208	26	1560	29.5	1536	42.8	1620	27.6		
464	1208	27	1590	28	1544	42.6	1630	27.9		
466	1212	27	1580	29.8	1494	44.1	1640	28.5		
468					1489	44	1620	28.5		
470					1465	43.8	1630	28.6		
472					1443	44.2	1620	28.4		
474					1534	44.1	1580	27.9		
476			1560	25.5	1506	44.3	1570	27.9		
478			1580	26.8	1222	44.2	1560	27.6		
480			1570	26.7	1270	37.7	1570	27.9		
482			1560	26.9	1314	38.1	1580	27.6		
484			1540	26.2	1236	39.6	1560	27.5		
486			1550	26.3	1250	39.2	1570	27.6		
488			1570	25.8	1263	40.3				
490			1580	24.9	1361	39.8				
492			1590	25.5	1410	40.2				
494			1530	28.6	1413	43.5				
496			1540	28.2	1528	44.1				
498			1530	28.8	1525	44.2	1530	27.6		
500			1520	29.1	1516	44.1	1520	28.7		
502			1510	28.9			1530	29.5		
504							1530	28.5		
506							1540	28.5		

Electrical conductivity and Temperature data of Addis Ababa area (2)

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2			690	19.4	661	23.4				
4			780	20.1	680	23.7				
6			748	20.3	720	23.8				
8			774	20.4	724	23.85				
10			762	20.6	733	21.75				
12			780	19.8	731	20.8				
14			785	19.7	738	20.71				
16			792	20.2	754	21.4				
18			774	20	784	20.9				
20			768	20.1	801	22.3				
22			769	20.6	809	20.03				
24			806	21.3	842	19.4				
26			812	21.6	825	19.8				
28			817	19.7	864	19.5				
30			820	20.8	954	19.9				
32			978	21.6	983	20.5				
34			1097	22	1030	21.2				
36			1178	21.9	1042	21.2				
38			1179	20.3	1108	21.8				
40			1148	20.1	1109	20.9				
42			1143	20.3	1108	20.7				
44			1098	19.4	1024	22.1				
46			1131	19.8	1042	22.4				
48			1020	20.4	1063	20.4				
50			1078	19.4	1080	20.1				
52			1057	20.2	1097	19.2				
54			1055	20.2	923	19.4				
56			1055	19.11	980	19.6				
58			1053	19.6	985	19.6				
60			1075	19.3	989	19.8				
62			1033	19.2	967	19.7				
64			1036	19.6	803	20.3				
66			997	22.4	803	20.7				
68			985	22.6	909	21.1				
70			989	25.3	924	21.4				
72			967	21.4	928	24.5				
74			803	23.1	934	24.5				
76			924	22.2	908	21.1				
78			884	21.7	897	20.9				
80			854	21	881	20.9				
82			830	22.4	876	20.7				
84			799	22.2	774	20.7			1175	19.4

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
86			791	23.8	780	21.3			1198	20.1
88			772	22.1	798	22.1			1020	19.8
90			784	20.7	753	22.2			1112	19.7
92			741	18.4	744	22.3			975	20.7
94			747	17.4	738	23.1			968	20.9
96			724	18.4	728	22			918	21.2
98			711	18.1	716	21.9			896	21.6
100			750	22.7	711	21.9			894	21.8
102			737	22.1	773	21.5			893	23.1
104			781	22.9	803	21.02			896	23.2
106			811	25	810	20.8			894	22.1
108			860	21.9	823	20.8			908	22.4
110			863	23.7	828	20.4			911	22.3
112			795	24.5	854	20.3			914	21.7
114			795	22.6	860	19.9			921	20.8
116			785	25.2	863	19.9			918	20.9
118	1056	19	778	25.6	810	19.8			933	20.9
120	1086	19.01	753	24.3	795	19.7			944	21.1
122	1132	19.03	751	24.8	784	20.3			947	20.7
124	1070	19.06	741	24.1	776	20.7			959	20.5
126	1036	19.08	797	24.3	771	21.3			961	19.8
128	1031	19.1	808	25.6	769	21.7			971	19.7
130	1004	19.03	760	25	754	21.5			976	19.5
132	1001	19.1	757	24.4	751	21.2			951	19.1
134	993	19.99	771	24.2	749	20.9			913	18.1
136	1048	20	758	25.3	738	21.5			905	18
138	625	20.1	698	24.5	727	21.4			946	18.3
140	906	20	764	24.1	718	22			941	18.1
142	940	20.01	753	25.2	706	22			917	18.7
144	916	20.04	713	26.1	706	21.06			858	17.5
146	899	20.04	740	25.3	704	21.07			758	17.2
148	891	20.09	703	25.02	705	21.03			687	15.9
150	923	21	706	22.09	674	22.06			573	16.6
152	900	21.01	713	21.6	652	22.1			681	16.1
154	907	21	706	22	670	21.6			657	15.1
156	925	21	674	21.4	679	21			676	15.7
158	910	21.08	686	20.1	669	20.9			687	16.1
160	940	21.05	669	23.8	657	20.8			710	16.2
162	922	21	668	23.8	649	21.2			973	16.3
164	890	21.05	648	22.7	640	21.4			1532	17.4
166	840	21.09	642	22.6	638	21.9			1016	15.1
168	950	21.1	661	23.1	694	22.01	1265	20.3	907	16.5
170	945	21.1	785	25.1	724	22	1270	20.5	1136	17.7
172	900	21.1	1979	23.3	732	22.4	1265	20.8	1230	17.4

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
174	896	21.2	1967	23.6	738	22.7	1465	20.8	1150	18.6
176	890	21.1	1995	22.2	744	22.8	1359	22.6	1080	18
178	910	21.2	1762	22.8	754	23	1430	23.2	1100	19.3
180	920	21.4	825	25.4	759	23.2	1353	22.6	960	20.6
182	900	21.3	1378	21.2	785	23.7	1229	23.4	918	20.3
184	890	21.3	1344	23.7	847	23.9	1337	22.4	865	20.8
186	870	21.4	1344	24.6	851	24.01	1238	23.7	787	21.6
188	880	21.5	1451	23.7	857	24.02	1086	22.7	802	20.7
190	910	21.3	1708	23.7	890	23.9	1185	24.5	823	20
192	915	21.3	1347	23.3	924	23.8	1073	25.7	779	21.6
194	900	21.6	1698	24.3	933	24.1	1191	25.9	747	20.7
196	930	20.7	1265	23.7	937	24.4	1172	29.5	721	20.5
198	895	21.6	1700	22.3	929	24.6	1136	27.3	700	20.3
200	888	21.5	1462	26.2	923	25.01	1214	22.2	686	20.3
202	898	21.3	1350	23.9	982	25.01	1247	26.1	665	19.5
204	912	21.3	1326	25.2	998	24.2	1220	28.3	661	19.1
206	908	21.3	1441	25.1	1020	23.7	1218	26.5	654	19
208	894	21.4	1521	23.6	1039	22.7	1185	29.9	653	19.5
210	875	21.5	1389	23	1041	22.4	1251	29.5	647	18.1
212	882	21.5	1656	23.4	1084	22.6	1167	29.4	641	18.3
214	891	21.8	1610	23.4	1102	22.2	1159	26.4	644	18.1
216	898	21.7	1518	24.6	1110	21.8	1105	24	641	18.4
218	912	21.7	1508	24.8	1120	21.6	1205	26.6	600	17.3
220	925	22	1595	23.7	1140	21.9	1241	27.5	558	16.1
222	913	22	905	26.3	1154	22.01	1233	27.6	551	15.4
224	941	21.9	905	26.4	1123	22	1177	28.4	502	15.1
226	938	22.07	946	24.8	1094	23	1276	27.8	481	15.3
228	938	22	936	25.2	997	23.04	1219	27.8	450	15
230	922	22	1031	27.2	980	22.9	1203	26	388	19.1
232	908	22	1112	26.9	949	22.6	1293	26.2	359	19.7
234	885	22	1045	27.1	921	21.7	1291	28	398	20.7
236	893	22	1102	28.7	905	21.4	1251	23.8	345	21.7
238	900	22	1122	26	1021	23.1	1222	26.1	359	21.3
240	900	22.03	1113	24.1	1043	23.4	1219	26.5	334	20.7
242	893	22	1010	28.6	1049	23.5	1222	28.5	350	19.7
244			1146	28.3			1242	26.9	346	19.3
246	879	22	1146	28.3	1052	23.7	1229	26.8	356	18.7
248	870	21.3	1073	29.6	1056	23.9	1236	29.8	376	19.9
250	872	21.4	1067	29.3	1065	24.02	1250	28.8	388	17.2
252			1051	29.1	1067	24.7	1240	27	390	16.2
254			1052	28.6	1072	24.6	1237	28.5	371	15.1
256			1055	29.2	1074	24.8	1225	28.9	381	15.2
258			1057	29.3	1023	25.02	1217	28.5	355	17.3
260			1071	29.2	1010	25.07	1212	29.6	314	20.3

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
262			1060	29.1	1029	25.7	1216	28.1	310	21.4
264			1062	29.1	1029	26.01	1215	28.5	296	21.6
266			1057	29.4	1031	26.01	1194	27.9	297	22.1
268			912	27	1027	26.03	1179	27.5	297	22.5
270			978	28.5	1043	26.05	1154	26.4	298	22.5
272			1068	29.7	1037	26.05	1145	26.6	298	22.6
274			1051	29.9	1034	26.2	1126	25.5	298	22.5
276			994	30.1	1045	26.3	1138	27	297	22.6
278			1014	27.8	1054	26.4	1148	27.5	301	22.5
280			1026	30.2	1061	25.3	1130	28.1	322	21.1
282			1011	32	1075	25.2	1139	27.4	319	19.7
284			1072	29.8	1057	25.2	1140	27.4	305	19.7
286			975	30.4	1049	25.01	1114	28.5	310	18.6
288			1034	29.32	1039	25.01	1123	29.3	310	17
290			1036	28.7	1024	24.02	1152	26.6	341	17.7
292			956	27.2	1038	24.01	1150	25.2	333	16.9
294			1058	27.6	1032	24.3	1122	27.4	356	16.1
296			1047	26.6	1037	24.7	1114	26.9	371	18.7
298			1027	26.4	1035	24.3	1177	25	341	15.3
300			1076	26.7	1047	24.2	1102	27.5	300	14.3
302			1035	26.2	1041	23.9	1152	22.4	587	13.9
304			1035	25.6	1033	23.9	1200	21.9	614	19.8
306			1043	25.8	1021	23.4	1250	21.9	542	15.3
308			1003	24.6	1017	23.4	1155	28.2	522	16.3
310			1022	24.9	1016	23.4	1167	26	630	15.8
312			1021	24.9	1014	23.7	1142	27.9	611	19.6
314			1007	24.6	1011	23.8	1143	27.8	598	20.1
316			1021	24.6	1010	24.1	1140	25.3	524	19.8
318			1020	26.7	1009	24.2	1037	26.4	507	19.9
320			1003	26.2	1067	24.6	1171	27.1	494	20.8
322			979	24.8	1006	24.1	1055	21.9	471	21.2
324			982	26.2	1003	24.2	1005	27.3	415	20.6
326			959	28.1	994	23.9	1086	25.9	395	21
328			933	28.3	989	23.8	1142	25.7	404	18.9
330			917	25.7	988	23.7	1216	24.8	418	18.9
332			922	25.6	985	23.1	1028	25.2	415	19.2
334			912	25.7	979	23.6	1264	27.8	421	18.2
336			914	25.9	974	23.8	1275	27.9	408	17.7
338			920	27.9	973	24.4	1282	28.1	406	18
340			894	29.6	971	24.2	1259	27.4	420	17.2
342			923	29.8	967	24.7	1239	26.6	415	16.9
344			910	28.7	968	25.01	1256	27.5	416	16.2
346			914	28.6	970	25.2	1231	27.3	571	15.1
348			904	28.3	975	25.6	1224	26.6	610	14.3

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
350			904	25.8	963	26.7	1322	26.5	570	14.9
352			901	25.3	958	26.4	1305	27.3	534	15.1
354			890	24.3	947	26.7	1276	27.5	587	14.2
356			891	24.4	944	27.1	1280	27.4	565	17.9
358			875	24.7	936	26.3	1306	28.5	575	17.2
360			915	25.4	933	26.01	1264	28.6	561	16.2
362			917	25.3	932	25.4	1164	28.3	541	16.9
364			909	25.4	930	25.6	1240	27.6	573	17.1
366			904	25.4	929	24.8	1126	27.4	516	22.2
368			918	27.8	921	24.7	1274	27.8	498	21
370			908	26.7	916	24.5	1248	28.3	481	21.4
372			916	27.1	913	24.2	1261	29.2	467	22
374			930	28.6	910	24.8	1246	28.5	456	22.2
376			945	28.6	909	25.3	1271	28.9	449	22.3
378			940	28.5	906	25.7	1267	29.5	436	22.6
380			948	28.7	903	25.8	1273	28.3	425	22.7
382			964	26.4	901	25.9	1260	28.5	471	22.8
384			947	28.4	916	26.4	1225	28.6	406	22.7
386			944	30.1	918	26.8	1217	28.3	410	21.9
388			958	29.1	925	27.04	1221	28.9	365	17.9
390			979	26.9	932	27.06	1226	27.9	344	20.3
392			988	26.7	938	27.6	1105	25.6	334	21.6
394			969	28.3	940	28.9	1050	26.9	340	22.3
396			969	28.7	947	28.5	1068	26.8	334	22.9
398			1009	29.3	948	28.7	1078	27.2	331	23.2
400			972	30.2	951	28.8	1084	26.9	322	24
402			981	30.1	955	28.6	1084	28	312	22.7
404			944	30.2	960	29.7	1079	28.3	328	12.2
406					967	29.4	1096	28.5	318	18.2
408					968	29.8	1149	26.8	357	15.7
410					971	29.9	972	25.6	317	15.1
412					973	30.1	1002	25.3	331	15.2
414							1001	26.9	328	17.2
416					976	30.3	1027	26.4	312	19.3
418					979	30.4	1080	26.3	321	20.1
420					980	30.4	1029	26.9	312	22.2
422					985	29.4			303	22.4
424					989	29.6			320	17.2
426					994	31.6			331	15.4
428					1004	31.4			340	14.4
430					1003	29.7			321	14.9
432					1001	29.8			391	15.1
434									337	16.7
436									311	19.1

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
438									315	18.8
440									319	21.6
442									325	20.6
444									322	21.9
446									340	19.6
448									330	20.3
450									324	22.1
452									330	22.5
454									915	23.1
456									921	23.4
458									921	23.3
460									923	23
462									923	23.3
464									972	23.4
466									1161	23.6
468									977	23.7
470									794	23.6
472									773	23.2
474									1116	24
476									1036	24.9
478									977	20.7
480									986	19.9
482									922	19.8
484									333	20.5
486									341	20.2
488									327	19.7
490									352	20.8
492									349	21.7
494									328	21.5
496									345	19.6
498									337	20.1
500									330	17.2
502									332	18.7
504									335	17.2
506									347	17.9
508									352	18.2
510									323	22.3
512									332	20.8
514									321	19.8
516									340	17.2
518									356	19.5
520									322	17.2
522									335	18.8
524									378	16.9

Depth, m	AABH6		AABH7		AABH8		AABH9		AABH10	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
526									321	19.1
528									337	20.2
530									407	17.2
532									387	16.1
534									351	17.9
536									367	15.9
538									329	21.3
540									335	21
542									345	16.6
544									326	21.7
546									316	13.2
548									328	22.5
550									320	22.7

Electrical conductivity and Temperature data of Addis Ababa (3)

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2							824	19.7		
4							835	19.4		
6							904	19.8		
8			212	22.1			789	19.8		
10			219	23.4			805	20.2		
12			214	24.3			839	20.4		
14			228	26.4			879	20.1		
16			236	22.6			910	19.4		
18			241	29.8			918	18.6		
20			283	26.3			932	20.8		
22			225	27.4			84.3	24.3		
24			233	25.8			836	23.2		
26			281	29.6			71.4	24.3		
28			246	25.3			702	21.2		
30			236	28.4			808	23.1		
32			284	28.6			818	22.1		
34			266	28.4			914	25.2		
36			293	28.8			921	25		
38			245	28.9			940	23.5		
40			261	27.3			959	23.4		
42			229	29.4			1041	25.2		
44			283	30.2			1058	25		
46			221	30.8						
48			236	30.1			929	23.5		
50			258	30.9			974	23.4		

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
52			294	29.6			912	23.2		
54			296	28.7			914	22.3		
56			290	29.3			909	22.6		
58			298	28.2			901	22.1		
60			297	27.4			878	22		
62	1564	21.5	301	28.1			947	21.5		
64	1577	21.5	308	28.3			893	23.26		
66	1568	21.6	312	29.01			882	14.2		
68	1560	21.7	304	28.9			882	13.7		
70	1560	22.6	307	27.7			876	13.2		
72	1554	21.5	321	28.3			871	15.37		
74	1556	21.4	318	29.1			864	17.7		
76	1558	21.5	312	27.4			798	23.1		
78	1551	21.5	294	26.5			792	21.4		
80	1552	21.6	297	27.3			801	20.4		
82	1543	21.7	304	28.2			788	23.8		
84	1523	21.7	292	28.7			763	16.5	1175	19.4
86	1516	22.2	289	27.8			754	21.7	1198	20.1
88	1514	21.9	298	28.1			751	23.2	1020	19.8
90	1504	21.8	287	27.5			729	17.9	1112	19.7
92	1506	22.6	329	26.4			723	23.5	975	20.7
94	1498	22.4	332	26.3			709	22.4	968	20.9
96	1485	22.7	314	26.5			706	18.7	918	21.2
98	1452	22.8	317	27.1			704	20	896	21.6
100	1420	23.2	321	27.3			704	17.1	894	21.8
102	1417	22.1	319	26.9	1750	19.6	701	21.2	893	23.1
104	1411	21	297	27.4	1764	16.1	694	23.5	896	23.2
106	1407	20.8	314	27.5	1761	15.1	694	18.6	894	22.1
108	1400	19.8	325	27.7	1760	15.4	687	21.7	908	22.4
110	1277	22.7	304	27.9	1768	15.3	683	23.1	911	22.3
112	1070	22.7	316	26.7	1789	15.2	689	22.4	914	21.7
114	1162	21.9	640	22.7	1794	15.1	684	22.1	921	20.8
116	1210	21.6	638	23.8	1800	15.3	684	22.1	918	20.9
118	1180	22.8	627	23.8	1831	15.7	679	21.8	933	20.9
120	1270	24.2	632	24.1	1828	15.3	675	22.06	944	21.1
122	1310	24.7	639	23.7	1824	15.4	673	22.01	947	20.7
124	1295	24.3	635	23.5	1837	15.1	671	22.4	959	20.5
126	1270	22.6	640	24.6	1844	15.2	670	22.8	961	19.8
128	1210	24.6	597	23.6	1843	15.1	669	25.7	971	19.7
130	1196	25.1	591	24.1	1854	15.1	668	25.6	976	19.5
132	1170	20.2	589	24.9	1850	15.3	664	22.1	951	19.1
134	1167	20.1	596	24.7	1847	15.3	661	20.6	913	18.1
136	1170	22.2	593	25.6	1858	15.2	659	22.8	905	18
138	1169	22.1	297	25.1	1861	15.1	657	23	946	18.3

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
140	1173	20	215	21.8	1869	15.1	653	23.3	941	18.1
142	1175	21	316	17.9	1881	15.2	650	23.4	917	18.7
144	1178	20.7	307	15.4	1882	15.3	242	23.3	858	17.5
146	1174	20.6	362	16	1876	15.3	629	23.4	758	17.2
148	1181	20.5	336	21.1	1812	15.1	623	19.7	687	15.9
150	1187	20.6	287	32.9	1778	16.4	623	22.4	573	16.6
152	1179	20.5	276	25.9	1882	15.3	619.9	17.6	681	16.1
154	1183	20.1	268	24.3	1810	18.4	607.2	19.2	657	15.1
156	1184	21.2	260	33.2	1712	19.3	614.7	23.1	676	15.7
158	1180	20.7	266	22.9	1062	21.3	641	23.2	687	16.1
160	1175	20.5	282	26.2	1099	21.3	639	23.6	710	16.2
162	1177	20.4	267	25.2	1071	21.7	640.7	24.1	973	16.3
164	1180	20.4	273	28.3	1064	17.1	636	23.3	1532	17.4
166	1175	20.3	270	28.9	1000	17.3	652	24.3	1016	15.1
168	1174	20.5	272	24.2	941	16.1	582	20.8	907	16.5
170	1170	20.5	275	26.9	923	15.9	544	21.6	1136	17.7
172	1169	20.5	281	25.8	921	15.4	612	19.4	1230	17.4
174	1168	20.4	298	20.6	894	15.3	568	23.9	1150	18.6
176	1170	20.3	274	18.7	811	16.7	553	20.1	1080	18
178	1165	20.4	296	20.1	745	14.3	570	24.2	1100	19.3
180	1163	20.3	288	19.8	756	16.7	576	24.6	960	20.6
182	1156	20.1	293	23.4	661	21.4	545	22.3	918	20.3
184	1155	20.1	284	25.6	685	21.1	548	22.19	865	20.8
186	1158	20.1	311	24.8	844	16.9	517	24.7	787	21.6
188	1156	20.1	297	25.7	823	15	537	20.9	802	20.7
190	1157	20.3	276	25.4	770	21.7	569	21	823	20
192	1155	20.2	276	25.9	690	22.1	586	21.5	779	21.6
194	1160	20.1	293	25	662	23	592	20.8	747	20.7
196	1167	20.2	298	25.6	723	21.9	601	21.3	721	20.5
198	1055	20.2	316	25.8	708	23.7	604	22	700	20.3
200	1010	21.8	308	25.4	710	23.7	611	24	686	20.3
202	1015	21.7	321	25.9	214	19.8	617	15.5	665	19.5
204	1012	21.9	329	24.6	224	21.5	623	23	661	19.1
206	980	23.3	325	22.9	225	21.5	628	24	654	19
208	1154	23.3	336	24.8	221	21.3	632	21	653	19.5
210	1143	23.1	319	25.1	228	21.2	631	24	647	18.1
212	1102	23.2	338	23.4	227	20.9	624	18.9	641	18.3
214	1135	23.1	324	24.9	225	20.8	641	23.4	644	18.1
216	1154	22.7	309	25.5	226	20.9	647	23.9	641	18.4
218	1167	22.8	313	25.3	224	20.5	635	22.7	600	17.3
220	1170	22.7	328	25.4	217	14.5	631	23.1	558	16.1
222	1165	22.3	299	24.8	219	14.6	625	24.6	551	15.4
224	1160	22.3	276	25.6	214	16.4	1266	25.6	502	15.1
226	1157	22.4	274	25.1	326	14.4	1260	24.7	481	15.3

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
228	1190	22.4	283	24.9	329	14.5	1258	24.8	450	15
230	1180	22.5	291	25.6	326	17.5	1128	24.6	388	19.1
232	1085	22.5	296	22.7	320	19.2	1112	24.1	359	19.7
234	1274	23	289	22.6	321	18.5	1210	25.3	398	20.7
236	1370	23.1	297	22.3	319	18	1091	24.6	345	21.7
238	1355	23.3	306	22.2	322	18.5	1048	24.2	359	21.3
240	1387	24.1	322	21.6	319	19	1033	24.1	334	20.7
242	1413	24.5	325	22.7	324	20	1021	24.6	350	19.7
244	1379	25	331	23.01	327	19.5	993	24.3	346	19.3
246	1368	25.1	320	21.9	321	21.5	988	21.7	356	18.7
248	1267	25	322	25.1	323	20.5	923	22.1	376	19.9
250	1286	25	329	26.3	321	20.4	905	23.14	388	17.2
252	1280	23	342	26.9	324	20.6	889	24.6	390	16.2
254	1274	22	248	24.4	320	20.4	874	23.7	371	15.1
256	1277	21.5	251	24.6	311	22.4	835	22.1	381	15.2
258	1269	21.8	333	23.1	320	20.3	793	19.9	355	17.3
260	1284	21.2	337	25	324	20.4	712	18.1	314	20.3
262	1524	24.3	341	22.6	331	18.8	714	23.4	310	21.4
264	1327	23.7	328	21.7	326	18	719	24.1	296	21.6
266	1220	23.9	332	22.8	332	20.7	724	19.8	297	22.1
268	1298	22.8	318	24.6	333	20	739	22.7	297	22.5
270	1350	22.6	321	24.8	335	20.1	743	21.5	298	22.5
272	1310	22.4	316	24.9	337	20	729	23	298	22.6
274	1316	22.5	338	25.1	336	20.1	848	24.1	298	22.5
276	1305	21.9	251	25.3	339	19.8	964	22.9	297	22.6
278	1290	21.8	546	25.8	342	19.6	793	23.1	301	22.5
280	1293	21.3	333	25.4	348	19.5	898	21.9	322	21.1
282	1325	19.5	324	24.8	346	19.6	994	23	319	19.7
284	1316	19	327	22.3	345	19.6	1000	23.4	305	19.7
286	1319	19	329	28	347	19.5	1030	24	310	18.6
288	1335	18.5	341	16.8	344	19.7	1230	22.2	310	17
290	1325	18.6	325	12.5	347	19.5	510	23.1	341	17.7
292	1487	23.1	337	20.5	349	19.5	560	24.2	333	16.9
294	1520	23.1	343	25.8	350	19.7	870	22.3	356	16.1
296	1370	23.4	490	26.8	348	19.6	990	21.6	371	18.7
298	1380	24.3	478	24.6	359	19.5	920	23.3	341	15.3
300	1155	24.7	319	19.9			678	20.8	300	14.3
302	907	24.8	349	19.7			683	22.3	587	13.9
304	1085	23.5	325	20			842	22.2	614	19.8
306	1190	23.8	338	14.6			568	22.2	542	15.3
308	857	23.6	415	15.2			680	22.6	522	16.3
310	893	23.8	409	14.3			720	22.8	630	15.8
312	900	24.8	455	15.8			784	22.7	611	19.6
314	908	24.7	440	20.1			724	22.1	598	20.1

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
316	911	24.1	460	19.5			721	21.7	524	19.8
318	890	23.1	474	21.8			709	20.9	507	19.9
320	894	24.1	477	21.6			701	21.2	494	20.8
322	891	24.2	488	22.4			694	20.4	471	21.2
324	821	24.1	460	21.6	1070	21.3	674	29.1	415	20.6
326	899	24.2	476	21.7	1088	21.1	640	27.4	395	21
328	900	24.1	477	22.8	1110	21	360	29.15	404	18.9
330	878	24.2	475	21.9	1110	21	378	28.3	418	18.9
332	891	24.1	246	20.7	1114	21.1	1300	21.4	415	19.2
334	1038	23.6	466	22.2	1118	21	770	26.2	421	18.2
336	1141	24.1	462	23.4	1123	21	590	27.4	408	17.7
338	1234	24.2	479	20.7	1119	21.1	1200	27.8	406	18
340	1337	23.9	493	21.9	1117	21	360	20.2	420	17.2
342	1221	23.5	480	22.8	1114	21.2	1320	23.3	415	16.9
344	1247	23.1	483	23.2	1119	21	750	24.6	416	16.2
346	1251	23.4	480	21.9	1117	21	1300	25.5	571	15.1
348	1265	23.5	482	20.3	1117	21	370	21.9	610	14.3
350	1271	23.6	486	20.8	1113	21.1	250	26.5	570	14.9
352	1285	26.7	234	23.2	1115	21.2	240	26.6	534	15.1
354	1291	26.1	220	22.6	1117	21	1310	32.3	587	14.2
356	1217	26.3	219	22.3	1150	21	480	30.7	565	17.9
358	1294	26.4	221	21.8	1210	21	440	32	575	17.2
360	1314	23	236	23.4	1314	20	570	24.1	561	16.2
362	1312	23.1	229	24.6	1324	20	580	24.8	541	16.9
364	1308	23.4	225	24.4	1330	20	596	24.9	573	17.1
366	1306	23.1	219	23.3	1327	20	640	25.2	516	22.2
368	1307	23.1	216	23.1	1324	20	655	24.7	498	21
370	1308	23.2	224	23.4	1318	20	670	24.1	481	21.4
372	1300	23.2	226	23.4	1210	21	690	24.1	467	22
374	1301	23.1	223	22.3	1200	21	599	24.2	456	22.2
376	1307	23.1	207	24.1	1197	21	580	24.8	449	22.3
378	1301	23.2	209	24.4	1199	21	560	25.1	436	22.6
380	1308	23.3	212	23.4	1179	21	540	28.23	425	22.7
382	1248	23.4	211	23.6	975	21	740	25.1	471	22.8
384	1299	23.1	223	24.2	999	21	780	24.91	406	22.7
386	1297	23.5	218	21.5	958	21	810	24.8	410	21.9
388	1287	23.1	213	15.3	974	21	890	24.7	365	17.9
390	1290	23.1	216	20.4	967	21	913	24.71	344	20.3
392	1294	23.1	221	24.5	955	21	923	24.6	334	21.6
394	1299	23.2	218	23.2	950	21	893	23.1	340	22.3
396	1301	23.1	219	19.9	953	21	904	23.4	334	22.9
398	1307	23.1	219	19.7	957	21	914	22.6	331	23.2
400	1308	23.2	222	16.9	960	21.2			322	24
402	1307	23.4	220	15.8	954	21.3			312	22.7

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
404	1308	23.2			958	21			328	12.2
406	1300	23.2			965	21			318	18.2
408	1304	23.1			949	21.1			357	15.7
410					953	21			317	15.1
412					956	21			331	15.2
414					954	21			328	17.2
416					950	21			312	19.3
418					951	21			321	20.1
420					945	21			312	22.2
422					399	20.7			303	22.4
424					401	20.8			320	17.2
426					402	20.9			331	15.4
428					404	20.8			340	14.4
430					406	21			321	14.9
432					407	21.3			391	15.1
434					403	21.2			337	16.7
436					410	21.2			311	19.1
438					416	20.7			315	18.8
440					411	20.8			319	21.6
442					419	20.9			325	20.6
444					411	21.2			322	21.9
446					410	21.6			340	19.6
448					408	21.7			330	20.3
450					408	21.5			324	22.1
452					409	20.9			330	22.5
454					407	20.7			915	23.1
456					410	20.6			921	23.4
458					412	20.5			921	23.3
460					413	20.6			923	23
462					415	20.5			923	23.3
464					405	21.2			972	23.4
466					400	21.3			1161	23.6
468					398	21.7			977	23.7
470					398	22.2			794	23.6
472					396	22.3			773	23.2
474					401	21.3			1116	24
476					403	21.3			1036	24.9
478					400	21.4			977	20.7
480					402	21.4			986	19.9
482					380	21.6			922	19.8
484					355	21.3			333	20.5
486					341	21.4			341	20.2
488					330	21.6			327	19.7
490					321	21.5			352	20.8

Depth, m	AABH11		AABH12		AABH13		AABH14		AABH15	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
492					310	21.4			349	21.7
494					310	21.5			328	21.5
496					308	21.4			345	19.6
498					309	21.5			337	20.1
500					309	21.4			330	17.2
502					310	21.5			332	18.7
504					309	21.5			335	17.2
506					310	21.5			347	17.9
508					310	21.4			352	18.2
510									323	22.3
512									332	20.8
514									321	19.8
516									340	17.2
518									356	19.5
520									322	17.2
522									335	18.8
524									378	16.9
526									321	19.1
528									337	20.2
530									407	17.2
532									387	16.1
534									351	17.9
536									367	15.9
538									329	21.3
540									335	21
542									345	16.6
544									326	21.7
546									316	13.2
548									328	22.5
550									320	22.7

Electrical conductivity and temperature data of Addis Ababa area (4)

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2			480	22.3					1061	19.9
4			494.3	22.1	873	23.2			1040	19.5
6	850	19	498.6	22	975	22.4			1107	23.6
8	850	20	497.6	22	1000	21.3			1000	20.8
10	850	19	525	22.4	1100	21.2			998	21.7
12	850	21	560	21.9	1080	23.4			917	16.6
14	740	20	568	21.7	920	22			889	17
16	760	18	574	21.9	910	20.6			886	16.9
18	810	20	571.9	22.3	826	20.7			885	16.85

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
20	880	19	571.8	22.1	920	20.5			935	22.2
22	900	19	590	23.1	790	24			940	23
24	830	20	597.4	23.4	840	21.1			948	23.8
26	830	20	600.1	22.9	930	22.2			930	22.8
28	830	20	610.2	22.7	860	23.1			932	23.5
30	900	20	616.4	22.64	868	22.9			936	23.1
32	480	19	750	22.1	610	22.9			934	23
34	500	22	700	22.4	630	25.6			930	22
36	480	19	560	23.5	696	26.4			934	20.9
38	740	24	556	22.4	615	22.3			920	20.8
40	700	22	560	21.8	620	23.4			922	20.9
42	730	23	970	23.3	560	23.2			924	21.9
44	720	22	970	23.1	600	19			924	21.5
46	690	21	660	22.1	560	20.1			928	21.4
48	710	21	620	23.4	510	21.2			886	19.6
50	735	22	620	23.4	598	20.6			889	19.8
52	725	21	750	22.4	605	21.2			891	19.2
54	500	21.7	820	20.4	480	19.18			894	19.21
56	400	21.5	829.3	21.02	500	19.2			899	19.28
58	350	21.5	700	22.1	510	22.6			831	26
60	300	21.7	510	19	508	21.8			800	26
62	240	21	620	20.1	500	20.2			784	20
64	280	22	750	21	520	21.2			782	20
66	300	22.1	970	21.1	518	21.6			788	20.1
68	310	23	970	21.3	430	21.1			789	21
70	315	24	970	21.5	400	19.3			788	22
72	316	23.6	560	22.1	420	21.1			786	21.6
74	320	24	560	23.2	410	19.8			785	21.8
76	320	24.8	600	21.1	418	19			784	21.6
78	330	25	720	23.1	410	22.4			783	21.4
80	325	25	750	19.9	420	20.5			782	21.6
82	335	24	700	19	440	22.3			784	21.7
84	300	23	700	20.9	380	19.6			881	23.5
86	280	23	708	20.7	390	21.1			882	23.4
88	290	22	804	20.4	400	22.1			880	23
90	310	23	724	21.2	460	21.8			879	22.8
92	320	23	784	21.3	478	20.5			877	22.6
94	315	22.5	824	21.1	386	19.81	570	20.9	878	22.5
96	318	23	814	22.3	416	19	570	20.9	878	22.6
98	310	24	810	23	504	20			879	22.5
100	330	25	804	22.9	489	18.9			892	21.5
102	320	24	750	21.1	504	18.5			893	21.6
104	330	25	670	18.8	518	18.8			861	22.5
106	335	25	750	21.2	470	19.9			862	23

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
108	325	24.8	720	21.2	465	20.3			863	23.5
110	328	24.9	750	22.1	470	20			862	24
112	321	24	750	20.6	460	22.1			860	24
114	300	20	750	21.4	460	19.6			859	24.1
116	315	21	740	20.1	720	23			861	24.5
118	290	21.5	620	22.1	680	22.6	540	18.9	806	26.6
120	320	22.8	642	20.3	686	19.7			800	20.4
122	330	19	620	20.4	670	22			796	26.3
124	350	19.9	750	22.1	580	21.8			794	26.4
126	320	19.8	680	23.1	628	22.3			792	26.5
128	310	21	750	21.2	730	19.1			789	26.6
130	320	21.5	660	20.9	620	20.2			770	24.6
132	321	23.1	750	20.6	540	19.2			772	25
134	320	24.3	620	20.4	670	18.3			756	20.3
136	310	24.6	650	21.2	750	20.9			774	24.3
138	330	24.5	620	20.9	690	20.7			774	24.6
140	330	21	650	21.4	680	20.4			772	24.3
142	310	21.5	712	22.1	698	19.8	480	18.3	770	25
144	320	23.1	720	21.3	1060	21.3			772	24.6
146	320	24.3	714	21.2	1090	20			816	25.5
148	310	24.6	500	19.8	1100	19.6			820	25.4
150	320	24.5	520	20.1	1030	24.7			825	25.4
152	330	21.5	620	20.2	1000	21.5			828	24.5
154	320	23.1	920	22.1	996	20.6			830	24.6
156	310	24.3	860	23.1	990	19.4			836	24.5
158	330	24.6	750	22.3	840	20.5			834	25.2
160	300	24.2	750	22.3	1050	19.2			830	25.5
162	310	23	800	23.2	1000	18.7			826	25.6
164	330	24.7	620	22.1	1018	20.9			821	24.8
166	300	24	620	28.3	1040	21.1			807	25.8
168	310	24.1	720	23.1	1160	19.5			806	25.5
170	310	24.5	920	22	1140	18.1			772	27
172	330	20.1	820	22.1	1230	17.1			770	26.8
174	320	20.8	860	22.2	1260	18.5			768	26.5
176	330	20.6	750	22.3	1160	22.2	320	32.5	760	26
178	310	21.6	820	23.2	1180	20.3	300	21.9	756	25.4
180	320	23.1	500	24	1190	19.8	290	22	696	26
182	320	23.4	560	23.4	1240	19.3	310	21.4	737	26.7
184	330	23.8	540	23.1	1260	21.1	330	22.5	720	26.3
186	320	24	300	23.4	1110	17.3	320	22.3	712	26
188	310	23.9	570	20.1	1110	22.1	340	22.3	705	25.6
190	330	20.1	590	21.2	1080	19.1	310	22.2	674	25
192	320	24	600	21.4	1120	21.2	1520	22.3	728	26
194	330	23	620	20.2	1130	19.1	1560	19.6	702	27

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
196	300	25	560	21.2	1090	20.3	1540	20.1	726	27.6
198	310	24.8	600	22.3	1070	23.5	1450	22.5	721	27.5
200	320	24.1	620	21.3	1040	21.7	1470	23	710	27.6
202	290	22.1	600	21.1	1000	20.3	1470	23.3	705	27.2
204	300	24	560	23.1	940	22.2	1360	22	711	26.4
206	310	23.8	600	22.2	900	19.1	1390	23.2	706	26.3
208	320	24.2	640	22.3	840	19.6	1250	20.5	702	26.22
210	300	23.6	1009	21.4	950	21	1330	22.1	696	25.8
212	320	24.2	1340	22.2	950	21	1350	23.3	682	25.4
214	330	24.5	1320	22.1	940	21.9	1360	23.8	686	25.7
216	350	20.6	1220	22.4	1070	20.9	1040	22.7	684	25.8
218	370	17.5	1240	21.2	1040	19.5	1080	22.8	680	25.86
220	350	20.2	1220	20.8	1340	21	1070	23.2	682	25.88
222	360	21.4	1254	21.2	1020	20.5	1120	26.4	679	25.82
224	340	22.1	1280	23.4	900	20.2	1150	23.8	679	25.84
226	330	21.8	1330	23.6	840	19.8	1130	22.8	678	25.86
228	340	19.1	1330	21.1	870	18.3	1100	23.8	686	25.27
230	350	21.3	1220	21.8	890	18	1300	23.3	682	25.26
232	360	20.1	1320	20.1	840	19.3	1280	23.5	684	25.27
234	340	21.1	1326	20.1	830	19.8	1220	21.17	683	25.28
236	330	20.6	1220	21	900	20.8	1220	21.2	674	26.1
238	340	22.3	1220	21.4	880	22.8	1310	22	697	28.2
240	350	22.4	1330	21.2	890	20.3	1300	23	700	28.1
242	330	22.8	1200	21.3	770	19.9	1220	23.9	710	27.8
244	330	22.2	1194	21.2	850	22.7	1100	21.4	718	27.7
246	330	22.6	1180	21.2	860	23.4	1200	23.9	720	27.7
248	340	23.2	1250	20.8	810	19.4	1150	22.3	684	28
250	330	23.6	1236	20.1	870	22.1	1230	23.6	685	28
252	320	23.1	1220	20.4	880	22.7	1220	25	635	28.8
254	330	22.9	1210	20.1	850	18.5	1250	22.8	636	28.72
256	340	22.6	1220	20.9	830	20.1	1260	22.5	638	28.71
258	340	21	1220	20.3	830	20	1300	25	640	28.62
260	330	24.7	1360	20.3	860	18.7	870	21.8	690	28.4
262	310	25.3	1230	20.1	850	18.8	2270	23.2	613	29.5
264	320	25.6	1236	20.3	820	18.5	2370	21.2	673	29.3
266	310	26.1	1220	20.1	830	22.2	1840	23	670	29.1
268	330	25.8	1210	21.1	840	22.3	1820	23.7	672	29.2
270	310	25.4	1236	21.2	830	19.2	1680	25.3	659	29.2
272	320	25.8	1238	20.2	810	20.7	1680	25.1	660	29.4
274	340	25.9	1250	20	840	22.3	1580	25.5	661	29.2
276	330	24.1	1236	22.1	830	19.4	1480	24.5	663	29
278	330	24.5	1232	20.3	920	19	1520	22.1	653	29
280	310	25.6	1240	20.3	770	22.5	1530	20.1	730	29.8
282	320	26	1245	21.2	800	19.4	1470	24.5	732	30.3

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
284	340	25.8	1244	21.1	730	21.1	1500	23.8	800	30.9
286	320	25.3	1600	21.4	750	21.6	1470	22.3	740	30.82
288	330	24.9	1620	22.1	740	21.1	1500	20.5	648	30.7
290	310	24.6	1610	21.2	710	19.8	1450	20.6	650	30.76
292	320	22.5	1600	22.3	750	20.8	1460	20.3	651	30.8
294	340	25.1	1560	22.1	770	20.3	1500	20.5	696	30.72
296	330	26	1630	22.1	740	20.6	660	21.2	700	30.7
298	320	24.2	1638	23.1	780	20.4	360	22.7	704	30.68
300	310	21.2	1600	22.3	780	19.3	370	22.9	702	30.65
302	320	22.3	1600	22.3	770	23.1	660	24.6	700	30.56
304	310	23.1	1600	22.3	770	20.4	1420	24.8	712	31.3
306	320	23.4	1650	22.4	790	23.8	1140	24.6	710	31
308	330	23.3	1620	21.3	670	21.2	1210	24.7	705	30.8
310	320	23.4	1380	21.1	720	22	1370	22.1	642	30.7
312	330	25.3	1336	23.1	750	18.4	1360	20.3	648	30.62
314	320	25.4	1346	22.1	740	19.2	1300	21.1	646	30.58
316	320	25.8	1356	23.1	840	21	1280	17.5	645	30.48
318	310	26	1346	23.3	920	25	1330	15.9	647	30.32
320	320	24.8	1346	23.1	940	22.9	990	19.7	646	29.92
322	310	24.8	1342	23.2	910	21.1	720	19.8	642	29.98
324	320	25.2	1534	23.3	990	18.4	650	24.3	642	26.9
326	310	25.6	1536	22.1	1000	20.8	1220	22.4	642	26.9
328	320	25.2	1536	22.2	970	21.3	1240	22.7	773	29.5
330	320	25.2	1524	21.2	990	21	1220	23.1	770	29.6
332	310	24.9	1514	21.3	1010	20	1300	23.9	768	29.8
334	330	25.3	1508	21.4	1020	20.2	1290	23.9	760	30
336	320	25.1	1489	21.7	1000	21.6	1120	23.6	738	30.01
338	320	25.6	1494	22.01	1120	21.7	1140	23.7	721	30.02
340	330	25.2	1487	22.4	1007	18.8	1160	23.9	725	30.02
342	320	24.9	1481	22.1	1090	21.1	1100	22.2	727	30.03
344	300	25.5	1476	21.9	1050	20.5	1100	21	728	30.04
346	320	25.7	1469	21.4	1070	20.8	1110	22	727	30.03
348	330	24.5	1472	22.4	1200	26.8	860	21.8	728	30.04
350	320	24.8	1459	22.6	1500	24.8	1100	20.9	723	31.02
352	330	25.3	1442	23.1	1130	21.6	1080	22.4	720	31
354	330	25.5	1428	22.1	1120	21	1080	23.1	716	30.8
356	330	25.4	1421	22.2	1120	21.2	1090	20.9	714	30.6
358	320	25.7	1428	22.1	1190	23.8	1050	22	715	30.5
360	310	25.3	1417	22	1120	22.2	1030	23.8	720	30.3
362	320	25.2	1414	21.8	1110	24.6	1040	23.4	715	30.2
364	330	25.5	1420	22.1	1140	23.5	1060	22.4	710	30.4
366	330	25.6	1420	22	1120	23.7	1050	22.5	712	30.4
368	320	25.9	1428	22.1	1180	29.7	1040	21.5	722	30.38
370	310	25.6	1770	21.4	1110	21.1	960	21.1	738	30.31

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**	**EC**	**Temp**
372	320	25.1	1780	22.3	1570	22.3	990	21.4	742	30.25
374	330	25.2	1890	21.4	1360	23.9	1040	23.9	748	30.1
376	320	25.8	1920	21.1	1410	25.5	1050	24	750	30
378	320	24.9	1900	21	1310	23.4	1060	24.8	737	31.6
380	330	25.3	1986	23.2	1420	24.1	1040	22.9	740	31
382	310	25.6	1999	24.3	1030	24	930	22.2	748	30.8
384	320	25.5	1980	24.2	1340	20.8	1010	22.5	752	30
386	320	25.3	1920	23.4	1370	27.1	940	24.1	725	30.4
388	320	25.4	1922	23.2	1330	23.9	930	25.4	715	30.5
390	310	25.8	1926	23.1	1410	24.1	920	25.1	716	30.61
392	320	26	1910	23.4	1280	28.7	950	26.4	725	30.7
394	320	25.9	1650	23.8	1260	24.5	920	25.4	734	30.82
396	320	25.7	1656	23.6	1284	25.3	960	24.8	747	30.84
398	320	25.9	1655	23.2	1290	22.1	960	24.8	752	30.98
400	310	25.6	1650	23.9	1300	27.9	910	24.1	765	31
402	320	26.2	1648	23.2	1260	23.8	740	25.4	782	31.2
404	310	25.3	1650	23.5	1210	22.8	920	24.9	830	31.8
406	320	25.8	1600	22.1	1120	24.1	930	25.1	831	31.82
408	310	25.6	1666	25.2	1140	22.1	940	25.2	828	31.8
410			1633	24.3	1230	23.6	920	24.5	826	31.79
412			1609	23.5	1210	21.7	490	25.5	825	31.78
414			1605	24.5	1160	23.1	980	25.2	826	31.76
416			1695	23.1	1110	26.3	1020	24.3	827	31.74
418			1622	22.3	1140	23.4	1010	25.2	825	31.73
420			1633	23.1	1120	21.1	1000	22.8	824	31.74
422			1632	24.1	1120	24.1	990	21.4	823	31.75
424			1628	23.2	1120	24.7	980	21.5	824	31.2
426			720	20	1050	23.4	970	20.7	827	30.4
428			722	20.2	970	16.9	1120	22.5	828	30.4
430			728	18.4	1010	27	1000	20.1	826	30.5
432			732	19.4	1130	26.2	1040	21.1	827	30.58
434			724	19.8	1120	26	1080	21.3	828	30.6
436			720	20	890	24.2	1150	25	858	31.6
438			736	22.1	660	26.7	1250	25	860	31.6
440			748	20.1	1000	18.6	1170	25.7	868	31.8
442			724	19.4	880	26.1	1270	25.2	874	32
444			731	21.3	950	21.5	1080	24.9	872	31.8
446			731	20.2	1020	23	1210	22.7	867	31.5
448			736	20.4	880	21.4	1120	25.7	868	31.4
450			731	19.8	1050	24.7	900	25.1	870	31.6
452			960	20.8	920	28.2	1090	24.5	802	31.2
454			966	20.6	870	20.1	1070	24.2	746	31
456			945	20	1110	26.2	1050	24.5	827	31.7
458			950	21.1	970	26.9	1220	26.7	826	31.68

Depth, m	AABH16		AABH17		AABH18		AABH19		AABH20	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
460			930	22.1	950	21.9	1200	25	824	31.59
462			925	20	990	15.2	1180	25.1	823	31.58
464			935	21.3	1010	28.1	1180	25.3	822	31.54
466			960	22.1	1020	27.9	1183	25.1	829	31.52
468			966	21.4	1050	25.2	1140	25	817	31.53
470			940	21.6	1030	20.3	1160	26	818	31.52
472			920	22.3	1060	28.2	1185	25.3	816	31.49
474			946	20.1	1030	23.8	1180	25.4	814	31.48
476			960	22.1	1060	22.6			828	31.02
478			954	21.2	1080	26.1			826	31.02
480			1230	21..8	1050	20.3			812	31
482			1200	22.6	1090	28			814	31.3
484			1236	22.8	1030	25.3			815	31.6
486			1222	20.7	1030	25.9			818	31.5
488			1238	22.4	1090	24.2			816	31.6
490			1236	22.4	1100	28.2			817	31.5
492			1212	21.1	1010	22.4			815	31.6
494			1209	20.4	1010	28.4			816	31.7
496			1200	21.2	1080	27.3			810	31.8
498			1201	22.1	1090	24.8			810	31.8
500			1200	20.4	960	19.2			728	31.63
502					1004	27			729	31.67
504					1010	25.3			721	31.43
506					1010	24.5			728	31.64
508					1020	26.1			722	31.45
510					1000	21.1			724	31.55
512					1020	28			728	31.65
514					1010	28.6			730	31.7
516					810	26.4			799	31.66
518									801	31.78
520									802	31.8
522									801	31.89
524									803	31.9
526									804	31.91
528									802	31.9
530									845	32
532									817	33
534									842	32.5
536									840	32.4
538									842	32.38

Electrical conductivity and Temperature data of Addis Ababa area (5)

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
2					786	17.1	1250	24.7	1108	24.3
4					787	16.8	1420	22.4	1107	25.1
6					784	17.3	1460	21.4	1063	25.9
8					786	17.4	1130	18.4	1043	22.2
10					788	17.5	1140	18.8	1046	22.3
12					782	17.3	1140	21.5	938	24.7
14					791	16.5	1170	22.6	796	21.5
16					793	16.6	1230	23.5	798	21.7
18	1135	16.9			790	16.7	1240	21.5	789	21.3
20	1203	21.2			780	16.4	1150	21.5	804	23.4
22	1160	20			792	16.5	1420	22.3	806	23.5
24	1097	21.9			784	16.8	1410	19.6	774	25.6
26	989	19.9			780	17.1	1210	18.6	984	23.9
28	972	18.9			784	17.6	1270	24.7	1028	27.2
30	836	20.3	540	26.7	786	18.2	1168	24.5	1023	27.1
32	829	19.15	569	24.9	792	18.3	1460	22.1	1022	26.8
34	806	21.4	580	24.2	796	17.9	1450	19.6	966	23.4
36	928	20.6	578	24.5	794	17.7	1160	18.5	958	21.5
38	876	18.7	586	25.6	790	17.7	980	21.3	962	21.1
40	737	20.5	591	23.6	788	17.8	1230	20.4	955	23.2
42	699	21.6	597	24.3	776	18.3	1180	19.8	1062	22.5
44	698	22.5	601	23.5	774	18.6	1410	23.4	1074	22.5
46	706	23.5	520	21.6	770	19.6	1400	20.9	1069	22.3
48	786	20.9	492	22.7	764	19.4	1450	20.4	1024	25.4
50	795	21.2	509	21.9	742	18.9	1390	20.4	1007	22.2
52	640	20	513	20.7	708	19.7	1280	20.3	1019	23.5
54	824	20.7	517	21.4	720	18.7	1280	21.6	1022	23.1
56	638	21.8	610	22.7	670	17.8	1370	22.4	1034	23.4
58	697	21.4	605	23.4	650	18.3	1180	19.8	1072	23.5
60	586	22.1	780	21.7	656	18.4	1200	20.5	1005	23.7
62	687	20.8	650	23.6	670	19.5	1140	25.2	1048	29.1
64	714	22.7	678	23.7	677	18.9	1170	24.7	1079	26.8
66	724	21.6	691	22.3	684	19.7	1190	22.5	1018	24.2
68	984	22.5	706	23.2	694	19.9	950	25.6	952	25.1
70	963	21.5	713	22.3	702	19.5	1140	23.5	980	25.1
72	1085	21.9	682	21.6	706	18.9	1150	24.7	941	25.2
74	989	21.7	684	21.5	689	19.6	950	24.8	930	25.1
76	979	22.3	713	23.1	694	19.4	760	22.4	924	24.7
78	1040	21.7	708	24.2	685	19.6	790	25.4	922	24.5
80	1240	21.2	690	23.9	673	19.7	990	23.1	922	24.6
82	1163	23.6	720	23.7	680	19.8	960	22.5	897	24.4
84	1155	22.5	710	22.9	600	19.9	950	22.8	880	24.5

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
86	1096	21.5	698	23.7	580	21.5	940	22.3	880	24.5
88	1093	21.8	684	24.5	590	21.5	850	21.3	572	28.7
90	1022	18.5	708	23.5	594	19.6	860	22.4	569	28.3
92	1080	21.9	697	23.6	610	18.9	850	23.1	581	28.5
94	1049	21.6	697	23.6	607	18.9	830	23.6	574	29.4
96	980	18.5	680	21.8	610	19.2	750	23.4	571	29.4
98	997	20.1	713	22.7	617	19.7	840	23.4	568	28.9
100	1008	20.5	690	23.9	620	20.8	830	23.9	566	28.3
102	1002	20.6	710	24.3	625	21.6	830	20.9	569	29.2
104	988	21.1	705	24.5	612	19.7	840	19.5	571	28.5
106	980	21.4	698	25.2	615	18.9	910	18.6	565	27.3
108	956	21.5	700	25.5	610	19.7	930	24	564	27.5
110	939	22.7	689	25.7	580	20	830	20.9	562	27.9
112	967	22.1	684	24.3	558	20.1	820	20.5	564	28.9
114	1021	20.9	697	24.7	512	19.7	820	20.8	562	28.8
116	1017	22.7	704	23.7	517	19.8	780	27.9	558	28.7
118	1027	20.5	696	22.5	520	21.9	820	24.9	559	28.7
120	1038	20.7	697	24.7	518	20.6	670	24.5	555	28.7
122	1106	21.4	740	24.7	520	19.7	690	24.8	556	28.9
124	1003	21.2	762	25.6	506	18.7	820	22.1	554	29.2
126	996	22.5	758	24.5	510	18.8	640	22.4	556	29.4
128	940	17.5	766	24.7	492	18.3	670	24.8	558	29.5
130	1058	22.2	760	24.5	470	18.2	670	24.5	552	29.6
132	1026	21.8	790	23.4	464	18.9	800	25.1	544	29.4
134	956	21.5	785	22.8	452	19.4	780	20.1	546	29.3
136	986	22.2	805	23.6	500	21.1	810	23.1	543	29.4
138	968	20.6	810	24.3	480	20.6	810	24.5	542	29.3
140	984	21.2	817	25.1	472	19.7	820	26.3	549	29.9
142	913	21.1	815	25.2	480	21.8	750	24.8	548	29.7
144	903	20.2	814	25.4	497	21.9	730	26.3	551	30.1
146	729	19.3	815	24.3	478	21.9	730	24.8	552	29.8
148	1257	21.5	812	24.7	480	20.6	760	22.8	552	29.8
150	1168	21.2	810	23.7	467	19.5	650	24.5	554	29.7
152	1325	20.9	807	23.5	458	18.7	660	26.6	553	29.8
154	1524	20.1	811	23.2	470	18.6	620	24.5	550	30.3
156	1682	20.7	813	24	486	18.5	630	26.8	549	30
158	1544	22.3	820	24.3	495	18.6	610	25.4	549	30
160	1110	21.3	810	23.7	480	19.6	740	24.6	552	30
162	680	20.05	816	23.4	460	20.5	710	24.5	550	30
164	1412	20.06	817	24.1	470	21.6	700	26.4	552	29.8
166	1064	20.04	786	24.2	476	21.8	780	26.7	553	29.7
168	1170	20.9	758	26.3	484	20.9	540	26.8	553	29.8
170	1582	23.5	780	26.2	478	19.8	500	28.6	554	29.9
172	1246	23.4	790	25.4	490	18.5	710	26.7	550	30

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
174	887	22.8	805	25.3	425	20.9	750	27.6	552	29.8
176	1025	21.8	810	24.7	442	22.1	740	26.8	553	30
178	1126	21.2	726	26.5	398	22.7	730	25.6	545	31.5
180	1038	21.6	738	25.4	367	22.1	730	24.6	546	31.6
182	1355	23.2	756	24.8	380	21.9	700	19.6	544	31.2
184	1382	23	734	24.3	427	20.8	720	25.6	550	31.2
186	1351	23.5	738	26.2	480	19.7	710	28.6	552	31
188	1376	23.1	731	26.3	510	20.4	740	26.8	553	31
190	1389	21.2	727	25.8	500	22.1	710	27.6	554	31
192	968	21.6	722	25	534	23.4	720	26.7	544	31.2
194	986	20.9	727	25.3	510	23.6	710	26.3	550	31.2
196	1368	19.9	725	26.2	497	23.7	730	25.6	552	31
198	1262	21.7	696	24.5	480	20.7	720	26.4	553	31
200	1246	22.7	650	25.6	492	20.4	710	26.7	554	31
202	1240	23.1	631	26.3	510	19.8	720	25.3	556	31.1
204	1187	21.9	612	25.5	513	18.9	720	25.6	524	32.5
206	985	21.5	608	24.7	497	18.7	710	26.7	524	32.5
208	1038	22.1	610	25.3	500	19.2	520	23.4	523	32.6
210	932	24.3	615	24.9	470	21.3	530	25.6	522	32.7
212	1190	23.6	609	23.7	450	20.5	730	26.5	522	32.7
214	1186	23.7	598	25.4	438	19.8	600	24.5	522	32.7
216	1175	23.2	607	25.3	426	20.4	610	26.4	524	32.6
218	1175	23.2	605	24.7	430	20.9	630	27.4	526	32.5
220	1186	22.9	613	27.2	429	21.9	680	27.1	530	32.4
222	1223	23.8	610	27.3	450	20.8	640	26.1	528	32.2
224	1198	23.6	615	26.4	446	20.7	670	25.4	532	32.1
226	1166	21.6	612	25.8	439	20.8	720	25.1	532	32.2
228	1138	23.1	615	27.2	438	20.6	710	23.4	530	32.1
230	1131	23.5	609	26.8	436	21.9	720	25.4	526	32.2
232	1137	23.2	595	27.2	438	20.8	720	25.9	524	32.2
234	1041	23.2	592	26.5	442	20.7	720	26	526	32.2
236	1082	22.8	604	27.1	451	19.9	730	27.1	523	32.2
238	1121	22.6	596	26.8	430	21.3	800	26.8	524	32.2
240	1076	22.4	585	27.4	446	21.9	800	26.8	526	32.2
242	1040	23.5	596	26.8	450	22.3	800	27.2	522	32.2
244	1047	23.4	602	26.2	430	21.4	640	27	503	33.1
246	1008	24.2	578	25.9	418	19.6	680	27.1	504	33.2
248	995	24.1	568	25.7	397	23.1	970	25	503	33.2
250	965	24.5	566	26.3	404	23.9	970	26.1	504	33.3
252	976	22.9	567	27.6	425	22.5	940	27.1	510	33.2
254	962	22.7	570	27.4	432	22.1	930	27.1	509	33.4
256	955	23.1	573	26.2	440	20.6	920	25.6	510	33.3
258	962	23.3	569	27.3	430	21.5	830	25.8	508	33.2
260	984	23.8	572	27.6	410	23.4	780	26.4	506	33.3

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
262	1005	23.3	576	26.9	390	21.5	730	26	509	33.2
264	1015	23.8	574	26.5	410	20.9	740	27.2	510	33.4
266	1028	23.6	570	25.7	423	20.6	740	27.2	511	33.2
268	1008	23.7	567	27.6	416	19.7	840	27.2	510	33.3
270	1109	24.3	562	29.2	410	19.8	860	26.6	511	33.4
272	1124	24.3	565	27.8	390	19.9	860	26.6	509	33.3
274	1130	24.1	559	27.4	420	22.1	830	27.7	511	33.2
276	1130	23.9	558	27.6	412	22.3	770	26.4	509	33.1
278	1147	23.6	556	26.8	408	21.3	790	27.2	510	33.3
280	1162	23.7	560	25.8	391	21.5	780	26.4	508	33.6
282	1163	24.8	562	27.9	397	23.5	790	26.4	506	33.5
284	1188	24.7	554	28.9	410	21.8	780	25.6	508	33.5
286	1210	24.2	548	29.3	407	22.4	750	25.4	509	33.2
288	1230	24.2	530	27.7	404	23.2	780	26.3	510	33.1
290	1224	24.1	542	26.5	410	24.5	750	26.4	511	33.3
292	1221	24.9	550	25.6	407	25.3	750	26.3	509	33.2
294	1240	24.9	561	26.7	418	23.5	720	25.6	508	33
296	1245	24.4	570	25.8	436	22.8	420	26.5	509	33.3
298	1236	23.1	568	27.3	427	23.7	540	26.9	508	33.2
300	1245	23.3	564	26.8	419	24.3	580	27.2	508	33.4
302	1142	23.4	568	26.5	431	21.9	690	27.2	510	33.4
304	1220	23.6	566	27.3	425	22.5	690	26.5		
306	1227	24	569	26.7	420	22.9	640	25.4		
308	1246	23.9	574	25.9	424	23.3	620	26.5		
310	1249	22.7	568	26.7	422	24	840	27.2		
312	1245	24.4	568	26.7	427	23.7	660	27.1		
314	1259	24.4	572	26.8	424	22.5	830	26.4		
316	1255	24.7	568	27.5	415	21.9	840	28.4		
318	1256	24.4	567	26.5	418	20.7	860	28.1		
320	1249	24.3	570	25.9	416	21.5	850	28.7		
322	1230	23.4	572	26.4	414	21.9	840	27.4		
324	1224	24.6	566	26.7	410	22.5	840	27.2		
326	1254	23.5	554	26.3	408	24.1	830	28.4		
328	1229	24.1	546	27.9	415	23.9	820	28.1		
330	1216	24.9	552	28.2	420	22.7	830	27.2		
332	1230	24.5	556	28.4	409	22.8	810	27.2		
334	1201	24.5	560	28.7	407	22.9	840	27.8		
336	1222	23.7	558	29.2	410	23.7	810	28.2		
338	1199	24.8	557	28.9	417	23.9	810	28.1		
340	1192	24	546	27.8	426	23.8	850	27.2		
342	1198	24.2	529	26.7	420	24.5	850	27.2		
344	1206	24.4	532	26.7	424	24.2	860	28.1		
346	1180	23.6	518	25.8	426	23.7	850	27.2		
348	1155	24.6	512	25.6	422	24.2	840	28.2		

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
350	1150	24.3	515	25.5	418	24.1	880	27.7		
352	1176	24.8	508	24.9	420	23.5	850	26.6		
354	1187	24.6	499	24.8	450	22.5	900	27.2		
356	1206	24.2	506	24.8	476	21.9	880	27.8		
358	1165	23.1	497	25.5	430	21.7	870	27.9		
360	1133	23.7	498	25.6	470	21.5	860	28.1		
362	1111	24.7	499	26.2	485	22.3	880	28.9		
364	1125	24.6	498	25.6	539	22.4	850	28.7		
366	1124	23.9	496	25.8	536	23.5	850	27.8		
368	1120	23.6	509	27.5	535	23.7	890	27.2		
370	1145	23.5	540	26.6	540	24.7	850	28.1		
372	1103	23.3	562	26.9	536	23.5	810	28.2		
374	1088	24	554	25.5	527	22.7	810	27.2		
376	1090	23.7	532	25.4	530	22.5	880	28.7		
378	1110	24.3	542	26.5	537	21.9	890	25.5		
380	1054	24.5	547	27.2	520	23.2	910	26.1		
382	1066	23.9	557	26.6	517	23.1	910	27		
384	1050	23.8	538	25.7	508	22.9	800	27.5		
386	1036	24.1	518	26.4	510	22.7	850	27.1		
388	1067	24.3	527	26.6	525	24.5	750	28.8		
390	1049	23.9	520	26.4	527	23.7	780	28.9		
392	1045	24.5	515	25.9	518	22.9	850	28.1		
394	1045	24.4	511	25.8	516	22.8	860	26.5		
396	1029	24.2	508	25.6	510	22.3	840	27.2		
398	1092	24.6	497	24.8	512	22.6	850	27.7		
400	1106	24.4	508	25.7	504	24.5	840	28.1		
402	1014	23.9	514	26.4	530	22.8	800	27.5		
404	1019	23.5	502	25.6	538	23.4	810	30.5		
406	1014	23.8	505	24.9	540	23.7	840	30.2		
408	1012	24.7	510	24.6	545	24.6	800	30.1		
410	1007	24.7	515	25.4	560	24.5	770	30.4		
412	1016	24.8	506	25.5	562	24.6	900	32.7		
414	1013	24.6	510	25.8	566	24.7	810	29.4		
416	1016	24.9	504	26.4	570	24.5	830	31.1		
418	1032	24.6	509	27.8	568	23.2	820	32.3		
420	1012	23.9	515	27.5	580	22.5	800	30.2		
422	1000	24.6	510	27.3	586	23.5	560	30.4		
424	998	24.6	497	26.8	568	22.9	800	30.1		
426	956	24.9	499	26.7	579	23.7	800	30.1		
428	950	22.4	482	27.6	560	22.8	780	30.4		
430	976	24.2	468	27.4	572	22.7	830	32.4		
432	987	24.9	470	27.3	590	22.6	860	31.4		
434	986	24.9	466	26.9	605	22.4	850	32.4		
436	959	24	450	25.8	620	22.9	790	30.4		

Depth, m	AABH21		AABH22		AABH23		AABH24		AABH25	
	EC	Temp	EC	Temp	EC	Temp	EC	Temp	EC	Temp
438	965	23.7	462	25.4	610	24.6	760	30.4		
440	946	23.5	465	25.6	620	24.2	780	30.2		
442	965	24.2	466	25.7	633	23.5	540	30.4		
444	941	24.4	438	26.5	645	22.3	670	33.4		
446	936	25.4	453	27.2	650	24.2	770	33.2		
448	942	25.2	428	27.9	635	23.5	750	27.8		
450	954	25	432	28.1	620	22.5	780	28.9		
452	948	24.8	455	26.7	617	24.5	850	30.2		
454	958	24.9	460	25.8	624	24.3	840	33.1		
456	952	23.7	456	25.9	608	23	890	33.4		
458	939	24.4	458	25.8	612	24.6	890	32.4		
460	966	24.3	395	26.3	615	23.5	1000	32.5		
462	935	24.9	370	27.5	610	23.4	980	33.1		
464	946	24.9	340	26.7	624	23.5	960	33.2		
466	999	24.3	345	27.5	630	22.3	640	33.1		
468	1003	24.9	336	27.6	634	23.6	710	30.5		
470	997	24.7	339	27.4	628	24.6	720	28.6		
472	995	24.3	346	27.5	626	22.9	940	30.1		
474	995	23	352	27.5	598	23.4	920	31.3		
476	993	23.7	342	26.9	590	22.8	680	30.5		
478	985	24.5	333	26.5	596	25.2	580	32.1		
480	966	25.2	348	26.7	610	25.7	720	32.9		
482	982	24.3	352	26.8	605	23.9	715	32.1		
484	981	23.8	348	25.9	613	24.5				
486	977	24.2	339	25.8	607	24.7				
488	986	24.8	354	25.4	598	23.9				
490	987	23.4	347	25.6	596	24.5				
492	987	24.5	342	26.7	599	23.3				
494	976	23.9	346	27.5	592	24.9				
496	954	24.6	344	27.6	596	24.3				
498	1035	24.5	345	27.9	590	23.5				
500	988	25	346	27.7	593	22.8				
502	1016	23.9			602	22.8				
504	999	24.9								
506	1005	24.3								
508	1067	25.5								
510	986	24.8								
512	1084	24.6								

Electrical conductivity and Temperature data of South Ayat area (1)

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	340	17.2			265	16.5	314	17.2	382	17.5
4	356	17.8			302	17.2	322	17.5	343	17.4
6	346	17.5			316	17.3	405	17.5	430	17.1
8	410	18.1			308	17.4	452	17.3	422	18.2
10	412	18	403	22.9	340	17.5	490	17.6	520	18.1
12	444	17.9	398	23.2	342	16.4	542	18.5	542	17.7
14	413	17.7	402.3	23.5	346	17.5	670	19.1	501	18.7
16	446	17.4	399.6	23	360	18.2	700	19.2	519	18.4
18	600	17.8	398.5	23.6	372	18.1	812	18.7	517	18.4
20	712	17.9	402.3	24	356	17.9	808	18.6	510	18.5
22	714	18.2	420.2	24.2	333	17.2	812	18.3	522	18.7
24	788	18	420.1	25.2	342	17.5	840	18.2	540	18.9
26	742	18.1	418.3	25.3	346	17	849	18.5	549	18.2
28	790	17.9	415.3	25	346	17.3	841	18.3	539	19.1
30	742	17.9	405.1	24.6	660	18.3	842	18.5	540	18.7
32	736	18.1	389	24.7	670	18.1	849	18.2	543	19.2
34	780	18.2	389	24	720	18.2	849	18.3	540	19.5
36	772	18.1	388	23.5	760	18.7	851	18.2	549	19.2
38			395	23.6	740	18.6	872	18.3	547	19.1
40			398	23.5	742	17.9	890	18.2	533	18.7
42			405	23.7	804	18.1	840	18.3	522	19.5
44	845	20.1	402	23.9	822	18.8	849	18.2	582	19.2
46	876	19.6	401.1	24	808	18.6	842	18.5	560	19.7
48	912	19.6	402.1	24.1	759	18.4	847	18.3	642	19.7
50	947	19.2	402	24.3	814	18.9	840	18.3	720	20.1
52	965	20.1	403.2	23.8	824	18.8	858	18.4	727	20.3
54	972	20.2	401	23.7	849	18.4	892	18.5	731	20.5
56	977	20.4	405.3	23.6	846	17.9	869	18.8	730	20.2
58	976	20.5	420	23.6	779	18.1	871	18.9	732	20.5
60	985	20.6	432	23.5	846	18.2	879	18.8	739	20.4
62	979	21.2	445	24.2	844	18.3	861	18.6	737	20.4
64	969	22	436	24.2	834	18.1	852	18.7	735	20.2
66	974.2	22.1	441	23.9	832	18.1	859	18.7	740	20.8
68	982.4	21.7	446	23.6	839	18.2	855	18.7	738	20.7
70	986.7	21.6	480	24.4	834	18.3	860	18.7	743	20.7
72	976.4	21.5	481	25.2	830	18.1	869	18.5	729	20.3
74	975.4	22.1	481	25.1	826	18.2	872	18.5	738	20.4
76	975.4	22.2	437	23,8	617	36.7	882	18.8	744	20.7
78	976.4	22.1	426	23.2	616	37.5	893	18.9	748	20.9
80	984.2	22.4	431	23.8	624	37.5	878	18.9	749	20.8
82	976.2	22.2	419	23,9	627	38.2	829	18.7	743	21
84	954.1	22.4	420	24.1	630	38.1	819	19.1	751	20.7
86	937.2	23	421	24.3	632	38.4	812	19.5	750	20.8
88	912.6	23	410	24.2	645	38.2	804	19.6	753	20.9

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
90	910.4	23.1	408	23.8	667	37.4	811	19.7	755	21
92	908.4	23.2	413	23.6	682	37.5	779	19.5	759	21.3
94	906.4	23.2	408	23.8	684	38.2	750	20.3	755	21.5
96	900.4	23.4	408	24.1	692	36.9	769	21.2	754	21.2
98	895.4	23.5	401	23.9	696	36.9	774	21.5	752	21.3
100	886.5	23.6	399	24.2	712	36.7	772	21.9	750	21.2
102	894.2	23.4	398	24.5	723	36.8	774	22.1	757	21.5
104	901.5	23.5	399	24.9	719	37.2	778	23.3	761	21.6
106	874.5	22.5	404	24.2	723	37.2	752	23.1	762	21.4
108	866.4	23.4	401	23.1	730	35.9	764	23.2	759	21.2
110	875.5	22.7	400	23.1	731	35.6	770	23.3	763	21.3
112	896.7	22.8	402	24.6	730	35.7	775	23.2	765	21.4
114	903.2	22.6	401	24.5	731	36.2	764	24.1	768	21.7
116	904.5	23.1	402	24.7	728	36.5	750	23.2	769	21.3
118	901.2	22.8	405	24.9	731	37.2	752	22.9	770	21.8
120	896.4	22.6	403	24.7	735	37.5	744	23.1	766	21.7
122	895.3	22.7	404	24.2	736	37.8	761	22.8	760	21.7
124	894.2	23.3	405	24.3	738	37.9	772	23.3	765	21.5
126	870.2	24.2	402	23.2	649	37.8	780	23.2	753	20.7
128	780.3	24.6	403	23.8	685	37.8	779	23	761	21.2
130	724.5	25	403	24.1	730	38	781	23.2	763	21.3
132	730.4	25.2	402	24.8	735	36.9	766	24	760	21.1
134	740.2	25.1	403	24.6	742	37.2	760	23.9	758	21.3
136	736.5	24.8	408	22.4	746	37.5	772	23.1	755	21.4
138	742.1	25.2	406	23.8	762	37.6	760	22.9	752	21.2
140	737.5	25.2	406	23.6	765	37.8	762	23.1	750	21
142	740.4	25.4	406	24.3	776	37.9	771	22.7	748	20.9
144	745.2	25.4	376	24.2	780	37.9	783	23.3	746	20.8
146	744.7	24.8	423	24	794	37.6	792	24.1	740	20.2
148	756.2	24.9	403	23.5	801	38	784	23.7	735	20.4
150	762.4	25.1	403	24.1	804	35.3	772	22.9	745	20.5
152	774.5	24.8	373	23.5	816	35.5	781	23.1	741	21
154	768.4	25.1	399	24.1	820	32.1	783	23	736	21.5
156	761.2	24.7	383	24.1	780	33.2	749	23.3	742	21.2
158	754.6	24.8	386	24.2	782	33.4	761	23.4	744	21.3
160	755.2	25.1	403	23.1	760	34.3	766	23.2	738	21.4
162	756.4	25.2	449	23.9	762	32.1	756	23.2	733	21.2
164	760.2	24.8	439	24.2	730	30.5	747	24.1	737	21.3
166	773.3	24.9	445	24.8	734	33.4	782	22.9	741	21.4
168	748.2	24.8	444	24.7	780	35.2	786	22.8	736	21.2
170	750.4	24.9	442	23.8	770	34.6	783	22.2	732	21.3
172	764.5	25.1	450	25.2	760	35.4	781	22.5	725	21.3
174	776.4	24.7	461	24.3	764	33.4	783	22.4	729	21.2
176	785.4	25.2	449	24.2	746	35.1	782	22.3	727	21.1
178	776.4	24.3	550	25	742	34.2	779	21.5	728	21.4
180	782.6	25.2	473	24.2	746	34.5	777	21	732	21.2

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
182	780.2	25.5	505	23.8	742	35.2	770	21.9	731	21.3
184	763.3	24.5	474	23.3	749	34.3	790	22.3	729	20.9
186	764.2	24.3	540	22.7	746	35.2	794	23.1	727	20.4
188	750.2	25.2	468	22.4	772	34.3	805	23	721	20.7
190	745.1	25.1	510	23.9	753	32.1	747	22.7	729	20.5
192	732.2	25.2	502	24.3	749	31.2	749	21.8	729	20.3
194	770.5	25.3	517	24.4	790	31.3	761	21.3	728	21.1
196	761.3	24.6	499	25.3	782	31.5	771	22.3	725	21.3
198	742.1	24.5	492	25.2	784	31.7	763	23.1	726	21.3
200	740.3	24.9	468	25.5	788	30.9	760	23.2	724	21.3
202	750.2	24.6	465	25.1	784	30.7	774	23.4	721	21.5
204	752.1	24.9	453	25.2	784	31.2	780	23.6	723	21.3
206	759.4	24.9	451	24.5	790	31.3	781	23.2	725	21.5
208	745.2	24.2	446	23.8	810	31.5	760	22.7	724	21.7
210	750.2	24.2	466	24.3	816	31.7	752	23.1	727	21.5
212	762.3	24.5	520	24.7	822	32.1	756	22.3	723	21.1
214	764.2	24.1	460	24.1	808	31.5	772	23.2	727	21.7
216	754.3	23.9	445	23.6	810	31.1	769	22.3	724	21.9
218	751.3	24.3	446	23.1	812	31.5	770	22.4	725	21.8
220	740.2	24.4	435	25.2	820	31.4	776	23.1	729	22.1
222	766.2	24.1	431	25.1	815	31.4	764	22.7	727	22.3
224	760.5	24.5	425	24.6	815	32.5	769	23.1	722	22.5
226	769.2	24.2	412	25.4	814	31.7	767	23.6	717	22.7
228	770.5	24.3	406	24.3	805	31.8	750	23.8	725	22.2
230	771.5	24.5	522	25.8	805	32.2	752	23.7	726	22.3
232	779.5	24.3	525	26.1	810	33.1	749	23.1	719	22.2
234	754.2	24.4	528	23.1	810	32.3	761	23.3	721	22.1
236	774.5	24.1	336	24.1	712	30	742	23.2	720	22.3
238	749.3	24.1	376	24	707	30.1	738	22.7	725	22.1
240	748.2	24.5	464	26.4	709	30.2	689	22.9	723	22.2
242	750.3	24.2	461	26.3	712	30.7	684	23.4	722	22.2
244	752.8	24.5	460	25.5	704	30.8	650	23.2	727	22.3
246	741.2	24.5	452	24.9	705	30.8	670	23.1	725	22.2
248	734.3	24.4	458	24.9	730	30.5	649	23.5	728	22.2
250	738.2	24.9	464	25.4	715	30.2	622	23.6	721	22.2
252	740.5	25.1	416	23.6	726	29.8	634	23.5	717	22.3
254	750.2	25.1	407	23.3	736	29.6	650	23.1	720	22.1
256	760.2	24.9	408	23.3	718	29.7	612	23.3	723	22.1
258	755.3	24.1	306	23.1	722	29.7	653	23.4	725	22.1
260	779.4	24.2	301	23.2	721	30.1	654	23.5	720	21.7
262	760.2	23.9	302	23	699	28.9	606	23.3	727	22.1
264	762.4	23.8	301	23	698	29.4	602	23.5	728	22.1
266	759.2	23.7	301	23.1	714	29.4	552	23.6	729	22.1
268	780.4	23.7	301	22.9	717	30	570	23.7	729	22.3
270	782.4	23.6	818	22.9	724	30.1	591	23.6	729	22.2

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
272	790.2	23.6	818	22.9	731	29.5	599	22.9	730	22.3
274	791.2	23.8	810	21.1	742	28.2	581	23.1	730	22.4
276	759.4	23.6	813	21.2	759	29.1	580	23.2	730	22.3
278	752.2	23.6	811	21.2	740	28.8	591	23.5		
280	810.3	23.5	813	22.5	739	28.5	594	23.2		
282	812.4	23.5	815	22.8	733	28.7	596	23.6		
284	850.4	23.5	815	23.2	749	29.1	592	23.5	731	22.3
286	840.3	23.2	812	23.6	762	28.7	598	23.1	731	22.4
288	839.5	23.3	814	23.4	772	29	573	22.7	732	22.8
290	820.2	24.1	814	23.5	769	28.9	559	22.3	733	22.7
292	810.2	24.1	816	23.6	764	28.7	556	22.4	731	22.5
294	812.4	24	827	23.6	762	28.7	560	22.5	733	22.7
296	850.4	23.7	883	23.6	740	28.9	573	22.5	735	22.5
298	852.5	23.6	826	23.8	749	28.6	554	23.1	732	22.4
300	880.4	23.5	828	26.5	741	28.7	548	23.2	737	22.4
302	910.5	23.8	729	28.4	752	28.1	588	22.9	739	22.8
304	915.2	24.2	821	29.9	761	28.3	590	23.1	745	22.9
306	930.3	24.5	832	29.8	749	28.7	584	23.2	747	22.9
308	940.2	24.1	830	28	762	29.1	594	22.7	760	22.9
310	942.4	24.3	868	28.8	740	28.5	596	22.8	755	22.9
312	939.5	24.4	865	28.7	731	28.5	576	23.1	753	22.8
314	940.5	24.5	858	28.8	749	28.2	566	23.2	757	22.8
316	942.2	24.5	873	28.7	748	28.8	542	23.3	759	22.8
318	950.5	24.2	680	28.8	740	29.2	559	22.7	765	22.8
320	955.5	24.4	627	28.8	742	28.4	543	23.1	764	22.8
322	1011	24.5	662	28.7	737	29.5	573	23.2	773	22.8
324	1012	24.3	662	28.8	810	29.1	559	23.1	775	22.8
326	1020	24.5	665	28.8	820	29.5	590	24.1	782	22.8
328	1002	24.2	663	28.8	827	29.1	598	23.7	787	22.8
330	1031	24.5	688	28.8	910	29.3	594	23.7	795	22.8
332	1039	24.3	678	28.9	930	29.5	590	23.2	792	22.8
334	1039	24.2	610	26.5	928	28.2	570	23.3	810	22.8
336	1040	24.3	612	27.2	932	29.5	582	23.2	822	22.8
338	1063	24.5	696	29.6	942	28.3	591	22.9	833	22.8
340	1069	24.2	693	29.5	944	29.1	577	22.8	851	22.8
342	1052	23.9	673	29.5	949	8.3	571	23.1	847	23.1
344	1054	23.8	715	30.5	942	28.7	558	23	846	23.6
346	1060	23.8	690	30.5	931	28.5	570	22.8	844	23.1
348	1069	23.7	696	30.5	937	28.4	565	22.4	867	22.8
350	1062	23.8	720	30.6	940	28.9	550	22.3	847	23.4
352	1070	23.2	735	30.6	941	28.5	542	22.7	844	22.9
354	1089	23.5	718	30.9	944	28.7	561	23.1	865	23.3
356	1068	23.3	757	30.7	947	29.1	578	23.2	872	23.4
358	1070	24	730	30.8	937	29.1	563	23.2	874	23.6
360	1069	24.1	702	30.6	957	28.7	568	23.3	876	23.2
362	1064	24.2	710	30.8	948	28.5	574	22.8	882	23.4

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
364	1070	24	709	30.7	948	28.4	561	22.3	856	22.7
366	1062	24.1	712	30.6	940	28.9	573	21.7	864	22.5
368	1056	24.2	726	30.4	933	28.5	554	21.5	875	22.4
370	1060	24.2	720	30.5	937	28.7	555	21	864	22.7
372	1055	24.3	704	30.6	937	29.1	564	21.4	865	23.1
374	1071	24.2	710	30.6	948	29.1	577	22	876	23.1
376	1050	23.1	721	30	945	29.1	582	21.2	883	22.8
378	1041	23.4	730	32.9	940	29.5	590	21.3	847	22.7
380	1051	23.5	822	32.3	945	28.5	572	21.9	856	22.8
382	1053	23.2	694	32.1	949	29.2	577	21.3	894	22.6
384	1069	23.3	768	31.9	980	29.3	554	21.9	895	22.8
386	1082	23.5	708	31.5	972	29.1	559	21.4	876	23.1
388	1022	23.6	715	31.3	1050	29.2	560	21.3	884	23.2
390	1031	23.7	820	31.8	1021	29.7	593	22.1	876	23.1
392	998.4	23.4	846	33.6	1010	29.7	594	22.1	883	23.4
394	1008	23.8	843	33.1	993	28.9	582	21.7	876	23.2
396	1005	24.1	839	32	984	28.7	586	21.7	889	23.5
398	1013	23.9	848	29	1001	28.7	574	21.4	876	23.7
400	1015	23.7	845	31.3	988	29.8	562	21.8	897	24.2
402	1023	24.2	846	30.8	980	29.4	560	21.8	864	23.5
404	994.4	24.5	843	30.2	949	29.3	570	21.3	839	23.6
406	1007	24.6	845	30.2	1002	29.5	573	21.8	846	23.7
408	1013	24.9	749	30.1	1017	29.9	574	21.8	857	23.6
410	1017	24.7	677	30.3	1007	28.8	592	21.5	864	23.5
412	1009	24.5	768	30.6	1021	28.5	607	21.6	865	23.4
414	1001	24.6	768	30.6	1005	28.1	612	21.5	865	23.1
416	1020	24.2	719	29.3	1011	28.2	622	22.4	867	23.3
418	1021	24.7	714	29.2	994	28.3	607	21.3	884	23.4
420	1027	24.8	710	29.2	1003	28.3	631	21.6	865	23.5
422	1020	24.9			989	28.7	645	21.7	867	23.4
424	1029	24.5			979	28.6	627	22	877	23.6
426	1024	24.1			990	28.6	617	22.1	884	23.7
428	1027	24.2			982	28.5	627	21.7	864	23.5
430	1028	24.3			984	28.5	674	21.3	875	23.5
432	1032	24.8			988	28.4	675	21.7	884	23.5
434	1022	24.5			984	28.9	674	21.4	885	23.4
436	1027	24.8			992	28.7	672	21.3	887	23.5
438	1024	23.9			998	28.8	667	22.2	878	23.4
440	1003	24.1			978	28.8	654	22.1	874	23.2
442	1010	23.8			1120	31.5	652	22.4	875	23.1
444	997.3	23.9			986	30.5	653	22.3	874	23.1
446	979.2	23.7			878	30.2	664	22.4	884	23.2
448	981.3	23.4			874	30.6	667	22.1	883	23.4
450	989.2	23.3			880	30.4	675	22	882	23.5
452	988.3	24			872	30.1	742	22.4	875	23.2
454	974.2	23.2			870	30.4	737	21.7	865	23.5

Depth, m	SABH1		SABH2		SABH3		SABH4		SABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
456	969.2	23.1			858	30.5	745	21.6	866	23.4
458	967.3	23.3			860	30.1	747	21.6	867	23.6
460	950.4	23.5			864	30.1	754	22.4	872	23.7
462	970.2	23.7			861	30.2	762	21.7	874	23.6
464	979.3	23.8			866	30.5	774	21.6	847	23.6
466	971.2	23.3			870	29.9	775	21.7	856	23.5
468	978.4	23.9			878	29.4	774	22.4	857	23.4
470	960.3	24.1			871	30.1	764	21.7	855	23.5
472	962.4	24.2			877	30	762	21.8	864	23.4
474	951.4	24.1			875	29.8	765	22.2	872	23.5
476	958.3	24.3			864	29.8	785	22	876	23.7
478	954.3	24			865	29.7	784	21.7	882	23.6
480	959.2	24			864	29.9	765	21.6	884	23.5
482	961.4	23.7			859	29.9	772	21.8	883	23.4
484	962.5	23.9			871	29.4	775	21.6	886	23.6
486	949.5	23.2			872	29.5	782	22.3	887	23.4
488	952.2	23.7			878	29.4	784	22	884	23.2
490	956.3	23.9			871	29.8	785	21.7	886	23.4
492	954.4	23.8			877	30.5	794	21.4	884	23.4
494	944.3	23.7			880	30.2	796	21.5	876	23.3
496	962.2	23.2			883	30.2	772	21.6	876	23.4
498	967.3	23.8			870	30.2	754	22.3	874	23.5
500	968.3	23.9			872	30.5	782	21.7	865	23.7
502	942.3	23.7			880	30.4	776	22.1	872	23.6
504	949.3	23.8			884	30.5	778	22.2	867	23.6
506	962.3	24.1			896	29.9	784	22.1	868	23.5
508	970.4	24.2			890	29.8	792	21.7	872	23.5
510	992.3	23.7			897	29.8	787	21.6	864	23.7
512	951.3	24.3			891	29.1	796	22.4	872	23.4
514	949.5	23.8			859	29.7	812	22.4		
516	957.3	23.7			871	29.3	807	21.6		
518	953.2	23.1			874	29.4	806	21.5		
520	943.1	23.5			863	30.5	794	21.4		
522	949.2	23.7			871	30.1	796	21.7		
524	940.3	23.8					768	21.4		
526	952.9	23.8					785	22.2		
528	964.2	24.1					796	22.3		
530							798	21.6		
532							774	21.5		
534							796	22		
536							807	21.6		
538							812	22		
540							797	21.7		
542							795	21.6		

Electrical conductivity and Temperature of South Ayat area (2)

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2			1170	20.6	1021	21				
4			1280	20.4	1020	21				
6	498	26.3	1272	20.5	1030	21.4				
8	527	26.5	1190	20.1	1040	21.4	230	21.3		
10	558	25.9	1140	20.7	1050	21.4	294	23.6		
12	579	25.3	1120	18.6	1050	21.5	254	21.6	480	22.5
14	573	24.9	1005	18.8	1060	21.6	362	20.3	460	22.3
16	569	23.2	1110	19	1062	22.6	353	20.5	458	25.1
18	498	23.4	1040	18.6	955	26.7	445	20.3	446	21.5
20	465	23.5	1070	18.7	850	18	503	20.2	444	19.8
22	462	23.6	1050	19.6	767	18	525	20.2	438	19.3
24	458	23.9	1060	18.9	778	19	514	20.15	437	18.9
26	445	24.1	1020	19.4	787	19.5	437	23.1	468	18.7
28	418	24.2	1005	18.2	799	22.7	416	24.2	454	18.5
30	425	24.1	1008	15.1	745	21	419	28.5	430	19.6
32	418	23.9	986	18.22	755	19.22	413	21.6	480	20.4
34	421	24.3	1006	18.1	786	22.6	456	20.5	410	20.8
36	425	24.1	1010	19.2	700	18.7	410	21.6	520	20.3
38	429	24.3	1022	20.1	750	22	440	22.4	516	19.8
40	428	24.6	1040	20.8	668	18.5	350	24.5	512	19.6
42	417	25.7	1020	19.8	748	22	385	23	496	20.4
44	420	25.7	1008	20.2	668	17.3	420	21.5	488	19.7
46	419	25.9	1040	19.2	670	18.2	475	20.6	482	19.2
48	424	26.1	1040	19.2	680	19	316	21.6	472	18.8
50	419	26.4	1010	19.2	852	20	451	23.5	470	19.1
52	421	26.7	895	21.5	853	21	356	23.8	460	19.3
54	424	26.8	882	20.5	853	22	328	25.5	380	20.6
56	418	27.1	820	19.6	854	22	390	28.1	392	19.9
58	415	27.3	806	20.2	760	19	380	29.1	368	20.2
60	414	27.4	720	22.4	718	18.8	340	26.3	424	20.5
62	416	27.7	680	20.6	809	22	365	24.5	406	19.8
64	410	26.9	620	19.6	800	21	545	25.4	380	19.4
66	408	26.9	680	20.2	807	21	415	21.5	384	19.2
68	406	27.1	680	22.2	810	21	513	19.4	398	20.3
70	405	27.3	680	21.8	780	20	398	19.6	418	19.8
72	401	27.1	672	20.8	860	21	819	18.5	426	19.7
74	397	27	660	19.8	652	19	764	19.5	740	24.6
76	394	26.9	652	20.2	898	24	764	19.5	680	25.7
78	389	26.9	636	20.1	900	24	626	21.4	654	25.4
80	384	27.2	662	18.6	880	20.5	796	19.5	644	25.3
82	378	26.8	640	19.9	870	21	846	22.5	640	26.4
84	377	26.6	620	22.2	724	20.5	856	25.6	658	26.8
86	375	26.3	640	21.2	810	21	890	27.5	718	27.8

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
88	379	25.9	630	20.2	650	20.4	913	23.8	712	27.6
90	379	25.9	662	20	724	24	816	27.6	696	27.6
92	382	26.1	640	20.2	654	20	796	28.4	702	26.5
94	384	25.9	656	20	858	24	826	21.5	690	27.7
96	385	26.1	640	20	792	21	822	22.2	694	27.2
98	965	26.2	630	20.2	807	23	795	25.3	695	26.5
100	959	26.2	622	20.2	855	25	849	26.5	720	27.5
102	962	26.3	650	20.6	800	21	856	23.2	718	29.6
104	966	26.3	626	22.2	794	21	884	21.6	710	28.9
106	968	26.1	610	23.2	802	23	819	20.5	685	29.4
108	971	26.2	600	22.1	800	22	879	23.1	693	29.4
110	974	26.3	642	20.2	848	25.2	856	21.6	682	29.3
112	977	26.4	630	20.8	786	23	866	25.2	698	29.6
114	981	26.2	660	20.8	747	22	818	21.5	714	29.4
116	982	26.3	640	20.8	756	24	714	24.1	730	29.8
118	985	26.2	590	22.3	758	25	854	19	684	28.9
120	986	26.1	560	20.8	752	26	816	18.9	678	29.5
122	988	25.9	580	21.8	680	23	894	24.2	695	29.2
124	978	25.9	550	22.2	702	26	875	24.6	684	28.4
126	972	25.8	570	22.5	642	25	835	26.2	680	27.9
128	976	25.9	560	21.8	640	24	844	26.3	672	27.4
130	973	25.9	570	22.3	638	23	847	24.9	668	27.8
132	969	25.7	562	23.1	680	23	816	25.6	676	28.6
134	971	26.1	580	23.2	682	23	854	26.2	693	28.5
136	970	26.2	570	23.3	604	23	845	26.5	686	28.8
138	968	26.4	562	21.2	708	25	857	25.9	634	28.3
140	965	26.4	556	20.6	700	24	866	26.1	642	27.9
142	967	26.2	532	19.2	690	23	892	25.1	650	27.7
144	958	26.4	544	19	640	22	890	21.3	704	27.6
146	957	26.3	540	19.8	657	24	890	20.6	698	27.8
148	954	26.5	560	23.6	630	23	891	19.4	688	27.2
150	950	26.2	570	23.8	600	23	886	19.9	684	27.8
152	945	25.9	566	24.2	610	22	879	20.2	672	27.9
154	959	26.1	572	24.8	650	24	858	21.3	668	28.4
156	953	26.3	576	24.6	588	23	868	19.8	677	28.3
158	897	26.4	578	23.9	589	23	870	20.2	653	27.9
160	903	26.3	570	24.6	602	23	876	19.9	715	27.6
162	907	26.5	580	23.8	603	23	878	21.8	780	26.6
164	910	26.6	570	22.4	608	24	882	25.3	766	26.7
166	908	26.6	598	22.8	611	23	880	24.8	755	26.9
168	899	26.5	602	23.1	610	23	883	23.9	691	27.2
170	896	26.4	589	23.2	608	24	878	22.1	684	26.8
172	899	26.4	608	23.1	609	23	876	20.9	655	26.5
174	896	26.4	596	22.8	608	23	894	24.2	648	26.5

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
176	899	26.4	610	23.4	612	24	896	24.9	598	26.7
178	900	26.5	600	23.8	638	24.8	852	23.9	615	27.1
180	902	26.4	608	24.1	632	24.5	833	24.9	725	28.8
182	904	26.3	610	24.2	640	25	837	25.7	735	29.4
184	909	26.4	895	23.8	680	27	820	27.2	699	29.6
186	905	26.4	898	23	679	25	815	28.1	680	27.8
188	904	26.5	592	22.2	682	25	825	27.3	684	27.5
190	945	26.3	596	19.9	681	24	869	27.9	676	28.6
192	955	26.5	610	20.2	683	25	865	26.9	720	28.1
194	959	26.7	606	20.4	690	25	869	25.2	724	28.8
196	963	26.8	616	21.2	691	25.7	878	25.1	669	29.9
198	970	26.7	612	22.2	744	25	869	26.3	676	29.6
200	975	26.6	608	22.8	743	25	875	24.2	656	28.5
202	972	26.4	610	22.4	742	25	866	23.9	654	27.8
204	977	26.5	618	23.2	746	25	886	21.3	648	28.3
206	985	26.7	598	23.6	729	25	888	19.6	698	28.7
208	984	26.8	656	22.3	730	24	879	18.9	780	29.6
210	987	27	670	22.1	732	25	888	21.8	815	29.1
212	991	27.2	760	22.4	740	24	866	22.5	795	29.8
214	992	27.3	770	22.7	732	25	868	22.9	755	29.7
216	995	27.4	780	22.4	734	24	898	23.7	733	29.4
218	998	27.5	776	22.8	732	24	892	22.6	810	29.9
220	1003	27.7	768	22.3	789	26	890	23.2	800	29.6
222	1010	27.7	760	23.6	746	26	896	23.3	691	28.6
224	1015	27.8	772	23.8	756	26.8	916	24.1	735	28.7
226	1018	28.1	698	24.2	750	26.2	933	24.2	676	27.8
228	1019	28.2	710	24.6	750	26	930	24.8	656	28.9
230	1023	28.3	720	23.8	751	26	898	22.1	767	27.6
232	1021	28.3	710	22.8	736	26	899	23	536	28.8
234	1024	28.5	698	21.9	758	26	912	24.2	850	26.9
236	1020	28.7	692	21	760	26	910	22.6	649	29.1
238	1018	28.7	706	20	768	26.6	899	21.2	598	26.4
240	1021	28.9	700	20	767	26	913	20.2	684	29.6
242	1019	29	708	20.6	765	26	898	22.3	710	28.8
244	1017	29.1	710	20.8	765	26.8	890	21.5	688	27.6
246	1017	29.2	720	21.2	763	26	916	19.95	650	27.4
248	1018	29.1	710	22.2	762	26	897	20.1	670	26.7
250	1016	29.2	735	22.6	760	26.2	894	21.3	650	26.8
252	1019	29.2	692	20.8	775	26	899	20.2	654	27.8
254	1015	29.3	682	20	776	26.3	895	21.3	670	27.8
256	1017	29.4	696	20.6	775	25	905	24.5	682	28.4
258	1018	29.4	708	20.4	776	25	909	25.6	712	27.6
260	1016	29.5	792	20.2	779	25	966	26.4	724	29
262	1014	29.4	686	19.5	778	24.8	983	26.1	708	28.1

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
264	1013	29.5	706	21.2	780	24.9	970	27	702	28.7
266	1014	29.8	710	22.2	781	24.5	978	27.5	697	27.5
268	1015	29.6	720	22.6	780	24.5	960	27.9	708	27.4
270	1014	29.7	716	21.9	766	25	985	27.8	694	27.8
272	1012	29.9	720	22.4	784	26	893	27.1	690	28.7
274	1010	29.8	716	23.4	784	26	970	26.1	714	28.3
276	1013	29.8	718	23.6	785	26	978	25.2	728	28.5
278	1016	29.7	722	23.8	814	28	960	24.3	738	28.9
280	1018	29.8	724	24.8	818	27	985	23.9	674	29.2
282	1017	29.7	730	24.6	815	27	893	22.6	686	29.8
284	1014	29.8	706	24.2	810	26	922	21.1	669	29.7
286	1011	29.9	710	23.2	800	26	934	22.6	699	28.8
288	1009	29.9	708	22.9	808	25	926	23.4	730	28.9
290	1008	29.8	712	21.8	772	24	906	23.9	808	29.2
292	1010	29.8	704	20.9	773	24	900	24.5	784	28.9
294	1012	29.9	710	19.8	800	25	913	23.1	798	28.6
296	1011	30.1	690	19.2	802	26	910	22.5	774	29.4
298	1013	30.1	688	19.3	803	26	912	21.6	764	29.3
300	1017	29.9	692	19.5	880	26	890	20.8	755	28.7
302	1015	29.9	769	26.2	881	26	911	21.3	772	28.6
304	1012	29.8	806	25.7	885	26	899	19.9	762	28.4
306	1010	29.9	807	27	886	26	905	21.6	750	27.2
308	1007	29.7	810	25.6	887	26	918	20.4	714	27.8
310	1004	29.8	812	26.8	882	26	904	19.6	720	27.6
312	1001	30.1	790	27.8	879	26	908	21.7	683	27.8
314	997	29.7	816	26.2	870	25	897	26.9	693	26.9
316	999	29.8	888	27.7	800	25	913	26.5	712	26.8
318	996	29.6	816	24.5	884	26	926	24.9	730	27.9
320	992	29.7	840	24.6	915	27	924	25	722	26.8
322	988	29.7	857	24.2	802	25	918	24.9	790	27.5
324	980	29.1	827	25	765	24.7	910	25.8	810	27.5
326	971	28.9	830	24.7	805	25	916	26.5	745	26.8
328	977	29.2	823	24.4	809	25	901	26.9	695	26.3
330	975	29.4	930	26	820	25	895	27.1	875	28.4
332	973	29.5	921	27.7	830	26	904	28.1	830	25
334	969	29.5	912	26.3	832	26	908	28.5	799	27.5
336	972	29.6	920	25.2	842	26	910	27.9	780	28.3
338	976	29.7	935	25.4	923	27	914	28.1	773	29.4
340	974	29.8	933	25.2	802	27	905	28.6	843	28.7
342	979	29.8	928	25.1	808	27	900	27.3	935	29.9
344	974	30.1	930	25.2	800	26	947	26.4	920	29.3
346	969	31.3	858	25.3	802	26	936	24.8	895	29.2
348	965	30.5	855	25.1	798	26	945	26.8	912	28.6
350	963	30.6	851	25.2	794	26	918	27.8	903	28.7

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
352	959	30.8	848	25.3	796	26	906	28.9	884	28.5
354	953	30.9	832	25.1	790	25	901	29.1	896	28.8
356	950	31.1	842	25.4	785	26	910	28.5	866	29.1
358	947	31.2	946	27.1	786	26	989	27.6	850	29.8
360	944	31.3	863	28.2	886	26	983	27.8	878	30.2
362	939	31.3	710	29.1	896	27	925	28.3	880	30.5
364	935	31.4	725	26.6	940	27	938	29.2	899	29.5
366	933	31.5	810	28.2	966	27.5	945	28.9	918	29.4
368	930	31.6	890	29.7	902	27	945	28.9	933	28.5
370	926	31.7	913	29.5	910	26	935	26.5	954	28.6
372	923	31.9	870	26.7	900	26	940	26.6	951	30.4
374	925	32	880	26.5	1002	27	990	28.5	940	30.2
376	924	32.1	844	27.5	1042	28	998	27.9	943	30.5
378	922	32.1	867	28.2	1030	27.5	995	28.2	928	29.5
380	925	31.9	870	28.2	1028	27.2	999	27.9	934	31.2
382	928	31.9	798	26	930	27.5	998	27.2	955	31.6
384	926	32	804	26	1020	27.5	1000	28.5	952	30.9
386	945	32.1	810	24.2	1060	28	1002	29.4	955	29.8
388	960	31.8	806	23.5	1077	29	1004	28.9	965	31.4
390	975	32	794	23.8	1070	28.9	1003	29.1	965	31.4
392	1080	31.9	804	22.2	1072	28.92	1005	29.5	960	30.3
394	1079	31.7	802	21.3	1070	28	1012	29.1	949	30.7
396	1075	31.8	810	20.6	1072	29	1015	28.9	930	29.3
398	1072	32.2	760	24.6	1069	29	1030	27.9	899	29.1
400	1069	32.3	820	26.2	1060	28.7	1035	28.6	915	29.3
402	1065	32.3	810	26.6	1058	28.9	1040	28.9	933	30.4
404	1070	32.2	670	25.6	1060	28.7	1030	28.5	909	31.8
406	1068	32.1	690	24.8	1070	28.79	1035	27.5	901	30.9
408	1059	32.2	875	24.5	1072	29	1045	29.1	893	29.9
410	1056	32.3	956	27.5	1074	29	1025	27.9	870	30.5
412	1060	32.1	870	30.4	1029	29	1129	28.6	885	30.5
414	1068	32.3	840	28.6	1028	28.6	1120	26.5	941	31.7
416	1075	32.4	860	26.6	1030	28.9	1100	28.2	975	31.6
418	1080	32.3	850	25.5	1032	29	1114	27.9	937	30.2
420	1084	32.2	840	25.7	1066	29.01	1120	28.2	940	30.8
422	1085	32.1	820	25.6	958	29.06	1115	29.1	927	28.7
424	1089	31.9	786	25.8	797	28.8	1117	26.6	937	28.4
426	1094	32	792	26.8	1003	29.6	1150	29	942	29.2
428	1100	31.9	806	26.8	1010	29	1155	28.1	919	29.5
430	1110	31.7	720	26.8	1017	28.45	1162	27.5	922	28.9
432	1115	31.8	760	25.7	1020	29.01	1170	27.9	941	28.6
434	1118	31.9	820	25.3	1032	29	1185	28.6	1220	29.6
436	1124	31.8	810	22.2	1108	29.8	1191	27.7	1190	31.5
438	1128	31.9	806	26.5	1109	29.86	1200	29.2	1120	36.7

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
440	1130	32	789	24.2	1110	29.76	1196	29.7	1010	36.4
442	1134	32	790	23.2	1109	29.6	1205	29.9	1270	36.1
444	1136	31.9	870	26.8	1108	29.8	1220	30	998	30.2
446	1138	31.8	880	27.6	1106	28.9	1222	30.1	1050	29.4
448	1145	32.1	860	27.9	1107	28.8	1220	30.3	1250	36.9
450	1149	32.4	842	28.6	1012	29	1225	30.2	1090	37.4
452	1153	32.6	842	23.6	1051	29.8	1230	30	1207	37.5
454	1157	32.7	860	23.8	930	30	1233	30.4	1125	38.1
456	1161	32.8	862	26.6	932	30	1239	29.6	1200	37.5
458	1169	32.9	578	26.6	931	30	1241	29.3	1160	38.4
460	1172	32.9	598	26.6	932	30	1246	27.9	1018	39.4
462	1175	33	620	27.2	934	29.9	1250	28.5	1090	37.4
464	1179	33.1	660	23.7	1100	29	1279	30.6	1207	37.5
466	1182	33.1	706	24.8	1100	29	1270	29.9	1125	38.1
468	1185	33.2	598	26.4	1164	28.4	1290	29.7		
470	1189	33.4	606	26.8	1136	28.5	1300	27.9		
472	1191	33.3	690	27.7	1167	29.5	1260	29.5		
474	1193	33.4	870	26.6	1166	30.5	1298	29.8		
476	1195	33.4	880	26.8	1160	30	1306	30.1		
478	1201	33.5	890	26.9	1044	29	1310	28.7		
480	1210	33.7	898	26.8	1043	29.02	1280	30.6		
482	1215	33.8	886	24.6	1042	29.03	1295	29.8		
484	1219	34.1	876	23.9	1043	29.01	1299	29.6		
486	1226	34.3	860	24.9	1042	29	1270	29.8		
488	1230	34.4	868	24.4	1046	29	1280	29.7		
490	1232	34.6	876	23.9	1044	29	1315	29.8		
492	1235	34.6	674	27.2	893	29.9	1308	28.9		
494	1237	34.5	652	26.8	1022	29	1314	29.5		
496	1240	34.7	630	28.8	1131	30.9	1316	27.7		
498	1238	34.6	698	29.2	1170	31.05	1313	28.6		
500	1239	34.7	598	28.8	1176	31.05	1320	29.4		
502	1242	34.7	600	23.9	1160	29.8				
504	1239	34.8	586	24.2	1112	29.05				
506	1241	34.9	574	24.8	1310	31.8				
508	1238	34.8	592	24.9	1255	32				
510	1236	34.9	610	26.8	1209	30				
512	1239	35.1	810	26.6	1200	30.1				
514	1237	35.1	1280	26.5	1208	30.4				
516	1234	34.9	1260	21.8	1205	30.4				
518	1235	34.8	1220	26.2	1206	30.4				
520	1238	34.9	680	24.8	1205	30.4				
522	1240	35.2	720	25.6	1209	30.8				
524	1243	35.3	760	25.6	1204	31				
526	1247	35.4	720	26.6	1206	31				

Depth, m	SABH6		SABH7		SABH8		SABH9		SABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
528	1250	35.5	690	23.3	1290	31.5				
530	1254	35.5	710	24.2	1292	31.6				
532	1300	35.6	720	25.2	962	32.7				
534	1258	35.5	726	25.6	1373	32				
536	1301	35.6	710	26.8	1270	31.5				
538	1304	35.7	726	25.8	1385	21				
540	1307	35.8	715	26.2	1445	32				
542	1310	35.7	712	26.4	944	31				
544	1309	35.8	908	26.6	1108	31				
546	1312	35.9	816	27.2	1247	32				
548	1314	35.9	778	26.2	1242	32				
550	1311	36.1	760	27.6	1240	21				

Electrical conductivity and Temperature data of South Ayat (3)

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	520	21	820	23			1230	19.4		
4	530	22	825	24			1210	18.6		
6	540	25	720	21	650	23.5	1222	18.9		
8	545	22	699	21	620	24.5	1056	17.5	711	20.4
10	560	20.5	740	23	580	24.8	914	17.2	1330	25.8
12	575	20.8	766	25	498	24.3	969	17.9	1282	24.5
14	580	21.6	830	28			992	17.9	1224	22.8
16	579	21.3	646	22			976	17.6	1236	24.9
18	582	21.4	656	21	434	26.3	905	17.5	1172	22.8
20	584	21.5	756	24	515	21.2	805	18.9	1137	22.4
22	585	21.6	833	27	490	21.8	886	18.6	1002	21.5
24	586	22.3	834	26	421	21.1	697	18.5	992	19.8
26	589	23.4	777	27	544	22.5	616	16	1008	21.5
28	588	24.5	745	28	549	22.9	721	22	1025	20.2
30	589	21.3	776	27	550	23.4	568	20	1037	19.5
32	650	21.5	681	27	564	23.8	744	21	995	22
34	685	22.9	776	26	570	24.2	708	18.5	934	23.5
36	690	22.8	774	26	595	24.5	653	21	1106	24.3
38	691	22.9	713	23	525	23.9	680	24	1102	24.1
40	692	21.9	695	26	530	23.9	700	26	1250	21.9
42	694	21.9	638	25	561	24.1	655	24	1247	22.2
44	693	22.3	564	25	542	23.7	640	24	1235	22.1
46	695	21.5	580	26	537	23.5	600	21	1216	22
48	696	22.8	582	25	533	23.8	565	20	1176	20.5
50	698	21.8	580	26	522	24.2	546	21	1351	20.6
52	697	22.9	580	25	524	24.3	503	18	1266	23.5
54	699	21.8	578	26	528	24.1	524	23	1076	20.8

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
56	701	21.5	576	25	530	23.9	501	21	1092	21.7
58	703	21.5	572	24	533	24.2	446	18	1091	21.9
60	695	21.3	560	24	540	23.8	485	23	1057	25.6
62	698	21.5	558	25	538	23.7	442	20	950	22.6
64	698	20.8	556	24	540	23.8	446	21	959	23.1
66	696	20.9	550	25	554	25.3	487	22	961	23.7
68	675	21.5	540	24	552	25.2	444	18.5	963	23.8
70	699	22.5	484	24	551	27.1	454	19	968	24.1
72	700	23.3	490	25	553	27.5	460	19	941	21.6
74	702	24.5	490	25	555	27.6	454	19	807	20
76	701	25.3	460	25	554	25.9	460	20	821	20.4
78	698	21.5	435	25	556	25.1	458	20	842	20.2
80	695	20.6	434	25	559	25.4	480	19	1090	24.1
82	698	21.7	820	23	560	25.5	518	20	1045	24.8
84	699	20.8	450	25	561	25.6	514	21	1053	23.7
86	695	21.3	455	24	562	25.7	594	23	1113	23.4
88	684	21.5	456	25	564	25.9	553	20	1048	23.2
90	675	21.2	450	24	565	25.8	536	21	1035	23.3
92	666	21.9	455	24	568	25.8	530	23	1050	23.2
94	681	22.9	466	23	569	25.9	573	20	1026	23.3
96	682	23.5	470	24	570	25.9	530	19	1025	23.1
98	675	22.1	475	23	570	25.8	486	20	1023	22.9
100	680	22.3	474	24	552	25.5	490	21	1006	23.1
102	681	21.9	360	23	554	25.4	472	20	960	22.9
104	570	24.3	390	25	556	25.3	472	19	987	22.5
106	575	23.2	400	24	556	25.1	472	20	987	22.3
108	574	21.9	410	25	564	24.9	534	19	1140	23.4
110	570	21.4	412	24	566	25.8	530	20	1160	24
112	560	21.5	450	25	568	25.9	328	20	1233	24.7
114	570	22.3	446	25	569	26	520	20	1231	25.4
116	580	22.9	400	23	570	26.1	525	20	975	25.3
118	579	23.5	390	24	572	26.2	519	19	924	25.3
120	560	23.9	385	23	573	26.3	563	20	967	25.4
122	556	21.5	380	23	572	27.5	564	19	938	25.1
124	576	22.5	430	24	574	27.8	560	18	914	24.9
126	581	23.3	432	24	576	28	520	19	900	24.6
128	585	21.5	390	23	580	27.9	513	18	911	24.7
130	580	21.6	380	23	582	27.8	507	18	915	24.9
132	586	22.6	370	22	585	27.8	556	21	930	24.1
134	585	25.1	380	24	588	27.7	550	21	943	24.5
136	587	23.1	390	23	590	27.6	548	21	960	24.9
138	584	22.6	395	24	594	28.3	546	21	654	26
140	585	23.7	400	24	596	28.4	510	19	900	23.6
142	587	23.5	410	24	600	28.5	520	20	1142	24.6

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
144	586	21.6	479	24	603	28.6	510	22	1161	25.6
146	584	23.5	478	26	601	28.4	519	21	990	23.5
148	602	21.6	508	26	598	28.2	489	22	1110	23.4
150	608	22.3	498	26	596	28.4	420	19	1110	23.6
152	606	25.1	497	26	594	28.5	502	24	1110	22.2
154	612	24.2	500	24	591	28.6	505	24	998	22.8
156	616	23.4	458	25	589	28.4	504	24	1020	22.6
158	630	21.2	466	26	591	28.3	545	26	1130	25.9
160	706	22.3	468	25	593	28.2	522	24	1130	25.9
162	708	23.1	465	26	595	28.1	519	25	1116	27.3
164	725	23.5	470	26	593	27.9	521	25	1102	27.8
166	750	22.1	490	25	591	27.9	528	24	1897	27.6
168	805	23.9	500	26	588	27.8	520	23	1160	26.7
170	825	22.3	495	26	592	27.7	519	24	1341	26.7
172	830	22.9	500	27	595	27.8	470	22	1362	26.7
174	850	23.1	550	26	600	28.1	450	20	1351	26.6
176	855	22.4	555	26	604	28.4	444	19	1429	26.5
178	865	23.5	504	27	609	28.8	448	20	1532	26.7
180	871	22.9	506	26	613	28.7	484	21	1496	26.6
182	873	23.1	510	26	615	28.6	527	24	1787	25.1
184	889	24.2	500	26	618	28.5	545	25	1862	28.5
186	892	22.3	520	25	620	29	439	26	1755	28.5
188	894	21.9	530	26	622	28.9	486	24	1791	28
190	898	22.5	525	26	625	28.8	490	23	1709	29.2
192	899	23.2	530	25	627	28.8	480	21	1702	29.1
194	897	21.9	520	26	630	28.9	878	22	1716	29.4
196	899	22.8	590	26	632	28.7	472	24	1505	29.1
198	897	23.1	600	25	640	28.9	460	23	1618	29.2
200	902	23.9	615	25	660	29.2	458	22	1624	29.1
202	908	24.1	602	26	703	29.3	450	21	1622	28.9
204	910	22.1	608	26	705	29.1	447	19	1605	28.8
206	915	22.8	628	25	709	29.1	442	20	1574	28.9
208	920	23.9	615	26	712	29.2	435	19	1565	29
210	943	24.3	610	25	715	29.1	434	20	1563	29
212	957	23.4	620	26	719	29	542	25	1560	28.9
214	959	23.4	602	25	721	28.9	525	25	1565	29
216	963	24.1	601	26	725	28.9	507	22	1545	29.1
218	971	25.1	602	26	728	28.8	509	23	1570	28.9
220	973	23.5	602	26	732	28.7	421	19	1591	29.3
222	984	25.1	601	26	732	28.8	532	25		
224	986	24.1	598	25	733	28.9	505	22	1555	29.2
226	897	24.1	599	26	734	29	500	23	1571	29.8
228	914	23.2	598	26	735	29.1	547	24	1542	29.6
230	917	23.9	660	26	735	29.2	445	24	1610	29.9

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
232	918	24.2	662	26	732	29.2	523	24	1602	30
234	921	23.9	500	25	731	29.3	518	26	1616	30.2
236	941	24.3	480	25	733	29.4	517	25	1606	30.1
238	955	22.9	461	24	734	29.3	516	26	1630	30.5
240	969	23.8	499	26	738	29.2	517	26	1895	30.5
242	972	23.2	490	25	742	29.2	516	23	1809	30.6
244	987	22.3		25	742	29.1	518	22	1780	30.9
246	989	24.1	424	27	739	29	499	20	1196	30.3
248	988	23.5	506	28	735	28.9	498	21	1240	30.3
250	992	22.6	485	27	732	28.7	509	23	1141	30.4
252	998	23.8	467	27	729	28.7	508	23	1144	30.3
254	1001	24.3	468	26	728	28.6	506	21	1146	30
256	1004	22.5	436	25	726	28.4	490	20	1140	29.9
258	1007	22.6	439	25	724	28.2	484	21	1242	30.1
260	1010	23.1	487	27	724	28.1	490	22	1387	29.9
262	1112	23.1	465	26	721	28	485	21	1670	30.1
264	1110	24.2	480	26	728	27.5	473	22	1675	30.2
266			485	25	730	27.4	463	21	1716	30.3
268	1019	26.1	467	26	732	27.3	468	21	1829	30.2
270	1021	25.2	468	26	734	27.2	490	20	1825	30.1
272	1024	24.5	482	26	736	28.5	485	21	1113	30.3
274	1023	24.9	484	25.4	737	28.6	473	21	1290	30.2
276	1021	23.8	489	25	739	28.7	463	22	1289	30.4
278	1023	23.5	486	26	741	28.4	468	22	1535	30.4
280	1099	22.9	485	24	747	28.8	476	21	1561	30.4
282	1100	23.6	490	25	750	28.8	498	20	1516	30.4
284	1012	23.8	486	26	800	28.9	490	21	1162	29.9
286	1116	23.9	485	26	804	29.1	500	23	1165	29.7
288	1020	24.3	498	26.5	806	29.2	502	22	1159	29.1
290	1018	24.5	490	25	808	29.2	500	21	1156	29.3
292	1015	24.2	500	26	811	29.3	490	22	1152	29.2
294	1025	25.1	485	25	813	29.4	490	22	1146	29.4
296	1024	22.9	486	26	815	29.4	465	21	1148	29.4
298	1026	22.3	485	25	817	29.3	860	23.2	1167	29.3
300	1023	22.9	490	26	820	29.3	482	21	1171	30
302	1022	23.8	495	26	822	29.2	512	23	1164	30.2
304	1024	23.2	482	25	824	29.4	522	24	1158	30.3
306	1017	22.9	485	26	826	29.3	520	23	1154	30.1
308	1014	24.1	495	26	828	29.2	521	24	1171	29.7
310	1080	23.8	502	27	830	29.3	518	23	1178	29.6
312	1010	23.2	504	25	836	29.2	520	22	1184	29.4
314	1015	22.9	520	26	840	29.1	539	23	1188	29.7
316	1016	23	530	26	845	29	528	22	1496	30.7
318	1003	23.8	540	25	849	29	520	23	1790	27.9

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
320	1009	24.1	560	27	853	28.9	518	24	1785	28.1
322	1070	23.9	520	25	859	28.9	520	25	1862	27.7
324	1072	24.8	524	26	862	28.8	519	24	1776	28.7
326	1078	24.5	502	26	866	28.7	521	25	1762	29.2
328	1065	24.8	503	26	870	28.8	526	23	1696	29.4
330	1068	24.1	496	26	872	28.9	498	22	1658	29.6
332	1072	23.9	500	27	875	28.9	540	23	1716	29.5
334	1075	24.5	520	26	879	29	548	24	1729	29.8
336	1078	23.1	600	26	881	28.9	572	24	1734	30
338	1073	22.9	589	26	884	28.8	571	24	1748	30.1
340	1076	25.1	597	27	886	28.9	570	24		
342	1074	23.8	600	26	889	28.9	572	24		
344	1077	24.1	589	25	892	28.9	571	24		
346	1080	24.3	597	25	894	29	570	24		
348	1081	23.5	596	25	896	29.1	572	24		
350	1082	23.9	608	26	899	29.2	571	23		
352	1077	24.3	604	26	901	29.1	570	24		
354	1089	23.9	598	25	904	29.2	570	23		
356	1090	25.1	599	25	909	29.3	574	24		
358	1099	25.2	605	26	912	29.1	573	25		
360	1110	25.1	604	27	914	28.9	572	24		
362	1185	25.9	602	26	916	28.8	570	21		
364	1190	25.5	597	26	920	28.7	568	22		
366	1192	25.9	596	25	924	28.9	572	24		
368	1195	25.8	602	25	927	28.8	570	23		
370	1198	26.1	600	26	929	29.1	568	24		
372	1201	24.9	600	26	932	29.2	571	23		
374	1205	25.3	610	27	936	29.3	571	24		
376	1205	25.3	690	25	939	28.9	567	24		
378	1207	24.4	699	26	942	28.8	568	23		
380	1209	25.1	789	25	947	28.9	568	24		
382	1210	26.1	798	26	951	28.9	569	24		
384	1212	25.3	796	26	953	29	545	24		
386	1210	25.9	794	26	955	29.1	578	24		
388	1211	24.3	800	26	959	29.2	548	24		
390	1218	25.1	799	27	1100	29.5	536	25		
392	1210	25.9	793	27	1110	29.6	540	26		
394	1215	25.3	794	26	1118	29.4	536	27		
396	1213	24.1	795	26	1109	29.7	542	26		
398	1214	24.9	796	27	1107	29.8	560	25		
400	1217	24.4	796	26	1108	29.9	568	26		
402	1211	23.9	786	28	1090	29.8	569	25		
404	1221	23.8	789	27	1098	29.8	580	25		
406	1208	24.1	800	28	1113	29.7	570	25		

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
408	1213	24.5	850	28	1111	29.7	569	23		
410	1222	25.2	950	28	1112	29.6	576	25		
412	1215	23.9	496	28	1109	29.5	578	25		
414	1210	24.3	500	28	1106	29.5	580	24		
416	1218	24.9	520	28.5	1120	29.7	584	25		
418	1216	25.2	600	29.7	1122	29.8	594	24		
420	1220	26.1	589	29	1124	29.9	592	23		
422	1233	26.7	597	29	1128	29.9	590	24		
424	1236	26.8	600	29.5	1130	30.1	586	24		
426	1240	25.8	589	29	1130	30	652	24		
428	1242	25.9	597	29.8	1132	29.9	650	24		
430	1245	26.5	596	30.6	1135	29.9	659	24		
432	1248	26.2	608	30.5	1137	29.8	649	24		
434	1250	26.3	604	30	1070	29.9	649	24		
436	1253	25.9	598	29.5	1060	30.2	639	24		
438	1256	25.8	599	29	1056	30.1	638	24		
440			605	29	1052	30	682	25		
442	1271	25.8	604	30	1048	29.9	648	24		
444	1276	25.9	602	30	1046	29.8	656	25		
446	1278	26.8	597	30	1042	29.7	654	25		
448	1280	26.9	596	30	1039	29.5	652	25		
450	1285	26.8	602	29	1035	29.4	656	25		
452	1283	26.7	600	29.5	1032	29.3	654	24		
454	1288	25.8	600	29.5	1032	29.8	657	25		
456	1289	25.3	610	29	1031	29.9	649	26		
458	1287	26.2	690	29	1029	30.1	680	23		
460	1288	26.3	699	29	1026	30	630	24		
462	1289	26.1	789	29	1024	30.1	630	24		
464	1296	25.9	798	29.4	1022	29.9	620	24		
466	1295	26.2	796	29	1019	29.8	611	24		
468	1289	26.2	794	29.4	1017	29.8	618	24		
470	1287	26.3	800	29.7	1015	29.7	620	25		
472	1285	26.9	799	30	1013	29.6	622	25		
474	1290	26.7	793	29.9	1010	29.6	618	25		
476	1295	26.8	794	30	1008	19.7	650	25		
478	1297	26.9	795	30	1005	29.8	662	24		
480	1299	26.7	796	30	1004	29.9	677	25		
482	1305	25.9	796	29.1	1002	30	670	24		
484	1310	25.6	786	30	998	30.1	660	24		
486	1315	26.1	789	30	997	30	670	25		
488	1328	26.1	800	29.5	995	29.9	676	26		
490	1325	26.3	850	30	994	29.9	680	27		
492	1312	26.9	950	30	993	29.9	710	28		
494	1308	25.8	1155	29.5	991	30	728	28		

Depth, m	SABH11		SABH12		SABH13		SABH14		SABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
496	1309	26.7	1187	30	990	30.1	732	27		
498	1314	26.5	1160	29.5	989	30.2	747	28		
500	1318	25.9	1173	29.5	989	30.2	802	28		
502	1320	25.8	1173	30	988	30.3	800	29		
504	1325	26.1	1176	30	986	30.2	803	28		
506	1319	25.7	1174	30.5	1020	32.5	798	29		
508	1304	25.6	1180	30.5	1017	32.6	797	29		
510	1298	25.7	1182	30	1015	32.4	796	29		
512	1285	25.5	1181	30.5	1010	32.3	795	29		
514	1281	25.9	1174	30.5	1006	32.1	796	29		
516	1279	25.5	1191	31	1004	32.1	799	29		
518	1263	25.8	1190	31	1001	31.9	798	28		
520	1245	25.9	1179	31.5	1015	31.9	800	29		
522	1241	25.5	1186	31.4	1019	30.7	802	28		
524	1239	25.1	1188	31.4	1022	30.8	801	27		
526	1236	25.3	1188	30.4	1024	30.6	752	28		
528	1234	25.9	1192	31.5	1026	30.5	760	28		
530	1235	25.7	1190	30	1030	30.5	747	29		
532	1237	25.4	1172	30	1032	30.6	827	29		
534	1237	25.1	1175	30.5	1062	30.8	728	29		
536	1229	26.2	1167	29.5	1092	30.9	730	29		
538	1225	25.9	1175	29.8	1122	31.1	900	30		
540	1228	25.8	1182	30	1130	31.4	880	30		
542	1228	25.9	1174	29.9	1136	31.7	890	30		
544	1220	25.5	1178	30	1144	31.9	870	30		
546	1200	25.3	1173	30	1150	32.9	875	30		
548	1204	25.8	1020	29.9	1152	32.1	895	31		
550	1206	26.1	1064	30.1	1155	32.4	900	31		
552					1160	32.5				

Electrical conductivity and Temperature data of South Ayat area (4)

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	305	21										
4	307	20.5										
6	304	20.8										
8	306	20.7										
10	306	20.5										
12	310	20.1			480	20						
14	311	21.6	365	22.4	496	24						
16	314	21.8	354	22.2	620	20.6						
18	312	20.1	359	22.1	910	18.9						
20	340	20.5	363	22.3	900	19.9						
22	341	21	365	22.4	880	19.7						

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
24	344	20.6	368	22.3	890	19.9						
26	347	20.7	370	22.5	880	20.8						
28	349	21.1	372	22.4	920	19.8						
30	341	21.3	371	22.3	915	20.2						
32	343	21.4	369	22.4	918	20.2						
34	346	20.9	372	22.4	910	19.8						
36	350	21.3	373	22.5	912	20.2						
38	354	21.2	372	22.6	890	19.8						
40	358	22.3	375	22.5	890	19.9						
42	366	21.4	350	22.6	880	19.9						
44	369	20.9	378	22.6	890	20.2						
46	373	20.2	381	22.6	740	22						
48	375	20.7	383	22.7	640	22.2						
50	388	20.8	385	22.8	910	20.4						
52	391	21.2	389	22.3	840	21.2						
54	393	20.9	387	22.3	670	22.8						
56	395	21.6	390	22.1	680	23.1						
58	401	21.5	389	22.8	740	22.3						
60	406	22.6	383	22.2	690	23.1						
62	435	21.5	385	22.1	720	23.2						
64	450	21.6	384	22.3	760	22.8						
66	495	22.1	387	22.4	820	21.8						
68	486	21.5	389	22.5	860	22.1						
70	521	22.5	386	22.5	812	20.8						
72	252	21.2	388	22.5	810	19.9						
74	590	21.5	389	22.4	820	22.1			561	23		
76	645	20.5	386	22.6	912	23.1			554	21.9		
78	701	20.6	390	22.5	910	21.8			550	21.8		
80	705	20.1	392	22.6	820	22.4			556	21.8	643	19.4
82	803	20.5	391	22.4	810	23.2			556	21.8	636	18.7
84	805	20.6	393	22.5	780	21.8			552	21.7	550	17.1
86	833	20.9	397	22.5	788	22.6			549	21	585	20
88	844	20.1	401	22.6	800	21.8			543	21.3	651	20.9
90	846	20.8	405	22.7	790	22.6			541	21.9	582	22.6
92	849	20.2	407	22.7	788	23.3			540	21.6	613	35.5
94	850	20.5	409	22.6	810	23.6			536	20.5	611	17.9
96	848	20.5	408	22.7	776	23.8			535	21	596	22.3
98	851	20.5	410	22.8	820	21.8			536	21.2	555	16.8
100	855	20.6	416	22.8	840	22.4			530	20	586	21.9
102	854	21.6	418	22.6	790	21.9			531	20	460	17.8
104	853	20.9	419	22.7	782	22.8			528	20.8	559	23.4
106	861	20.8	421	22.8	780	20.8			524	20.8	563	22.3
108	860	20.9	435	22.9	760	21.9			497	20.9	583	24.2
110	862	20.4	439	22.3	820	22.4			499	20.6	589	24.3

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
112	856	20.5	437	22.2	816	23.8			496	21	586	22.4
114	855	20.4	438	22.3	820	22.9			498	21.5	571	20.2
116	854	20.6	440	22.3	790	24.8			462	21	532	17.3
118	845	20.3	445	22.4	670	24.3			456	20.5	655	19.4
120	841	20.9	446	22.5	680	24.5			450	19.8	652	20.14
122	840	20.7	447	22.7	720	25.52			501	19.8	673	23.4
124	846	20.5	448	22.8	778	23.5			509	19.9	310	20.6
126	849	20.3	449	23	720	22.4			507	20.7	332	20
128	843	20.4	451	22.9	780	21.8			513	20.4	563	23.4
130	844	20.1	452	23.1	820	22.9			523	20.3	325	20.5
132	843	19.8	455	23.2	780	23.9			519	20.7	611	18.5
134	845	20.4	458	23.2	772	24.2			532	20.4	612	17.3
136	846	20.3	457	23.3	720	24.6			530	20.6	635	18.4
138	845	20.2	462	23.4	782	24.8			524	19.8	586	18.3
140	844	20.3	464	23.5	745	24.6			517	19.9	563	20.2
142	842	19.9	466	23.5	635	24.5			511	20	539	20.9
144	845	19.8	472	23.6	670	23.8			483	20.4	569	21
146	847	20.1	476	23.5	642	21.8			459	21	596	22.3
148	849	20.1	479	23.6	721	21.6			461	21	614	23.2
150	846	19.5	480	23.6	722	22.4			465	20.5	639	23.9
152	847	19.7	483	23.6	782	22.4			479	20.4	554	18
154	842	19.9	486	23.7	825	22.6	570	19.8	482	20.2	625	18
156	843	19.7	490	23.7	820	22.4	542	22.3	464	19.9	620	21.3
158	839	19.6	495	23.8	810	22.2	491	21	479	19.8	639	20.4
160	840	19.7	499	23.7	745	21.8	522	20.9	472	20.3	787	21.9
162	842	19.6	502	23.8	742	22.1	440	24.4	485	20.5	720	22.9
164	843	19.3	503	23.4	784	23.4	470	22.1	496	20.6	780	22
166	844	19.4	508	23.6	728	23.6	420	21.8	482	20.6	760	23.2
168	841	20.1	509	23.7	732	23.4	510	22.4	476	21	806	21.5
170	833	20	510	23.9	741	23.4	480	21.4	493	21.4	820	24.3
172	835	19.9	514	24.1	722	21.8	493	22.1	506	21.3	789	24.4
174	837	19.6	525	24.1	781	22.2	480	22.3	495	20.9	786	23.2
176	834	19.7	528	25.1	792	21.9	480	22.3	466	21.4	773	23.4
178	838	19.6	529	25.1	742	23.8	495	22.8	447	20.1	780	24.2
180	836	19.7	533	25	802	22.3	482	23.2	469	20.4	790	23.4
182	839	19.5	534	24.9	792	23.4	490	22.8	489	20.6	800	24.2
184	840	20.1	537	24.3	782	22.4	498	23.1	489	21	784	23.6
186	837	20.2	538	24.2	750	21.1	496	23.2	493	20.9	886	24.9
188	836	19.8	545	24.3	740	22.2	500	22.9	498	20.8	686	22.9
190	839	19.5	549	24.3	722	22.6	518	22.8	497	22	680	22.2
192	847	20.1	561	24.4	672	23.2	520	22.9	508	23.5	670	22.1
194	848	20.1	563	24.5	652	23.6	519	22.8	522	23.3	746	22.3
196	850	20.3	565	24.5	684	23.8	520	22.8	534	23.4	789	24.2
198	853	20.4	568	24.4	672	23.4	520	22.9	526	21	720	24.6

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
200	855	20.5	570	24.4	684	23.7	520	22.9	528	20.5	730	22.9
202	856	20.6	572	24.3	678	23.4	520	22.8	526	20.6	710	23.8
204	857	20.7	574	24.4	672	22.8	544	22.9	526	20.8	718	23.3
206	860	20.4	576	24.5	722	23.4	536	22.8	538	20.8	685	22.6
208	863	20.3	583	24.6	782	23.8	528	22.8	547	20.9	701	22.3
210	862	20.9	589	24.6	784	24.2	562	23.1	562	20.7	722	23.1
212	866	20.7	593	24.6	792	23.8	567	23.1	556	21.2	670	22.3
214	867	20.8	595	24.7	798	24.4	571	23.3	574	20.9	662	22.8
216	869	20.4	597	24.7	802	23.5	580	23.5	567	22	653	23.1
218	868	20.8	610	24.7	672	20.8	578	23.2	609	21	667	20.2
220	859	20.7	618	24.6	684	21.4	540	22.8	609	20.7	625	22.6
222	855	21	630	24.6	742	21.8	540	22.9	623	20.3	624	20.7
224	861	21.1	627	24.7	722	22.2	536	22.8	632	20.3	705	20.6
226	863	20.9	638	24.7	722	22.2	538	22.6	637	20	605	17.6
228	867	20.3	670	24.6	742	24	542	22.6	646	20.2	593	18.3
230	869	21	678	24.7	672	22.6	533	22.3	644	21.4	650	20.1
232	873	21.2	689	24.6	678	24.6	530	22.1	653	21	732	23.6
234	874	21.3	697	24.6	672	22.2	529	22.2	663	22.7	655	20
236	875	21.4	710	24.7	668	23.4	529	22.2	669	21	532	20.2
238	872	21.5	719	24.8	721	22.8	526	22.1	667	22	422	19.1
240	877	21.5	730	24.6	642	21.2	524	22.1	665	21.5	332	19.2
242	875	21.3	743	24.7	684	20.4	524	22.1	670	22.1	331	18.1
244	890	21.4	750	24.7	722	21.8	612	24.9	678	22.5	322	18.1
246	893	21.5	768	24.6	748	22.4	623	23.8	677	22.6	321	17.7
248	895	20.9	777	24.7	724	22.8	618	22.9	665	21.5	360	21.1
250	897	20.7	785	24.7	662	22.6	631	23.1	669	20.7	489	22.3
252	895	21.3	793	24.6	670	23.8	647	23.3	657	21.5	473	21.9
254	894	21.6	799	24.8	684	24.6	659	23.7	653	21.2	463	21.8
256	896	21.3	804	24.8	726	23.9	654	23.2	651	22	467	21.6
258	898	21.4	809	24.8	672	24.8	679	22.1	651	22	463	21.5
260	899	21.7	815	24.8	666	25.8	648	22.1	649	21.7	469	21.9
262	902	21.5	820	24.8	660	25.9	580	22.1	649	21.9	506	22.4
264	903	21.7	825	24.5	640	25.8	566	22.3	648	22.3	470	20.3
266	905	21.6	827	24.6	712	24.4	581	22.2	652	21.5	502	21.7
268	906	21.8	829	23.9	722	23.8	578	22.4	654	20	584	22.6
270	908	21.8	828	23.8	712	22.6	610	22.3	657	21.7	610	22.9
272	910	21.7	825	23.4	692	24.5	620	21.9	652	21.2	612	22.8
274	913	21.3	827	23.9	568	25.2	617	22.2	654	20.8	635	23.2
276	917	21.4	831	24.1	522	22.2	590	22.6	643	20.6	630	23.9
278	916	21.8	830	24.9	695	24.6	610	22.6	640	20.5	745	25.4
280	920	21.1	831	24.5	654	23.4	629	22.7	621	20.2	733	24.2
282	930	21	835	24.2	652	22.8	628	22.6	619	20.8	753	23.2
284	932	22.2	836	24.3	658	24.6	631	22.6	622	21	723	24.3
286	936	22.5	834	24.4	642	22.8	631	22.6	620	21.5	743	23.9

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
288	939	22.6	837	25.1	654	22.2	631	22.6	617	21.4	758	24
290	941	22.7	839	25	672	22.6	622	23.7	609	21.5	809	26.1
292	945	22.8	840	25.1	678	24.6	594	23.4	602	21.2	820	26.4
294	944	22.9	841	24.5	722	21.8	594	23.4	594	21.6	827	26.2
296	947	22.7	843	24.6	718	22.8	529	22.7	597	21.7	769	25.8
298	948	22.6	842	24.3	692	22.4	529	22.7	597	21.9	790	25.8
300	947	22.7	844	24.3	674	21.9	529	22.7	595	21.8	745	20.7
302	948	22.6	845	24.5	653	22.4	509	24.2	586	22.2	651	22.1
304	947	22.1	846	24.4	670	22.8	509	24.2	586	21.7	645	21.8
306	948	22.3	847	24.6	642	21.8	509	24.2	581	22.6	633	22.3
308	959	22.5	843	24.5	682	23.2	511	24.3	569	22.7	680	22.5
310	956	22.3	846	24.6	657	22.2	511	24.3	561	22.6	673	24
312	949	22.5	848	24.6	692	21.9	511	24.3	573	22.7	693	24.2
314	955	22.6	849	24.3	684	21.8	532	24.4	577	22.8	694	24.5
316	958	23.1	844	24.5	648	21.9	532	24.4	574	22	689	23.2
318	958	23.2	843	24.6	710	22.4	532	24.4	574	21.1	720	23.9
320	957	23.2	910	25.8	720	22.6	532	24.4	576	22.8	715	24.8
322	958	23.4	950	24.1	694	21.4	519	20.2	575	21.5	728	25
324	960	24	1010	26.5	691	23.2	519	20.2	570	22.3	732	25.4
326	961	24.5	1040	27.2	662	22.2	521	19.8	567	21.1	735	25.9
328	960	24.7	1050	28.3	672	21.8	482	24.5	567	21	718	24.2
330	963	24.6	1060	28.6	681	22.4	482	24.5	563	22.8	743	24.9
332	965	24.1	1090	28.7	662	23.2	590	23.9	565	21.5	753	24
334	966	24.2	1040	28.9	642	22.2	541	24	564	20.5	693	23.4
336	969	24.3	1200	29.1	672	23.2	538	23.8	561	20.5	689	23.9
338	967	24.6	1210	29.3	688	22.8	532	23.9	556	20.3	677	24.3
340	970	24.3	1215	29.1	682	22.4	538	23.9	553	20.9	720	25.3
342	972	23.9	1220	29.2	678	23.4	537	23.8	551	21.9	736	24.9
344	973	23.4	1230	29.3	642	23.6	532	23.7	545	21.4	758	24.3
346	974	23.5	1220	29.1	672	24	528	24.1	545	21.5	780	25.3
348	977	23.6	1230	28.9	688	23.8	522	24.4	547	21.5	787	26.4
350	976	23.7	1240	28.8	670	23.9	523	23.8	547	21.8	795	26.2
352	978	23.6	1240	29.3	678	21.2	528	24.1	549	25.1	803	26.5
354	979	23.8	1250	29.1	672	20.8	531	23.8	549	24	810	25.3
356	977	23.6	1250	29.4	684	20.4	522	23.4	549	24	816	25.9
358	980	23.7	1260	29.1	694	21.5	514	23.4	543	23.8	826	25.4
360	981	23.9	1265	29.3	706	21.8	508	23.2	540	24.9	836	24.3
362	983	24.5	1268	29.5	704	22.4	511	22.8	536	24.5	813	24.9
364	984	24.4	1270	29.6	668	22.8	510	23.6	537	21.7	820	25.3
366	986	24.5	1275	29.5	656	22.2	513	23.6	537	22	808	25.9
368	983	24.3	1280	29.7	672	22	509	23.9	534	21.6	739	26.2
370	985	23.8	1285	29.7	668	22.4	511	23.8	531	22.8	789	26.3
372	987	23.4	1286	29.9	710	23.6	517	23.4	531	22.6	790	26.2
374	986	23.5	1290	29.4	682	23.8	519	23.2	529	23.3	805	26

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
376	987	23.9	1294	29.3	692	20.8	518	23.3	525	23.6	813	25.3
378	984	23.4	1298	29.6	710	20.4	505	25.3	524	25.8	832	25.4
380	983	23.5	1300	29.7	652	20.8	470	25.4	529	20.6	843	25.4
382	988	24.1	1310	29.8	720	20.6	472	25.2	536	21.1	813	23.2
384	989	23.6	1320	29.3	688	21.2	460	24.8	533	21.7	818	26
386	990		1325	29.1	694	22.4	468	24.2	529	22	796	26.3
388	960		1328	29.3	696	22.4	440	24.8	542	22.5	783	26.4
390	903	24.3	1330	29.4	682	26.5	420	26.7	543	22.9	736	26.3
392	904	24.6	1335	29.4	722	24.2	401	26.3	541	22.4	756	26.4
394	905	24.3	1339	29.5	728	22.8	370	26.2	546	21.7	789	24.2
396	906	24.7	1340	29.5	692	22.2	382	26.3	542	21.8	800	24.3
398	903	24.3	1345	29.6	678	23.8	381	26.6	545	21.9	836	25.2
400	905	24.6	1350	29.7	682	23.8	390	28	539	24	853	26
402	907	24.3	1355	29.3	708	23.2	370	27.1	548	23.8	786	24.2
404	909	23.9	1360	29.4	694	22.8	378	26.8	561	23.8	789	23.2
406	905	23.9	1365	29.3	712	26.2	380	26.3	567	264	796	24.2
408	907	23.8	1366	29.1	678	24.4	380	25.4	571	24.3	735	25.9
410	906	24	1367	29.2	682	21.8			582	24	789	23.2
412	909	24.1	1369	29.2	670	20.2			585	24	796	24.9
414	910	23.9	1370	29.1	678	20.8			586	25.6	776	24.5
416	909	24.2	1372	29.6	648	21.2			592	25.4	639	23.4
418	911	24.1	1376	29.6	662	22.2			601	25.5	680	23.9
420	912	24.1	1380	29.7	672	23.8			634	25.8	789	24.2
422	915	24.2	1385	29.8	684	21.8			625	26.2	743	24.2
424	913	24.1	1380	29.3	672	22.2			624	26.5	800	25
426	916	24.1	1370	29.5	708	20.8			629	25.9	816	25.3
428	918	23.8	1385	29.1	678	20.6			631	26	832	24.8
430	920	23.9	1390	29.3	692	20.4			628	26.6	839	25
432	923	24	1370	29.7	674	20.9			630	26.3	823	24.2
434	924	24.1	1378	29.8	682	24.5			632	25.8	815	23.2
436	924	24.3	1395	29.1	648	24.6			656	26.8	796	24.8
438	925	24.3	1390	29.9	708	22.5			661	26.9	789	25.2
440	927	24.2	1396	29.7	692	21.9			672	26.7	792	25.9
442	929	24.3	1389	29.8	686	21.4			679	27.4		
444	931	24.4	1380	29.5	689	22.8						
446	933	24.5	1390	29.6	784	27.4						
448	938	24.5	1385	29.3	798	27.8						
450	941	24.4	1395	29.5	830	27.6						
452	942	24.5	1380	29.3	824	28.2						
454	943	24.4	1386	29.4	832	28.6						
456	945	24.3	1387	29.4	850	28.9						
458	948	24.4	1398	29.5	836	27.8						
460	948	24.6	1400	29.3	842	26.6						
462	950	24.5	1410	29.4	878	24.6						

Depth, m	SABH16		SABH17		SABH18		SABH19		SABH20		SABH21	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
464	951	24.5	1405	29.5	862	23.6						
466	953	24.6	1408	29.6	874	22.2						
468	955	24.5	1414	29.8	899	21.5						
470	957	24.6	1416	29.7	888	20.6						
472	958	24.7	1420	29.8	892	20.4						
474	961	24.6	1423	29.8	872	20						
476	964	24.7	1430	29.7	856	19.8						
478	967	24.8	1440	29.8	842	19.2						
480	970	24.9	1448	29.8	734	25.8						
482	974	25	1455	29.9	720	26.7						
484	975	24.9	1459	29.9	710	26.9						
486	980	25.1	1465	30.1	722	25.4						
488	983	25.1	1468	30.2	712	24.2						
490	988	25.2	1475	30.1	708	23.1						
492	989	25.1	1482	30.2	820	20.2						
494	991	25.2	1489	30.3	812	21.2						
496	990	25.3	1494	30.3	798	22.2						
498	989	25.2	1498	30.4	758	22.2						
500	992	25.3	1504	30.3	762	22.1						
502	993	25.4	1509	30.2	798	20.9						
504	997	25.4			758	20.7						
506	999	25.5			762	19.9						
508	996	25.6			752	20.9						
510	998	25.7			792	20.1						
512	1002	25.6			772	19.4						
514	1004	25.5			784	20.2						
516	997	25.6			794	20.8						
518	999	25.7			784	24.8						
520	1003	25.38			820	25.2						
522	1005	25.8			828	25.9						
524	1007	25.8			840	26.2						
526	1009	25.9			822	26.22						
528	1008	25.8			788	27.27						
530	1006	26.1			772	26.71						
532	1007	26.2			782	25.8						
534	1004	26.1			802	25.2						
536	1015	24.5			810	25.8						
538	1026	25.7			840	20.6						
540	1035	25.8			822	20.9						
542	1037	25.7			798	21.4						
544	1045	25.3			782	21.6						
546	1047	25.6			808	20.9						
548	1049	25.7			802	20.1						
550	1045	25.6			806	19.8						

Electrical conductivity and Temperature data of Akaki area (1)

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2							740	17.5	615.8	20.4
4							750	17.6	616.8	20.3
6							745	17.6	617.9	20.1
8							743	17.9	616.1	20.2
10							760	18.5	620.2	20.3
12							752	18.5	618	20.2
14							759	18.5	619	15.23
16							749	19.1	618	15.24
18							765	19.4	515	15.23
20							760	19.4	588	15.22
22							761	19.4	594	15.23
24							759	19.6	595	15.23
26							758	20.1	585	15.23
28							763	20.4	552	24.5
30							764	20.4	663	24.5
32							761	20.4	651	24.5
34							765	20.4	921	24.5
36							769	25.1	936	24.5
38							772	24.3	863	24.5
40							768	24.3	862	24
42							781	22.1	771	21.5
44							785	25.1	676	19.9
46							781	24.9	862	19.9
48							789	24.3	863	20.1
50							772	25.1	664	20.3
52							791	25.1	865	20.1
54							794	25.1	867	20.2
56							795	24.7	828	20.2
58							791	24.8	836	20.1
60							820	24.8	626	20.1
62							856	24.9	621	20.2
64							860	24.9	823	20.3
66							870	25.2	826	20.1
68							856	25.1	830	20.1
70							890	25	828	20.3
72							870	24.1	715	20.1
74							971	22.6	760	20.2
76							978	23.11	600	20.1
78							977	23.24	751	20.3
80					354	25.4	983	23.3	731	20.1
82					355	25.5	980	24.1	733	20.2
84	476	23.6			355	25.6	974	23.9	742	20.4

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
86	475	23.7			354	25.6	985	24.3	682	20.3
88	477	23.7			355	25.5	987	24.2	684	20.5
90	477	23.6			355	25.5	988	24.1	734	20.6
92	479	23.6			356	25.5	980	24.5	792	20.1
94	476	23.5			350	25.5	979	24.5	911	20.2
96	472	23.4			343	25.4	983	24.8	830	20.2
98	472	23.5			340	25.5	985	24.8	832	20.3
100	480	23.7			341	25.5	982	24.6	739	20.4
102	473	24.5			340	25.5	980	24.6	742	20.5
104	475	24.8			431	22.3	985	24.8	746	20.2
106	476	25.9			440	22.4	979	24.6	741	20.1
108	466	26.6			442	22.1	977	24.7	752	20.4
110	458	26.6			442	22.4	984	24.5	762	20.1
112	452	26			440	22.1	988	24.3	765	20.2
114	452	25.9			444	22.2			772	20.5
116	448	25.8			448	22.2			775	20.3
118	445	25.8			387	22.2			868	20.4
120	445	25.8			1509	21.9			862	20.2
122	442	25.8			1480	22.6			772	20.1
124	439	25.8			1474	22.2			774	20.2
126	434	25.8			1398	22.6			796	20.4
128	336	25.8			1390	23.1			882	20.4
130	336	25.8			1387	22.6			823	24
132	438	25.8			1380	22.1			621	25
134	435	25.8			1367	22.6			628	23
136	434	25.8			1371	22.4			655	22
138	432	25.8			1381	22.3			658	21
140	436	25.8			1380	22.3			531	22
142	430	25.8			1378	22.4			543	23.2
144	433	25.8			1379	22.1			548	21.4
146	431	25.8			1374	22.4			560	21
148	434	25.8			1378	22.2			551	21.1
150	434	25.8			1380	22.1			791	24.1
152	875	25.6			1240	23.6			791	20.4
154	870	25.5	431	24.7	1184	24.1			792	20.4
156	880	25.5	424	24.4	1082	24.4			682	26.3
158	877	25.6	431	24.2	1090	24.3			683	26.1
160	878	25.4	434	24.3	1083	24.3			684	25.3
162	881	25.5	435	24.4	1080	24.1			682	24.4
164	880	25.5	426	24.5	990	24	950	21.9	686	26.1
166	992	26.1	427	24.3	889	24	965	22.1	687	23.2
168	972	26.1	430	24.4	889	24	943	22.1	687	20.3
170			433	24.5	900	24.1	934	22.5	687	20.3
172	970	26.3	431	25.2	921	23.9	915	22.6	717	20.7

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
174	973	26	439	25.2	936	23.7	906	22.6	723	20.7
176	950	25	439	25.2	936	23.6	889	22.7	714	27.6
178	845	24.9	432	25.2	911	22.9	885	22.8	624	27.4
180	779	24.9	393	26.2	711	23.6	865	22.9	652	27.2
182	774	25.4	391	26.2	635	24.4	843	23.1	654	27.3
184	780	25.4	394	26.4	634	24.6	831	22.3	654	26.6
186	765	25.5	389	26	637	24.5	816	23.3	652	25.2
188	759	25.5	390	25.3	638	24.5	792	24.1	652	25.2
190	759	25.6	404	25.4	638	24.6	799	24.1	654	25.2
192	757	25.3	405	25.5	640	24.1	787	24.1	658	24.1
194	756	25.3	402	25.5	560	24	774	23.9	668	23.2
196	742	25.2	402	25.6	541	24.3	782	23.6	668	23.5
198	669	25	401	25.6	570	24.1	769	23.7	668	18.3
200	697	25.2	394	24.7	630	24.4	772	23.7	740	16.5
202	680	25	395	24.9	640	24.3	765	23.8	740	16.5
204	603	25	393	25	591	24	757	23.9	740	16.5
206	607	25	390	24.9	590	24.1	769	24.1	740	16.5
208	600	24.9	389	24.9	592	24.2	802	24.2	742	16.5
210	598	24.9	390	24.9	594	24.1	798	24.3	748	20.3
212	597	24.8	389	25	597	24.2	789	24.3	628	17.2
214	595	24.7	389	24.9	596	24.2	804	24.3	638	17.3
216	592	24.5	383	25	594	24.1	810	24.3	642	18.4
218	592	24.2	384	25	597	24.1	815	24.4	656	18.2
220	589	24.2	380	24.9	598	24.1	809	24.5	742	18.1
222	585	24	381	24.5	591	24.2	807	24.5	752	20.3
224	571	25	377	24.8	590	24.3	802	24.3	738	20.2
226	574	25	375	24.8	560	24.4	796	24.3	623	20.5
228	574	25	373	24.9	561	24.1	788	24.4	836	20.4
230	572	25	373	24.7	440	24.1	784	24.5	842	20.5
232	576	25.3	523	25	400	24.2	792	24.6	652	16.2
234	583	25.5	450	24.2	357	24.4	777	24.7	623	16.3
236	581	25.6	452	24.8	354	24.3	768	24.7	541	16.8
238	583	25.6	455	25.4	355	24.4	773	24.7	635	17.5
240	584	25.7	454	25.7	356	24.3	778	24.6	723	20.2
242	582	26	453	25.6	355	24.1	776	24.6	748	20.4
244	586	26	452	25.6	354	24.3	774	24.7	791	20.5
246	591	25.8	452	25.8	353	24.2	781	24.7	822	20.4
248	604	25.7	448	25.9	354	24.1	786	24.8	824	20.3
250	597	25.6	454	26	357	24.2	783	24.8	640	20.3
252	592	25.6	450	25.8	356	24.3	786	24.9	642	20.3
254	587	25.4	452	26.2	356	24.1	792	25	652	20.4
256	581	25.3	450	26.3	357	24.2	798	25.1	653	16.5
258	582	25.1	445	26.4	355	24.3	809	25.2	671	17.8
260	581	25	446	26.1	354	24.2	821	25.1	685	16.5

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
262			437	25	357	24.1	818	25.1	563	27.6
264			434	25	354	24.1	816	25.1	522	27.6
266			429	25	357	24.2	814	25.2	553	27.6
268			434	25	356	24.3	828	25.3	538	18.6
270			434	24.9	357	24.1	830	25.4	544	18
272			431	25	355	24.2	826	25.5	553	19.2
274			429	25.1	354	24.3	821	25.7	548	19.3
276			430	25.3	357	24.1	818	25.8	533	19.4
278	492	26.3	425	25.6	340	25.5	815	25.9	548	20.8
280			421	25.3	431	25.5	811	25.9	533	20.3
282			420	25.5	440	25.5	808	25.9	548	20.4
284			421	25.8	442	22.1	803	26.1	553	20.5
286			419	25.8	442	22.4	796	26.2	623	18.7
288			416	25.6	440	22.1	792	26.3	688	19.5
290			415	25.7	444	22.2	798	26.3	693	19.3
292			406	25.4	448	22.2	789	26.3	560	19.8
294			401	25.4	387	22.2	783	26.4	561	20.3
296			400	25.6	509	21.9	782	26.5	562	20.5
298			408	26.5	480	22.6	768	26.4	562	20.5
300			401	26	474	22.2	766	26.4	560	20.5
302			394	25.6	398	22.6	762	26.4	634	21.7
304			386	25.7	390	23.1	850	26.5	630	21.7
306			385	25.8	387	22.6	875	26.6	648	18.2
308			382	25.6	380	22.1	890	26.7	656	19.4
310			380	26.2	367	22.6	910	26.8	636	24.3
312			375	26.1	371	22.4	835	27	642	24.3
314			380	25.8	357	24.1	958	27.1	653	24.1
316			377	25.9	340	25.5	971	27.2	648	23.2
318			384	25.6	431	25.5	960	27.2	643	23.2
320			383	25.9	354	24.1	970	27.3	691	18.3
322			385	25.8	357	24.2	965	27.3	636	19.7
324			380	25.7	356	24.3			593	19.8
326			381	25.4	357	24.1	975	27.4	546	19.7
328	520	25.6	381	25.5	355	24.2	978	27.5	577	19.5
330	522	25.8	382	25.4	340	25.5	990	27.7	666	20.3
332	522	25.7	380	25.4	431	25.5	1000	27.9	678	27
334	521	25.6	379	25.2	440	25.5	980	28.1	676	27
336	519	25.5	388	25.5	442	22.1	988	28.2	680	26
338	519	26.3	384	25.5	442	22.4	995	28.3	680	27
340	530	26.5	384	25.5	440	22.1	989	28.4	679	27
342	538	26.6	389	25.4	444	22.2	972	28.4	679	27
344	574	26.8	388	25.8	448	22.2	984	28.5	680	28
346	573	26.6	390	25.5	387	22.2	1005	28.6	682	26
348	570	26.5	392	25.5	509	21.9	1008	28.6	681	25

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
350	562	26.5	399	25.5	480	22.6	1002	28.6	618	25
352	561	26.6	402	25.8	474	22.2	988	28.7	676	24
354	556	26.4	401	25.8	398	22.6	995	28.8	675	23
356	551	26.3	401	25.8	390	23.1	999	28.9	677	24
358	551	26.5	401	25.8	387	22.6	1003	28.9	678	25
360	547	26.5	408	25.4	380	22.1	1009	28.9	679	25
362	543	25.6	422	26.8	367	22.6	1010	28.9	682	25
364	543	25.7	433	27.3	371	22.4	1100	29.1	80	25
366	544	25.8	430	27.3	357	24.1	1030	29	679	25
368	545	25.8	434	27.2	340	25.5	1015	29.1	677	25
370	542	25.7	431	27.5	431	25.5	1010	29.2	680	25
372	538	25.5	447	27.4	440	25.5	996	29.2	680	25.5
374	537	25.5	468	28.6	442	22.1	987	28.9	678	25.6
376	537	25.6	464	28.8	442	22.4	982	28.9	676	25.6
378	539	25.7	477	29.3	440	22.1	992	28.7	678	25.7
380	536	25.7	489	29.3	444	22.2	1005	28.4	678	25.7
382	532	25.8	494	29.5	448	22.2	1006	28.2	678	25.6
384	527	25.8	481	28.6	387	22.2	1050	27.8	676	25.6
386	521	25.6	428	28.8	509	21.9	1032	27.4	676	26
388	528	25.6	438	28.8	440	25.5	1044	27.4	678	26
390	535	26.4	418	28.5	442	22.1	1062	27.2	680	27.3
392	539	26.3	419	28.5	442	22.4	1088	27.1	680	27.3
394	545	26.4	441	27.6	440	22.1	1073	27.5	680	27.3
396	545	26.4	452	27.6	444	22.2	1064	27.6	676	26.5
398	550	26.5	450	27.6	355	25	1072	27.8	676	26.5
400	570	26.7	454	27.6	349	25.3	1075	27.9	676	26.1
402	620	26.6	453	27.7	382	25.3	1066	28.1	678	26.1
404	620	26.6	452	27.6	348	25.3	1110	28.2	678	26.1
406	626	26.5	451	27.7	374	25.2	1160	28.3	675	26
408	626	26.4	457	26.8	364	25.3	1250	28.5	675	26
410	624	26.7	458	26.8	355	25.4	1310	28.7	680	25.9
412	620	26.7	457	27.1	349	25.3	1360	28.7	680	25.8
414	628	26.9	456	27	382	25.3	1390	29.1	685	25.8
416	624	27.5	459	27.1	348	25.3	1280	29.2	685	25.5
418	622	28.6	461	27.1	374	25.2	1390	29.2	685	25.1
420	625	28.4	461	27	364	25.3	1410	29.4	687	24.3
422	627	28.6	463	27.1	355	25.4	1380	29.3	687	25.1
424	629	28.6	461	27.3	348	25.3	1320	28.8	687	25.4
426	628	28.8	462	27.2	374	25.2	1270	28.6	687	25.7
428	628	28.7	462	27.2	355	25.3	1240	28.6	685	27
430	631	28.7	461	27.1	365	25.6	1375	28.6	685	27.3
432	630	28.8	462	27.3	360	25.7	1450	28.4	685	28.1
434	587	27.4	461	27.2	365	25.6	1510	28.3	687	28.1
436	588	27.9	462	27.3	374	25.5	1580	28.3	687	28.1

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
438	594	27.9	461	27.1	370	25.7	1560	28.2	689	28.6
440	591	28	464	27.4	368	25.7	1320	28.1	689	26.6
442	594	27.7	465	27.3	369	25.7	1650	28.1	689	28.7
444	596	27.8	467	27.2	369	25.7	1450	28.2	690	28.7
446	596	27.7	471	27.3	373	25.6	1380	28.3	690	28.9
448	595	27.7	470	27.5	364	25.3	1320	28.4	690	28.9
450	598	27.7	472	27.4	355	25.4	1291	28.4	692	28.8
452	624	27.5	473	27.2	348	25.3	1230	28.5	692	27.5
454	631	27.3	471	27.2	374	25.2	1090	28.6	692	27.5
456	628	27.3	474	27.4	381	25.3	1065	28.6	694	27.2
458	625	27.3	478	27.3	381	25.4	1042	28.7	694	27
460	627	27.3	451	27.1	386	25.7	980	28.9	694	26.8
462	627	27.3	450	27.2	395	25.6	955	29.1	696	25.2
464	620	27.2	452	37.1	395	25.6	921	29.3	696	25.2
466	637	27.2	451	27.3	393	25.7	890	29.5	702	26.1
468	660	27.9	610	38	399	26.2	910	29.5	702	26.2
470	664	27.4	612	37.5	398	26.3	944	29.6	702	26.1
472	675	27.7	611	38.2	403	26.5	967	29.6	703	26.5
474	672	27.7	614	38.1	403	26.6	976	29.7	708	26.5
476	680	31.4	615	38	405	26.6	988	29.8	708	26.7
478	674	31.4	610	38.1	405	25.4	1015	29.8	708	26.7
480	650	31.6	610	38.2	416	25.4	1110	29.6	708	26.7
482	630	31.5	613	38.1	405	25.4	1005	28.2	708	26.7
484	633	31.5	610	38.1	412	25.5	1035	28.6	712	26.9
486	631	31.5	617	38.2	408	25.8	1150	28.8	712	26.9
488	635	31.4	612	38.1	406	26	1130	28.7	712	27
490	640	31.4	614	38.2	408	26	950	29.1	712	27.5
492	638	31.4	612	38.3	407	26	920	28.8	717	27.5
494	639	31.5	617	38.2	407	26	1100	28.6	717	30.1
496	634	31.5	618	38.3	407	26	980	28.8	719	30.1
498	630	31.5	620	37.9	407	26	1010	28.9	719	30.1
500	632	31.5	624	37.8	414	26	1210	29.3	720	30.1
502	638	31.5	617	38.1	415	26	1030	29.3	720	30
504	637	31.5	619	38.2	411	26	1005	29.5	720	30
506	637	31.5	615	38.1	413	26.2	992	28.9		
508	635	31.5	612	38	413	26.5	978	29.1		
510			612	38	412	26.4	984	28.8		
512			611	39	410	26.1	1015	29.4		
514					412	26.3	1075	29.6		
516							1110	29.7		
518							1145	29.2		
520							1220	28.9		
522							1230	28.6		
524							1310	28.9		

Depth, m	ABH1		ABH2		ABH3		ABH4		ABH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
526							1450	29.4		
528							1392	29.7		
530							1372	29.7		
532							1260	29.8		
534							1213	29.5		
536							1164	29.8		
538							1091	29.9		
540							1043	29.7		
542							950	30.1		
544							942	30.5		
546							1010	29.9		
548							1090	29.6		
550							1140	29.3		
552							1210	29.9		

Electrical conductivity and Temperature data of Akaki area (2)

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2							642.3	19.8		
4							640.1	19.6		
6							635.6	20.1		
8							629.3	20.3		
10							648.4	20.4		
12							646.2	20.8		
14							648.5	19.9		
16							640.1	20.2		
18							643.8	21.6		
20							644.2	20.2		
22							648.4	20.5		
24							966.3	20		
26							848.2	20.3		
28							931.4	20.6		
30							864.9	20.8		
32							862.9	20.4		
34							868.4	20.8		
36							869.8	20.9		
38							870.1	21.2		
40							890.2	21.3		
42							928.3	21.2		
44							932.8	21.6		
46							605.7	22.6		
48							609.3	21.9		
50							607.9	22.3		

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
52							609.8	21		
54	594	21.2					702.3	21.9		
56	592	20.5					692.4	21.3		
58	592	20.8					699.7	20.9		
60	594	20.5					679.6	21.8		
62	602	21.1					842.7	20.3		
64	604	22.5					729.3	20.8		
66	604	22.3					732.9	21.9		
68	602	22.5					792.8	20.2		
70	598	20.9					820.2	21.5		
72	600	22.4					798.9	21.3		
74	598	22.1					812.3	20.9		
76	602	22.4	569	20.8			921.3	20.9		
78	582	23.3	547	20.8			872.8	21.3		
80	583	23.1	544	20.8			889.3	21.9		
82	583	23.1	562	20			852.8	20.8		
84	582	23.3	565	20.5			913.5	21.7		
86	583	23.4	565	19.9			807.2	23.5		
88	582	23.3	569	19.9			816.8	22.9		
90	573	22.3	626	20.6			828.1	23.6		
92	555	24.3	597	20.2			869.5	22.8		
94	555	24.3	572	20			890.3	22.6		
96	554	23.3	577	19.7			845.1	23.3		
98	553	23.3	565	21.4			832.3	23.7		
100	554	23.5	576	20.2			815.8	23.2		
102	576	23.1	566	18.7			902.3	23.1		
104	554	23.1	616	20.3			817.9	22.9		
106	576	22.8	573	19.7			899.5	22.7		
108	632	21.8	584	19.6			899.5	22.1		
110	633	21.4	578	19.5			945.2	23.5		
112	575	21.4	564	21.3			962.4	25.6		
114	620	21.8	567	21.6			985.6	25.5		
116	628	22.2	567	21.5			976.5	25.4		
118	627	22.3	574	25			956.4	25.4		
120	618	23.1	574	25			972.3	24.3		
122	608	21.6	566	20.1			976.4	25.4		
124	606	21.2	593	17.4			985.3	24.6		
126	601	22.3	596	18	471	23.9	985.5	25.5	486	25.9
128	604	22.6	586	17.7	475	23.8	976.4	24.2	485	26
130	603	22.8	581	19.3	486	28.8	996.5	23.7	485	25.8
132	565	23.5	589	20.5	480	28.6	993.2	25.4	486	25.9
134	558	23	604	17	492	27.4	996.5	25.5	486	25.8
136	549	23.6	596	16.3	528	25.8	994.2	25.7	484	25.9
138	549	23.6	583	18.5	529	26.3	998.2	24.8	483	25.9

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
140	564	21.6	583	19.8	532	25.4	996.3	23.7	485	26
142	554	23	584	19.7	541	26.5	999.4	25.6	489	25.7
144	562	23.6	600	17	541	25.7	1005	22.3	490	26.1
146	548	23.1	595	18	543	25.9	1001	25.6	487	25.1
148	554	21.9	586	20.4	547	25.6	1028	24.5	483	25.9
150	577	21.9	583	20.7	550	25.9	994.3	21.4	487	25.3
152	555	21.9	588	19	549	26.1	936.8	24.3	488	25.7
154	573	22.4	584	19.2	548	27.2	991.2	22.7	487	25
156	571	22.4	589	19.2	488	28.1	928.4	25.2	490	25.1
158	574	21.9	587	19.5	498	27.9	903.3	23.8	489	25.3
160	574	22.1	580	19.8	580	26.4	896.4	24.1	491	25
162	544	21.9	583	19.8	583	27.3	908.5	23.2	488	26
164	539	21.6	581	21.3	543	25.6	921.4	23.8	489	26
166	535	20.9	581	20.4	569	26.4	879.9	23.2	488	25
168	541	21.4	612	19.7	571	29.4	873.9	22.9	492	25
170	562	22.6	598	18.4	568	28.5	878.2	23.1	491	68
172	558	22.1	597	18.2	555	24.9	891.4	22.8	493	25.6
174	558	22.3	598	18.2	587	26.8	883.6	21.9	496	25
176	562	21.9	572	19.8	588	26.4	887.5	21.1	495	25
178	561	22.1	580	19.6	594	25.1	891.6	21.7	496	25.8
180	562	21.9	584	19.2	560	27.1	890.8	21.3	499	25.8
182	578	23.1	592	19.4	509	29.3	943.2	22.6	493	25.9
184	568	23.1	586	18.7	648	24.4	825.6	22.8	496	26
186	562	23.1	576	20.09	657	29.3	867.3	23.6	494	26
188	564	22.1	578	20.4	631	26.4	877.6	24.7	496	25.9
190	554	23.4	582	21.2	638	29.3	886.6	25.2	511	26.3
192	538	25	584	21.8	645	28.4	889.6	24.1	530	25
194	571	22.3	579	21.3	675	28.3	883.2	23.2	516	25.4
196	502	23.4	582	21	680	27.1	881.4	23.2	510	26.5
198	547	23.2	580	22.3	689	21.2	892.8	25.4	506	26.7
200	559	21.8	591	20.4	684	23.7			499	26.9
202	554	22.3	594	20.8	664	24.4			495	26.7
204	558	21.7	593	21.6	667	24.3			502	26.7
206	554	22.1	594	21	574	26.2			493	26.7
208	559	22.1	598	20	580	26.4			498	28
210	597	21.8	596	20.2	620	26			589	26.7
212	598	22.2	590	21.3	627	25.2			559	28.8
214	620	21.7	592	22.3	631	23.9			556	26.9
216	558	21.8	587	21.6	636	24.6	854.4	24.6	556	26.1
218	559	22.1	587	21.2	660	26.4	877.6	26.1	557	26.5
220	551	22.4	586	21.2	640	26.2	885.2	25.3	558	26.2
222	568	22.4	584	20.6	645	24.1	885.5	25.3	553	26.3
224	571	21.9	586	21.1	665	23.5	857.6	37.5	561	26.1
226	574	22.5	587	21.2	649	24.5	859.2	26.3	560	26

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
228	572	21.8	581	21.4	675	23.9	854	23.6	561	27.4
230	577	22.1	581	21.9	671	25.24	856.2	23.8	558	27.2
232	583	21.8	598	23.5	682	24.4			560	27.2
234	574	21.5	594	22.3	684	26.9	858.9	25.1	561	27.2
236	564	21.1	582	21.8	680	24.6	863.3	24.8	550	27.1
238	557	21.8	582	21.3	683	25.1	867.2	23.9	696	26.9
240	580	22.5	583	24.2	673	23.1	863.1	25.1	681	26.1
242	551	21.7	583	25.1	727	22.6	843.8	23.8	688	30.5
244	549	21	620	20.2	706	21.1	857.9	24.3	684	30.5
246	552	22.5	618	21.8	725	22.1	872.4	23.9	684	30.5
248	545	22.7	599	20.5	713	22.2	881.3	21.7	688	30.4
250	549	21.1	600	21.6	729	22.6	947.3	22.9	684	30.6
252	531	24.1	617	21.7	750	22.1	927.9	23.1	683	30.3
254	530	23.9	610	21.3	739	22.5	923.4	24.3	684	29
256	539	24.2	627	22.1	734	21.4	928.3	26.4	685	29
258	540	24.1	610	22.1	736	23.9	926.7	25.2	685	28.9
260	543	24.1	626	22.4	760	23.2	917.6	24.3	683	29.3
262	545	24.2	627	22.8	749	24.2	878.3	23.2	684	30.8
264	545	24.1	625	22.2	755	24.9	986.3	25.1	660	29.7
266	543	23.9	624	21.9	762	23.8	995.6	29.6	688	29.8
268	542	23.8	621	22.6	742	22.7	994.3	28.9	656	29.8
270	541	24	611	22.6	757	24.9	995.8	29.3	660	29.6
272	544	23.7	609	22.7	743	24.1	990.1	28.7	660	30
274			613	22.3	768	26.1	983.2	28.3	658	30
276			621	22.1	765	24.1	971.4	27.8	655	29.8
278			620	22.5	746	25.5	973.3	27.3	687	0.8
280			618	22.2	767	24.4	974.2	29.1	660	30
282			609	21.4	760	25.4	960.2	24.6	658	28.7
284			612	22.2	769	23.8	963.1	28.3	667	29.4
286			614	20.8	758	24.4	942.4	25.4	660	27.3
288			613	20.4	766	23.6	883.9	26.3	667	30.9
290			629	20.6	776	23.9	890.3	28.1	660	31.2
292			635	20.5	783	22.1	893.4	25.4	662	30.8
294			633	21.9	785	23.1	885.3	28.3	674	32.4
296			622	21.6	760	23.2	913.6	29.1	682	33.7
298			631	22.5	765	23.3	893.4	28.3	683	33.8
300			629	22.4	774	26.6	896.8	29.3	689	34.2
302			620	23.5	772	23.4	932.5	22.5	691	36
304			623	23.6	781	23.8	928.6	22.6	691	36
306			623	22.8	783	23.8	928.7	22.7	692	36
308			691	22.8	765	23.4	933.6	22.6	692	35
310			595	23.4	768	23.9	956.7	23.4	692	36
312			586	23.7	773	23.7	995.6	24.1	691	36
314			594	22.9	771	23.6	993.5	24.1	690	35

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
316			589	22.8	775	23.4	985	23.8	690	32.3
318			585	22.9	796	25.3	995.6	24.3	690	30.6
320			604	23.1	801	25.1	999.7	24.1	698	33
322			620	23.4	785	25.1	1008	24.6	697	32.8
324			628	22.8	787	26.3	1006	24.3	681	33.2
326			624	22.6	799	26.4	1001	25.1	688	32.5
328			625	22.1	794	26.5	1089	24.5	682	33
330			690	22.9	795	25.4	1013	24.7	682	30.2
332			738	22.8	816	25.6	992.1	23.7	705	32.9
334			741	23.8	818	25.8	983.1	23.5	683	30.1
336			730	24.1	815	26.6	994.2	24.3	676	32.4
338			734	24.5	805	26.7	1000	24.7	675	31.6
340			746	24.3	808	25.9	867.7	25.2	672	32.5
342			734	24.1	806	25.1	859.6	24.7	683	31.7
344			739	24.9	803	26.3	855.3	23.5	690	32.4
346			693	25.2	811	26.5	851.6	22.7	688	31.6
348			698	25.6	812	26.4	847.5	22.6	683	32
350			694	24.8	814	25.8	837.5	23.7	686	33
352			730	24.9	807	25.9	847.8	23.2	687	33.2
354			731	25.1	813	26.3	847.6	23.6	688	34.2
356			738	25.3	810	26.4	852.1	23.8	690	32.8
358			726	25.2	809	26.9	855.7	23.8	689	33
360			730	25	811	26.2	859.6	24.1	688	37.6
362			731	24.9	807	25.8	870.8	24.2	688	33.6
364			728	24.8	809	24.4	875.8	24.1	687	34
366			733	25.2	803	24.9	878.6	24.2	688	30.4
368			726	24.6	806	25.3	891	23.7	689	32.8
370			724	24.8	776	25.8	896.2	24.7	689	35.6
372			732	25.1	818	25.3	908.7	24.2	689	31.5
374			704	25.2	820	25.9	922.6	24.3	649	32.5
376			693	25.7	826	25.4	890.6	23.4	648	34.4
378			670	26.1	819	25.8	851.2	23.3	661	32.4
380			710	26.7	803	24.9	885.7	23.7	668	31.6
382			708	26.8	801	24.3	892.5	23.5	665	33.8
384			620	26.8	792	25.8	913.5	23.7	665	32.7
386			619	25.3	790	24.4	920.5	23.8	664	30
388			655	26.4	821	26.9	921.4	24.1	662	32.2
390			634	27.6	829	25.5	933.2	24.2	666	32.3
392			641	28.3	796	26.7	930.5	25.1	674	32.7
394			659	29.8	813	26.9	926.3	24.7	670	33.4
396			649	29.9	830	27	917.6	23.9	664	34.5
398			654	28.1	835	27.3	925.4	23.6	666	29.6
400			629	23.8	855	27.6	926.7	23.5	665	30
402			613	27.1	860	27.9	933.4	23	634	30

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
404			633	25.9	872	28	926.2	23.6	624	29.8
406			625	24.9	868	27.8	924.3	23.7	684	0.8
408			621	25.1	857	27.3	936.4	24.1	647	30
410			624	25.4	863	28.1	857.4	24	656	28.7
412			628	24.6	849	28.3	812.6	24.9	664	29.4
414			632	25.3	841	28.9	856.8	24.5	661	29.6
416					843	28.4	859.8	22.4	666	30
418					854	28.6	865.6	22.9	682	30
420					856	28.3	813.7	23.3	748	29.8
422					861	28.1	827.6	23.6	743	0.8
424					855	27.8	806.8	23.7	725	30
426					843	27.3	842.7	23.2	632	28.7
428					834	28	816.6	24.3	719	29.4
430					819	28.5	813.8	24.5	757	27.3
432					805	27.9	856.6	24.9	738	30.9
434					798	28.5	861.7	23.9	743	31.2
436					784	28	828.8	23.8	719	30.8
438					755	29.1	836.7	23.9	783	32.4
440					743	29.7	853.6	24.2	728	33.7
442					761	29.3	863.7	24.3	735	33.8
444					853	30.7	848.8	24.3	771	34.2
446					749	31.8	863.2	24.8	760	36
448					453	28.1	872.2	24.9	760	36
450					461	27.9	865.3	24.3	759	36
452							856.7	24.2	766	35
454							866.8	24.8	777	36
456							868.7	24.7	678	36
458							878.8	24.8	814	35
460							880.2	24.8	840	32.3
462							886.8	25.2	842	30.6
464							888.2	24.8	877	33
466							888.8	24.3	907	32.8
468							880.2	25.9	936	33.2
470							885.5	24.7	965	32.5
472							879.3	24.3	994	33
474							876.4	24.5	1023	30.2
476							875.9	24.6	1053	32.9
478							877.4	24.5	1082	30.1
480							873.7	24.3	805	32.4
482							881.3	25.1	1140	31.6
484							875.6	24.7	1169	32.5
486							878.2	25.1		
488										
490							879.6	24.7		

Depth, m	ABH6		ABH7		ABH8		ABH9		ABH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
492							863.5	25.1		
494							864.5	25.2		
496							854.6	25.5		
498							847.5	25.3		
500							844.6	25.2		
502							846.7	25.6		
504							844.8	25.4		
506							846.7	25.8		
508							850.7	25.3		
510							857.8	25.4		
512							845.9	25.8		
514							848.4	24.7		
516							855.3	27.7		
518							858.2	26.4		
520							874.2	25.3		
522							848.3	25.2		
524							864.9	25.4		
526							864.3	25.3		
528							854.4	25.1		
530							853.8	25.4		
532							849.4	25.3		
534							848.3	24.2		
536							860.4	24.3		
538							853.7	25.2		
540							862.3	25.3		
542							881.4	25.4		
544							874.2	25.3		
546							860.4	24.9		
548							860.8	24.3		
550							860.7	25.4		

Electrical conductivity and Temperature data of Akaki area (3)

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2										
4										
6										
8										
10										
12										
14										
16										
18										

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
20			638	22.4						
22			642	22.6	480	21.1				
24			384	22.6	471	21.2				
26			362	22.8	456	21.5				
28			668	24.8	499	20.6				
30			854	25.2	448	19.4				
32			907	25.8	487	19.6				
34			854	25.4	472	20.9				
36			907	25.2	490	21.2				
38			870	25.6	475	20.6				
40			854	23.2	497	20.2				
42			860	21.3	484	21.6				
44			840	23.2	1320	19.6				
46			820	25.4	1050	18.2				
48			800	23.9	1064	17.7				
50			780	23.2	1704	23.3				
52			800	23.8	1589	21.1				
54			780	23.4	1280	24				
56			770	23.9	1098	22.3				
58			740	23.2	1760	19.5				
60			730	22.4	1682	22.5				
62			750	22.2	1739	21.1				
64			740	22.2	1560	22.3				
66			720	21.5	1796	23.2				
68			730	21.2	1498	22.4				
70			682	20.4	1968	21.5				
72			669	20.9	1909	20.8				
74			666	20.4	1621	19.9				
76			669	20.2	1450	22.5				
78			670	20.8	1431	24.1				
80			678	21.4	1377	24				
82			668	21.9	1460	24.5				
84			672	22	1246	26				
86			699	25.6	1230	28.1				
88			690	26.3	1131	26.4				
90			700	26.9	1062	23.6				
92			697	26.7	1138	23.5				
94			700	26.4	1181	22.7				
96			703	26.3	1057	21.7				
98			725	25.9	1165	22.5				
100			730	26.2	1149	22.4				
102			735	25.2	1150	20.3				
104			740	24.9	1130	19.1				
106			734	23.3	895	24.1				

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
108			797	23.5	894	24.7				
110			750	23.4	840	26.5				
112			740	23.9	889	20.3				
114			760	22.9	839	20.5				
116			725	21.5	824	22.4				
118	519	27.4	740	21.2	803	21.9				
120	526	27.2	745	21.8	806	21.4				
122	534	27.5	734	22.7	820	20.2				
124	562	27.5	740	21.5	822	20.7				
126	581	27.5	713	22.5	740	20.1				
128	576	27.5	641	20.9	666	18.6				
130	659	27.5	660	21.1	839	21.5				
132	648	27.6	685	21.5	820	21.6				
134	663	27.6	690	22.2	840	20.3				
136	624	27.4	676	24.1	862	20.7			598	23.4
138	601	28.8	680	24.8	872	20			580	23
140	623	28.8	685	24.4	835	20.9	730	23.1	600	23.1
142	619	29.3	670	24.2	710	20.6	808	23.8	569	24
144	621	29.3	675	25	718	20.3	807	23.8	546	25
146	623	29.5	653	25.6	579	19.9	804	23.6	517	24
148	607	30.5	693	25.3	544	21.4	808	24.1	580	24.3
150	607	31	687	25.5	499	22.6	798	24.1	590	25
152	603	30.8	653	25.9	534	19.8	795	23.9	546	25
154	594	30.8	694	25.6	588	18.9	796	24	538	24
156	589	30	680	26.3	650	22.5	806	23.2	546	26.1
158	599	30	718	26.4	618	21.8	817	26.1	538	25.1
160	600	30	740	26	680	23.5	819	26	546	25.2
162	597	31	784	25.4	646	20.3	811	24.5	516	23
164	587	31	713	24.3	664	20.4	820	24.3	528	24.6
166	594	31	718	24.5	760	20.5			560	24.3
168	596	31	720	22.3	790	19	829	23.4	577	23.6
170	600	30.8	850	21.4	755	22.1	832	23.6	570	25.6
172	598	30.5	880	21.9	800	21.9	886	24.4	569	25.8
174	596	30	679	21.2	745	22.6	832	23.8	560	25.8
176	599	30	690	22.4	838	20.2	810	23.9	568	25.6
178	600	30	685	23.8	815	21.3	817	24.1	566	25.6
180	598	30	660	22.5	854	23.3	840	25.2	560	24.6
182	596	32	650	22.3	815	21.9	807	25	540	24.5
184	598	31	680	23.9	769	20.4	798	24.7	534	24.3
186	599	31.8	649	23.3	755	21.6	798	24.2	588	24
188	598	31.4	680	29.4	747	21.9	790	26.5	560	24.6
190	596	32.7	697	24.8	759	22.7	792	26	566	24.6
192	592	31.5	684	24.5	818	22.2	798	24.2	588	24
194	608	31	680	25	843	22.3	802	25	540	24.5

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
196			670	24.5	822	20.6	802	25	588	24
198	594	30	685	24.4	870	20	800	24.3	560	24.5
200	607	30.5	668	24.5	863	20.5	810	24.8	568	25.6
202	606	31.2	692	24.2	845	21.5	816	25.6	588	24.3
204	601	32	667	23.5	825	20.1	812	25.4	579	26.1
206	608	32	675	24.1	812	23.2	822	24.6	591	24.1
208	599	33	762	26.6	781	24.7	834	24.8	587	24.7
210	605	33	790	26.8	803	21.5	836	24.2	571	24.5
212	602	32.5	870	26.2	731	25.5	840	25.4	568	25.3
214	605	32	785	25.9	723	22.9	846	26	541	24.9
216	604	31	690	25.2	748	19.4	840	26.2	568	25.2
218	600	32.1	682	24.9	864	21.8	848	25.2	570	25.6
220	605	32.3	695	21.1	762	26.8	850	24.1	568	24.8
222	606	31.4	790	22	745	22.5	868	25.3	557	25.1
224	602	31.3	822	23.4	779	20.1	879	25.4	550	24.1
226	603	31	800	21.2	775	20.7	883	25.6	571	25.1
228	1223	28.5	796	23.4	776	20.7	866	24.9	581	26.1
230	1240	27.1	740	21.9	836	22.6	868	25.2	568	23.9
232	1195	27.1	790	22.2	739	22.4	872	24.6	558	26.9
234	1186	27	838	23.2	840	23.2	858	23.5	560	24.9
236	1156	27	840	22.6	878	23.6	843	26.2	571	27.1
238	1143	27.1	797	22.4	924	22.9	840	26	571	25.1
240	1128	27.2	840	21.5	900	23.2	848	24	590	24.1
242	1110	27.5	740	21.2	870	21.2	852	23.9	561	24.6
244	1112	27.2	740	21.2	890	19.5	845	23.7	571	23.9
246	1120	27.1	790	21.5	900	20.2	844	26.3	610	25.1
248	1112	27.1	810	24.3	885	20.6	848	25.7	581	24.1
250	1098	27	842	26.6	898	23.2	850	25.4	598	26.1
252	1092	27	800	23.2	867	24.7	838	26	620	26.1
254	1058	26.8	820	26.8	821	21.1	838	27	624	25.9
256	1036	26.4	870	26.4	777	22.5	840	27.2	610	25.4
258	1038	28	889	22.2	668	24.2	855	25.3	608	25.9
260	1021	27.5	825	22.7	686	22.1	853	25.5	612	25.1
262	1020	28	830	22.4	649	24.1	853	26.2	650	24.7
264	881	28.8	840	22.2	738	23.2	851	24.8	660	24.7
266	890	28	802	22.2	659	25.9	859	25.9	670	24.4
268	917	28.6	840	22.8	715	22.2	856	26.1	678	23.6
270	886	28.7	818	22.6	669	22.9	853	26.4	673	25.6
272	902	28	824	23	710	20.8	855	25.8	678	25.8
274	886	28	800	24.2	659	25.3	857	26.1	668	24.1
276			825	24.5	633	27.3	860	24.6	654	23.1
278	861	28.3	848	25.8	690	22.2	868	27.1	662	22.8
280	856	28	827	29.5	734	22.8	850	26.4	653	22.8
282	840	27.5	887	24.7	819	21.8	868	25.4	690	23.3

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
284	813	28.4	740	24.5	790	19.4	872		668	24.1
286	800	28.7	803	25.2	786	23.4	862		620	22.8
288	804	28.9	802	21.9	766	23.4	870		580	23.6
290	793	28.7	814	22.9	793	20.5	874		600	24.1
292	615	28.9	808	26.5	762	22.1	860		672	22.4
294	650	28.9	737	26.2	755	20.9	857		673	22.4
296	635	28.4	758	26.5	737	22.6	853		678	23.5
298	627	28.2	702	26.5	726	22.1	859		665	23.4
300	635	28.2	714	25.3	705	24.4	854.5	24.9	670	24.6
302	607	28.7	727	25	751	22.1	852.6	25	690	25
304	600	28.1	735	27.2	749	20.1	850.7	25.1	610	24.2
306	608	28.2	754	27.8	735	21.5	848.8	25	578	25.1
308	607	28.5	779	29.2	720	22.1	846.9	25.1	590	26
310	607	28.6	780	24.4	724	23.3	845.1	25.2	600	22.4
312	600	27.2	740	27.6	689	22.7	843.2	25	670	27
314	612	28.8	726	25.6	659	21.7	841.3	25.3	690	26.4
316	606	28.9	702	24.5	741	21.6	839.4	25.2	578	25.1
318	692	28.8	694	21.9	720	21.2	837.5	25	665	24.3
320	690	29.2	690	22.9	785	19.7	835.6	25.1	661	24.9
322	686	28.9	686	23.2	763	22.1	833.8	24.8	670	27
324	688	28.8	780	24	751	22.2	831.9	24.9	678	26
326	685	28.3	748	26.5	742	22.6	830	25.3	680	25.3
328	688	28.9	750	27.9	725	21.7	828.1	25	682	26
330	689	29.2	756	27.2	681	24.3	826.2	25	669	25.4
332	688	28.8	725	27.1	759	20.1	824.3	25.2	670	24.9
334	689	29	737	25.5	620	20.4	822.5	25.3	651	24.1
336	588	28.5	689	24.5	690	20.9	820.6	25.1		
338	669	28	723	25.7	739	21.6	818.7	25.1	690	23.1
340	678	28.3	750	23.2	687	24.6	816.8	25	678	24.7
342	674	28.2	736	24.9	662	22.1	814.9	25.2	690	25
344	688	28.3	725	25.3	660	21.1	813	25.2	610	24.2
346	686	28.3	730	23.6	668	24.5	811.2	25.2	578	25.1
348	685	28.2	703	25	628	21	809.3	24.9	590	26
350	678	28.5	659	22.4	645	21.3	807.4	24.9	600	22.4
352	688	28.3	704	23.5	669	21.6	805.5	25	670	27
354	680	28.5	714	25.3	731	28.7	803.6	25.1	690	26.4
356			684	26.2	745	20.5	801.7	25.2	578	25.1
358			724	26.4	658	20.2	799.9	25.2	665	24.3
360			730	28.8	692	22.5	798	25	661	24.9
362			720	28.6	685	22.1	796.1	25	670	27
364			743	28.4	675	26.4	794.2	25	678	26
366			740	26.3	643	25.6	792.3	25.4	680	25.3
368			739	23.8	635	22.4	790.4	25.2	682	26
370			672	23.6	620	22.9	788.6	25.9	669	25.4

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
372			673	24.9	659	23	786.7	26.2	670	24.9
374			672	23.9	624	24.1	784.8	25.2	651	24.1
376			670	23.3	619	25.4	782.9	26.4	690	23.1
378			670	24.9	631	21.9	781	25.4	678	24.7
380			660	21.4	679	20.2	779.1	26.4		
382			671	24.4	656	24.5	777.3	26.4		
384			680	24.4	659	25.6	775.4	26.4		
386			677	24.4	639	21.5	773.5	26		
388			680	23.2	591	25.2	771.6	26.2		
390			673	23.7	656	21.5	769.7	26.4		
392			678	23	615	25.3	767.8	23.3		
394			678	22.4	615	24.8	766	23.4		
396			676	22.5	641	22.9	764.1	23.2		
398			676	22.6	621	24.9	762.2	25.1		
400			669	21.8	669	23.9	760.3	25.5		
402			666	22.2	659	25.5	758.4	26.6		
404			670	22.4	649	25.2	756.5	24.8		
406			685	23.2	765	21.9	754.7	24.8		
408			670	23.9	642	24.5	752.8	23.2		
410			667	23.6	660	25.4	750.9	22.8		
412			669	23.4	692	27.2	749	22.6		
414			680	23	670	26.4	747.1	24.1		
416			689	23.4	720	22.4	745.2	24.3		
418			696	23.3	870	24.3	743.4	24.4		
420			706	23	800	24.6	741.5	24.6		
422			708	22.9	830	26.7	739.6	25		
424			712	22.6	850	24.2	737.7	25.6		
426			710	22.9	867	24.4	735.8	25.4		
428			680	24.8	772	25.5	733.9	25.6		
430			706	24	820	27.4	732.1	25.8		
432			704	22.9	680	22.5	730.2	25.1		
434			712	23.9	770	22.4	728.3	23		
436	678	30	716	23.7	749	22.7	726.4	23.7		
438	691	30	720	23.6	842	24.7	724.5	25.9		
440	664	30	724	23.2	870	25.4	722.6	23.3		
442	686	30	730	23	778	27.3	720.8	23.2		
444	686	30	740	23.1	855	27.5	718.9	25.3		
446	683	30	749	23.1	860	25.3	717	25.4		
448	676	30.6	759	23	887	24.7	715.1	22.4		
450	672	30.7	744	23.2	843	23.1	713.2	22.2		
452	677	30.5	750	23.1	845	23.2	711.3	25		
454	676	30	760	23	867	25.7	709.5	24.8		
456	716	30	761	23.4	827	27.6	707.6	24.6		
458	706	30.5	765	24	773	21.3	705.7	26.4		

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
460	715	30.5	769	24	820	25.3	703.8	26.9		
462	690	30.4	780	24.5	834	22.4	701.9	26.8		
464	707	29.5	793	24.8	833	22.3	700	26.4		
466	721	29.5	800	24.1	762	22	698.2	25.8		
468	694	29.4	810	25.3	708	27.1	696.3	26.2		
470	687	29.5	820	24.1	803	27.7	694.4	26.2		
472	684	29.6	831	24	820	21.4	692.5	26.2		
474	680	30	837	24.2	839	24.6	690.6	25.6		
476	676	30.5	839	24.4	793	24.3	688.7	24.4		
478	671	31	846	24.2	870	22.7	686.9	24.6		
480	678	31	820	23.9	860	24.5	685	25.2		
482	678	31	836	23.4	813	24.5	683.1	24.2		
484	680	31	824	23.2	795	27.6	681.2	23.9		
486	681	31	819	22.8	723	28.8	679.3	24.6		
488	651	31	814	22.5	789	24.8	677.4	24.4		
490	675	30.2	809	22.2	737	26.2	675.6	26.4		
492	665	30.6	804	21.8	834	23.7	673.7	25.8		
494	655	31	799	21.5	810	23.5	671.8	25.9		
496	665	30.9	794	21.2	778	24.2	669.9	25.1		
498	669	30.8	789	20.8	750	25.6	668	27.1		
500	660	30.4	784	20.5	748	24.3	666.1	27		
502	654	29	783	20.1	751	25.4				
504	647	30			750	23.2				
506	652	29								
508	660	29								
510	645	30								
512	653	30								
514	640	30								
516	642	29								
518	646	30								
520	645	28.8								
522	645	29.7								
524	650	30								
526	569	30.6								
528	567	30								
530	576	30.1								
532	555	30.5								
534	546	30.3								
536	559	30.6								
538	561	30.8								
540	552	30.9								
542	567	31								
544	558	30.9								
546	562	30.8								

Depth, m	ABH11		ABH12		ABH13		ABH14		ABH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
548	556	31.4								
550	549	30.4								

Electrical conductivity and Temperature data of Akaki area (4)

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2									785	25
4									827	25.4
6									830	25.5
8									825	25
10									836	25.3
12							701.2	23	835	25.4
14							700.8	22.4	850	25.3
16							699.2	23	845	25.6
18							700	24	845	25.7
20							699.8	23	857	25.7
22							700	23.02	856	25.7
24							700.2	22.7	856	25.6
26			703	22.2			701.3	22.8	857	25.7
28			705	24			702	21.9	861	25.6
30			734	25.9			703	23	863	25.5
32			727	27.8			700.9	23.5	857	24.6
34			714	25			701	23.3	856	24.5
36			722	24.7			701.81	23	857	24.4
38			720	20.8			701.2	23.01	852	23.8
40			728	27.3			699.3	23	854	23.7
42			683	22.2			700	23.01	855	23.6
44			741	29.1			700.8	22.8	857	23.7
46			729	24.7			701	22.7	858	23.6
48			714	26.5			701.3	22.2	862	23.6
50			732	26			700	21.9	865	23.6
52			733	24.4			699.9	22.9	867	23.5
54			735	26.7			700.5	23	862	23.6
56			741	25.9			701	23.3	861	24.1
58			726	26.5			700.9	23.5	862	24.2
60			745	25.6			701.2	24	866	24.3
62			741	25.8			698.95	23.15	865	24.5
64			727	27.8			699.78	23.5	867	24.5
66			719	28.1			700	23.8	867	24.5
68			742	27.9			700.8	24	865	24.2
70			728	28.3			700.3	23.3	864	24.3
72			712	28.7			701	23.7	865	24.5
74			729	24.1			700.89	24	867	23.7

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
76			728	27.1			701.7	23.5	868	23.6
78			752	20.1			699.7	23.2	865	23.5
80			748	21.5			698	24	867	23.7
82	680	24.16	731	25.5			798.87	24	866	23.7
84	700	24.18	717	22.3			700	23.8	868	23.7
86	690	24.17	719	22.9			701.2	23.62	867	23.7
88	700	24.17	728	22.9			703	23.15	865	23.6
90	710	24.17	747	23.1			699.98	23.04	867	24.5
92	720	24.18	744	21.4			697.22	23.08	858	24.5
94	710	24.9	739	19.7			700	24	861	24.6
96	730	24.11	718	20.1			701	24.01	865	24.7
98	740	24.11	729	27.1	530	26.5	700	24	862	24.3
100	740	24.12	793	26.6	508	27.1	700.45	24.2	863	24.2
102	760	24.15	812	27.6	513	26.08	700	24	857	24.5
104	750	24.11	814	24.1	508	27.01	701	23	855	24.3
106	750	24.18	783	27.1	498	27	700.75	23.4	848	24.3
108	770	24.17	801	26	505	26.6	699.95	23.05	847	24.5
110	780	24.19	725	23.9	507	26.3	701.03	23.03	845	23.7
112	790	24.25	690	25.5	514	26.4	700.89	23	842	23.8
114	770	24.2	672	23.7	500	26.3	699.84	23.9	842	23.6
116	800	24.13	655	22.9	507	26.5	699.8	23.2	845	24.5
118	810	24.21	703	22.4	503	26.9	700	23.98	846	24.3
120	800	24.23	679	21.7	502	26.66	701.33	23.01	847	24.2
122	800	24.13	658	26.1	500	27.1	699.89	23.04	845	24.6
124	830	24.13	702	27.7	503	26.4	700	23.08	851	24.5
126	850	24.8	698	26.6	501	26.5	701	23.01	854	24.3
128	840	24.81	698	25.2	498	27	700	24	852	24.7
130	840	24.8	703	25.2	505	26.8	699.89	23.08	848	25.1
132	830	24.5	715	27.3	525	27.6	701	23.05	845	25.6
134	860	24.5	689	23.9	527	27.6	699.84	23	838	25.3
136	870	24.51	686	27.2	515	27.5	699.9	23.08	837	25.4
138	860	24.85	781	26.9	510	27.5	700	24	836	25.2
140	880	24.79	688	26.3	517	26.9	702	23	838	25.5
142	890	24.79	668	27.1	516	26.9	701	26	835	25.1
144	880	24.7	696	23.9	507	27.1	700	27	837	25.3
146	880	24.1	684	22.6	513	27.3	699.9	24	837	25.1
148	900	24.12	693	20.9	515	27.6	698	26	835	25.3
150	920	24.15	681	22.1	514	29.1	700	26.5	847	23.5
152	910	24.18	695	25.3	512	29	701	28.1	845	23.6
154	910	24.11	678	27.5	518	25.3	702	26.8	851	23.3
156	940	24.23	687	26.6	518	26.8	699	24	853	23.4
158	930	24.15	713	27.3	519	26.8	699.8	23	857	23.2
160	950	24.17	728	27.6	519	26.9	700	26	858	23.1
162	970	24.19	693	20.8	522	26.1	701	28	853	23.5

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
164	910	24.21	718	20.9	523	26.5	703	29	854	23.6
166	900	24.21	699	21.5	521	26.4	700	25	854	23.4
168	950	24.25	689	25.5	524	26.6	699	23	852	23.5
170	980	24.19	752	26.1	524	26.9	698	26	854	23.5
172	960	24.26	688	25.1	527	27.1	697	27	856	23.6
174	720	24.23	692	21.6	527	27	700	27	854	23.7
176	750	24.25	705	21.9	530	26.9	701	29	853	23.5
178	780	24.19	686	27.1	530	27.6	704	26	853	23.6
180	850	24.2	668	25.9	532	27.9	700	25	853	23.1
182	860	24.26	683	27.1	534	27.91	792	22.2	854	23.2
184	850	24.28	805	23.7	534	28	772.9	22.5	854	23.3
186	800	24.18	686	27.6	533	28.1	769.3	22.9	855	23.4
188	820	24.2	667	24.9	534	29.2	773	23	855	23.4
190	760	24.11	708	23.7	532	29.4	756	24	852	23.2
192	830	24.16	830	27.6	531	29.1	781	27	851	23.3
194	879	24.12	890	25	522	30.2	753	25	851	23.3
196	784	24.19	870	24.1	508	30.6	777	26	849	23.2
198	788	24.23	871	22.6	514	30.5	780	24	847	23.1
200	780	24.23	878	23.11	515	29.6	705	28	848	23.5
202	1100	24.23	877	23.24	506	30.2	699	23	845	22.7
204	1080	24.12	883	23.3	510	30	699.8	22.7	846	22.6
206	1010	24.38	880	24.1	1747	27.4	698	22.4	847	22.8
208	970	24.19	874	23.9	1736	27.5	688	22.2		
210	890	24.19	885	24.3	1421	27.9	684	22	845	22.5
212	860	25.03	887	24.2	1411	28.1	666.8	22	843	22.7
214	878	24.8	888	24.1	1410	27.1	666.48	22.2	841	22.8
216	890	24.72	880	24.5	1380	28	666	22.3	845	22.6
218	850	24.19	879	24.5	1367	28.2	666.3	22.5	846	22.7
220	860	24.38	883	24.8	820	28.3	666.7	22.1	843	22.7
222	840	24.19	885	24.8	818	28	666.8	22	842	22.7
224	865	24.18	882	24.6	812	28.1	666.5	22.3	841	22.6
226	879	24.82	880	24.6	816	28.1	666.4	22.1	845	22.8
228	867	24.78	885	24.8	816	28	666.2	22.5	846	22.7
230	866	24.39	879	24.6	813	28	666.8	22	851	23.2
232	878	24.55	877	24.7	810	28	666.9	23	852	23.4
234	879	24.65	884	24.5	820	27.8	667.2	23.5	856	23.5
236	867	24.63	888	24.3	810	27.8	665.4	23.9	853	23.2
238	884	24.42	815	21.8	817	27.6	666.3	24	854	23.3
240	845	24.46	842	20.1	817	27.1	669.4	24	852	23.4
242	850	24.38	829	20.8	822	27	670	22	853	23.4
244	852	24.33	865	21.1	811	27.1	681.2	22.8	855	23.5
246	890	24.34	842	20.1	802	26.8	690.7	23	853	23.6
248	880	24.82	889	20.9	804	26.6	695	23.1	857	23.7
250	780	24.9	891	21.4	804	26.6	700	23.9	856	23.5

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
252	880	25.03	895	20.4	803	26.2	701	24	857	23.4
254	790	25.01	842	21.5	802	26.4	699	24.4	856	23.5
256	780	24.52	851	22.6	801	26.6	693.8	25	855	23.6
258	780	24.8	881	20.5	801	26.8	695	26	854	23.3
260	810	24.9	830	23	801	26.7	697.8	24	856	23.4
262	815	24.5	839	20.5	807	26.4	677.3	23	854	23.5
264	820	24.62	811	25.5	805	26.8	670	23.8	853	23.2
266	820	24.33	815	20.5	806	25.4	669	23.4	853	23.1
268	825	24.39	885	20.7	826	25.1	667.8	23	852	23.6
270	824	24.32	813	24.9	860	25.4	669.5	22.5	851	23.4
272	824	24.57	882	24.4	902	25.1	700	22.8	853	23.5
274	825	24.59	808	22.8	907	25.3	701	22.4	851	23.5
276	818	24.82	843	24.1	910	25.1	699.5	22.2	852	23.1
278	850	24.82	865	21	911	25.2	701	22.5	857	23.2
280	855	24.75	803	22	912	25.1	705	22.8	856	23.4
282	855	24.59	863	21.2	917	25.01	712	22.9	853	23.6
284	855	224.35	851	22.8	921	25	697.4	22	855	23.2
286	860	24.77	805	21	944	25	693.8	22.3	854	23.5
288	860	24.79	899	20.4	970	25.1	667.8	23.1	856	23.6
290	850	24.81	870	26.23	1126	26.4	668.2	23.5	856	23.5
292	870	24.95	859	22.8	1038	26.4	666.3	23	857	23.4
294	835	24.83	813	20.4	1004	27.9	667.9	23.3	853	23.4
296	842	25.04	827	23.9	850	27.9	670.8	23.7	852	23.5
298	850	25.5	887	20.8	830	25.7	678.9	23.1	849	23.5
300	850	25.7	898	22.4	950	25.6	667.7	24.3	851	23.4
302	862	25.7	858	22.2	664	25.6	670.5	25	867	23.5
304	861	25.3	855	21	668	25.6	678.3	26	865	23.6
306	855	25.04	878	23.5	674	25.5	675.9	27	863	23.5
308	850	25.4	829	21.39	691	25.5	677.8	29	865	23.5
310	850	25.35	748	20.5	721	25.3	676.6	27	867	23.6
312	860	25.34	898	21	720	25.1	678	24	866	23.7
314	860	25.71	877	20.7	718	25.3	679	23	865	23.6
316	870	25.42	863	21.4	717	25.2	680	22.1	864	23.5
318	869	25.3	858	23.4	716	25.2	681	22.3	865	23.5
320	870	25.9	825	25.4	710	25.3	680	22	865	23.7
322	860	26.04	786	23.1	711	25.1	679	22.23	867	23.6
324	860	26.2	842	22.5	710	25.3	674	22	866	23.6
326	834	26.7	884	21.1	700	25.7	672	22.03	867	23.5
328	836	26.3	762	21.3	690	25.6	674	22.04	867	23.5
330	854	26.3	810	21.4	694	25.6	669	22.32	863	23.7
332	860	26.4	862	20.4	686	25.5	667	22.5	864	23.5
334	860	26.3	895	20.3	678	25.4	663	22.7	865	23.6
336	865	26.7	879	21.1	681	25.3	666	22.2	866	23.6
338	855	26.5	855	21.6	681	25.4	662.5	22.05	866	23.7

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
340	860	26.7	828	22.1	660	27.5	662.34	22.03	865	23.6
342	860	26.4	871	23.3	667	27.1	660.2	22.23	867	23.3
344			819	25.2	660	27.2	666	22.32	866	23.5
346			830	26.9	659	27.3	866.7	22.14		
348			819	24.6	661	27.3	867	22		
350			763	23.8	663	27.2	878	22.13		
352			825	20.2	661	27.1	666.5	22.5		
354			897	20.3	660	27.1	665.2	23.1		
356			829	20.8	654	27.1	653.2	23.89		
358			866	24.8	651	27.3	632.3	24.9		
360			802	20.7	653	27.4	621.2	24.3		
362			817	21.6	650	27.2	599.4	24.45		
364			869	21.9	648	27.4	594.2	24.1		
366			867	21.2	641	27.2	585.4	24.3		
368			891	21.8	631	27.1	564.8	24.5		
370			804	26.5	631	27.3	500	25		
372			826	22.8	624	27.1	550	27		
374			828	20.2	620	27.5	500	28		
376			843	23.5	612	27.4	525	29		
378			875	22.5	611	27.5	509	29.5		
380			856	22.7	614	27.2	552	22.1		
382			814	22.9	619	27.1	566.8	22.16		
384			843	22.7	617	27	566.7	22.4		
386			844	21.8	615	27.1	598	22.1		
388			818	21.6	616	27.1	587	22.8		
390			805	23.1			500	22.2		
392			882	22.7			545	22.8		
394			815	20.9	617	27.21	582	22.5		
396			850	21.1	615	27.1	400	23		
398			760	20.3	614	27	450	24		
400			775	24.3	605	26.5	480	26		
402			894	26.1	607	26.8	500	28		
404			880	27.6	598	26.9	523	27		
406			830	29.9	610	27	547	26		
408			776	25.1	615	27.1	576	28		
410			851	26	620	27.1	586	28		
412			791	23.2	603	26.9	579	29		
414			873	21.6	608	26.7	520	27		
416			884	21.8	601	26.9	500	25		
418			842	23.8	580	26.6	498	26		
420			782	22.9	580	26.1	495	26		
422			819	20.2	579	26.2	500	27		
424			840	23.4			525	28		
426			844	22.4	580	26.8	537	26		

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
428			814	21.8	581	27.1	514	24		
430			810	20.2	581	27.2	500	27		
432			826	22.8	580	27.8	697	29		
434			801	23	574	27.8	618	26		
436			822	24.4			565	24		
438			815	22.8	574	28.1	527	27		
440			856	20	570	28.1	525	28		
442			851	22.4	560	28.1	538	29		
444			839	21	564	28.4	562	26		
446			855	22.2	560	28.4	539	24		
448			817	20.1	561	27	542	25		
450			780	22.5	561	26.4	565	24.2		
452			879	23.4	598	26.7	531	25		
454			836	24.5	594	27.8	548	26		
456			821	23	595	30.1	573	27		
458			879	23.3	607	30.7	525	29		
460			803	21.7	585	30.4	536	26		
462			811	20.8	590	30.1	549	28		
464			834	26.1	592	29.9	567	25		
466			858	23.1	585	30.6	548	23		
468			821	23.3	590	30.2	592	26		
470			790	23.8	592	30.8	554	27		
472			829	23.7	597	31.2	573	28		
474			873	25.1	591	31.6	530	25		
476			870	25.5	592	31.1	559	28		
478			867	26.2	591	31.2	557	29		
480			864	26.8	593	31	536	28		
482			861	27.5	591	31	578	27		
484			858	25.1	592	31.1	576	26		
486			855	23.8	591	31.3	573	25		
488			852	25.4	593	30	578	25.3		
490			849	23.1	595	30.2	561	25.9		
492			846	25.7	597	30.5	565	25.4		
494			843	23.4	599	30.7				
496			840	22	601	30.2				
498			837	22.7	604	28.1				
500			834	23.3	592	26.8				
502					597	27.1				
504										
506					587	27.6				
508					601	27.2				
510					594	27.9				
512					610	28.2				
514					602	29.1				

Depth, m	ABH16		ABH17		ABH18		ABH19		ABH20	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
516										
518					610	29.1				
520					612	29.4				
522					608	28.9				
524					605	28.1				
526					601	28.4				
528					607	28.4				
530					604	28.4				
532					601	28.4				
534					604	28.2				
536					603	28				
538					604	28.4				
540					603	28.1				
542					603	28.12				
544					601	28.1				
546					604	28.1				
548					603	28.1				
550					603	28.1				

Electrical conductivity and Temperature data of Akaki area (5)

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	888	22.5	765	21.7						
4	886	22.4	766	22						
6	884	22.2	777	23						
8	883	22	766	24						
10	885	22.2	781	21.4						
12	887	22.4	767	22.5						
14	888	22.3	777	22.5						
16	884	22	756	22.4						
18	888	22.5	768	23.1						
20	886	22.3	757	23.2						
22	884	22.1	766	23.2						
24	887	22.4	768	22.1						
26	884	22.2	781	22.3						
28	885	22.3	781	22.3						
30	886	22.4	779	23.1						
32	888	22.5	768	23.2						
34	885	22.2	780	23.5						
36	886	22.3	769	24.1						
38	884	22.2	780	24.1						
40	884	22.4	768	24.5						
42	886	22.3	781	24.1						

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
44	888	22.5	769	24.2						
46	885	22.3	769	24.1						
48	883	22.2	777	24.4						
50	881	22	778	24.6						
52	884	22.3	778	24.5						
54	881	22	776	24.4						
56	883	22.2	778	24.5						
58	885	22.3	769	24.2						
60	887	22.5	775	24.1						
62	888	22.4	767	25.1						
64	886	22.3	769	25.2						
66	886	22.3	775	26						
68	887	22.2	768	26						
70	885	22.4	768	25						
72	886	22.1	768	24						
74	887	22.3	786	24						
76	884	22	786	24						
78	881	22.2	787	23						
80	885	22.4	786	23						
82	887	22.5	788	24						
84	888	22.5	768	24	681	27				
86	886	22	796	22	541	26				
88	884	22.9	785	23	530	25				
90	887	22.1	767	24	514	27				
92	885	22.9	787	25	506	28				
94	887	20	786	24	498	26				
96	886	20.1	768	24	511	26				
98	884	20.5	776	23	517	27				
100	885	21.8	787	24	526	25				
102	885	21.6	769	24	514	25				
104	883	21.9	767	23	527	25				
106	881	20.5	767	23	522	25				
108	884	20.4	778	25	522	26				
110	882	20.6	775	24	524	25			1286	26.9
112	885	20.4	774	23	520	25			1467	27
114	886	20.2	776	23	517	25			1520	26.9
116	888	21	778	24	516	25			1395	24
118	887	21.01	775	23	496	25			1454	24
120	888	21.02	776	23	478	24			1330	23.5
122	886	21	778	24	470	27			1239	23.8
124	887	21.03	777	23	463	25			1237	23.9
126	885	21.01	775	23	481	25			1239	23.8
128	882	21.04	776	24	488	25			1220	27
130	884	21	778	24	517	26			1230	27.1

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
132	887	21.03	774	23	578	25			1234	26.4
134	888	21.04	778	23	581	26			1217	26.4
136	886	21	776	24	562	27			1229	26.9
138	883	21.07	777	23	571	25			1241	26.1
140	885	21	776	23	583	24	1127	23.9	1240	26.4
142	888	19.9	775	23	571	25	3019	24.01	1239	26
144	887	21.01	778	24	587	25	1092	23.7	1231	26.1
146	888	21.7	776	24	577	25	1042	28.8	1234	26.2
148	886	21	776	24	561	26	948	24.01	1230	26.4
150	883	21.05	776	24	531	25	978	23.4	1232	26.3
152	885	21	778	24	571	27	671	23.3	1230	25.4
154	887	21	777	23	561	26	701	23.3	1231	25.3
156	884	21.05	775	23	556	25	603	23.4	1230	25.4
158	882	21.07	776	24	531	25	589	23.6	1229	25.6
160	885	21.03	779	24	537	26	579	23.4	1227	25.4
162	888	21.05	776	24	527	26	530	23.9	1227	25.3
164	884	21.01	778	25	533	26	511	23.6	1226	25.4
166	880	21	776	24	525	27	514	23.9	1223	25.6
168	887	21.03	678	21	522	26	506	24.01	1221	25.5
170	885	21	677	21	520	25	509	24.1	1222	25.4
172	888	21.05	678	22	517	27	521	24.5	1221	25.1
174	883	21.03	677	22	531	24	505	24.9	1221	25.3
176	885	21	678	21	541	26	511	23.9	1218	23.2
178	883	19.9	678	22	533	26	515	24.9	1243	23.9
180	888	20.89	674	21	549	25	507	24.8	1223	23.7
182	887	21	677	22	527	25	507	25.1	1291	23.1
184	885	21.01	676	22	517	25	507	25.01	1291	23.3
186	887	21.04	675	21	516	26	508	25.7	1211	23.7
188	884	21.02	677	21	513	26	510	25.8	1257	23.01
190	882	21	676	21	521	24	512	25.72	1261	23.01
192	885	20.9	675	23	527	25	517	25.15	1216	23.9
194	887	20.2	676	23	517	25	518	26.1	1206	23.6
196	884	21	677	22	519	25	517	24.1	1273	23.8
198	882	21.09	675	23	521	25	521	23.9	1270	23.9
200	885	21	678	24	518	25	518	23.4	1271	24.1
202	884	21.05	677	24	533	26	519	23.9	1269	24.2
204	887	21	675	23	541	25	511	25.5	1268	24.1
206	883	21.07	676	23	542	25	516	25.4	1269	24.2
208	885	21.1	677	23	555	25	521	25.7	1268	24.3
210	888	21.05	667	22	571	24	515	25.2	1264	24.4
212	884	21.03	677	22	551	27	511	25.2	1263	24.3
214	885	21	678	22	534	27	521	25.2	1266	24.6
216	888	21.01	675	23	527	26	517	25.7	1264	24.5
218			676	22	517	25	518	25.8	1261	24.4

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
220			674	22	521	23	513	25.4	1264	24.2
222			776	23	518	26	516	25.3	1263	24.5
224			774	23	513	25	511	25.5	1267	24.4
226			772	22	521	25	512	25.4	1263	24.6
228			775	24	531	24	516	24.9	1261	24.5
230			774	23	533	25	508	25.1	1268	24.3
232			776	23	517	23	508	24.1	1256	24.5
234			776	24	512	24	507	24.5	1253	24.3
236			775	23	518	24	506	24.3	1254	24.5
238			774	24	521	25	510	24.1	1253	24.6
240			776	24	522	25	512	23.9	1255	24.6
242			775	23	518	27	517	23.4	1254	24.7
244			774	24	533	24	507	23.01	1253	24.8
246			776	24	527	27	506	22.7	1255	25.1
248			775	22	521	25	506	22.6	1252	25.1
250			776	23	517	25	508	23.3	1250	25.3
252			774	24	536	25	507	24.9	1251	25.2
254			767	23	539	25	540	23.9	1249	25.1
256			776	23	530	25	477	23.7	1244	25.4
258			775	22	532	26	400	23.5	1241	25.3
260			778	23	541	26	399	23.6	1242	25.2
262			776	22	538	25	428	23.6	1237	25.1
264			774	24	543	25	442	23.7	1235	25.2
266			776	24	549	26	458	24.2	1236	25.4
268			775	23	556	25	458	24.5	1190	25.2
270			774	24	559	26	460	24.4	1190	25.1
272			774	26	557	26	462	24.6	1189	25.3
274			772	26	558	25	460	24.3	1188	25.2
276			776	24	603	26	458	24.2	1187	25.3
278			774	23	615	26	460	24.4	1180	25.4
280			776	24	618	27	464	24.5	1101	25.4
282			777	24	632	26	473	23.8	1130	25.3
284			775	23	638	27	480	23.2	1143	23.1
286			776	23	643	26	477	23.5	1150	23.1
288			776	24	645	26	474	23.8	1178	23.4
290			776	22	646	26	462	23.7	1137	24.1
292			775	24	649	26	469	23.4	1123	24.8
294			767	22	647	26	471	23.3	1092	25.4
296			768	23	652	26	468	24	1098	25.3
298			767	24	657	26	468	23.7	1093	25.5
300			768	24	655	27	469	23.4	1091	25.4
302			766	25	671	27	476	24.5	1088	25.4
304			775	25	682	26	484	24.6	1081	25.6
306			776	23	691	26	471	25	1082	25.4

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
308			776	24	803	26	475	25.2	1084	25.1
310			775	24	809	26	480	25.2	1191	23.14
312			766	23	821	25	487	25	1180	23.7
314			768	23	832	25	491	25	1142	23.9
316			767	23	845	25	482	24.8	1140	23.2
318			766	24	901	25	480	24.9	1161	23.5
320			767	24	903	25	500	25	1180	23.7
322			767	23	915	26	497	25.2	1171	23.5
324			768	23	921	26	498	25	1174	23.4
326			768	23	929	29	503	25	1176	23.4
328			766	24	945	26	488	24.9	1175	23.5
330			776	24	945	26	480	24.9	1172	23.4
332			777	24	944	26	505	24.7	1174	23.4
334			778	23	954	26	500	24.8	1170	23.4
336			775	23	941	26	508	24.7	1172	23.5
338			767	22	940	26	510	24.8	843	23.6
340			768	23	938	25	511	24.4	1100	23.1
342			757	24	941	25	514	24.5	1190	23.5
344			756	24	936	25	507	24.7	1187	23.5
346			756	23	938	25	509	24.5	1186	23.8
348			758	24	944	25	515	23.7	1187	23.7
350			758	24	948	25	518	23.6	1189	23.8
352			776	25	943	26	508	24.3	1186	23.7
354			776	25	943	26	522	24.3	1187	23.9
356			774	24	940	25	509	24.3	1194	23.9
358			772	24	944	25	520	24.1	1296	24.1
360			767	23	940	25	534	25	1331	24.1
362			686	23	938	26	483	25	1330	24.6
364			684	24	940	26	511	25.3	1329	24.3
366			678	24	947	26	505	25.6	1326	24.1
368			676	23	956	26	487	25.4	1327	24.1
370			677	22	959	25	466	25.3	1320	24.3
372			670	22	957	26	475	25.4	1324	24.5
374			676	23	963	25	483	25.5	1321	24.1
376			768	24	965	26	476	24.6	1318	24.3
378			767	25	962	27	478	24.6	1314	24.4
380			766	25	959	26	477	24.7	1312	24.5
382			768	23	968	27	487	24	1305	24.1
384			765	23	972	27	505	25	1248	24.7
386			768	24	960	27	508	25	1244	24.4
388			767	24	947	25	511	25	1253	24.6
390			766	25	931	24	536	25.2	1261	24.4
392			768	25	925	24	536	25.4	1274	24.3
394			768	23	902	24	540	25.8	1271	24.4

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
396			762	23	868	24	540	26	1270	24.3
398			767	24	861	22	557	26.1	1274	24.1
400			766	24	874	23	559	25.9	1311	24
402			768	25	858	22	563	25.8	1310	23.9
404			776	25	870	21	570	25.7	1309	24
406			774	22	900	24	576	25.7	1290	24.2
408			776	22	906	24	586	25.4	1284	24.1
410			768	24	931	24	580	25.5	1248	25
412			767	25	924	24	582	25.5	1244	25.1
414			767	25	928	24	579	25.3	1244	25.1
416			768	23	951	24	578	25.4	1240	25.2
418			768	24	969	24	580	25.3	1241	25.1
420			767	24	974	24	582	25.3	1248	25
422			766	23	987	24	580	25.4	1244	25.2
424			766	24	1001	24	589	25.4	1237	25.4
426			768	24	1028	24	585	25.3	1230	25.8
428			767	25	1019	24	588	25.2	1124	25.9
430			767	25	1023	24	602	25	1180	25.3
432			765	24	998	24	603	25	1183	24.6
434			768	24	996	24	602	25.1	1182	24.7
436			767	25	1011	24	603	25	1176	24.5
438			766	22	1100	24	620	25.5	1164	24.3
440			776	22	1098	24	585	26.3	1163	25.1
442			767	22	1095	24	580	26.4	1160	25.4
444			766	24	1011	24	584	26.2	1137	26
446			768	25	1017	24	581	26.1	1163	24.1
448			767	24	1018	24	594	25.9	1171	24.2
450			766	24	1025	25	592	26	1181	24.1
452			768	24	1029	24	593	25.9	1219	28.1
454			776	25	1019	25	590	25.9	1229	27.2
456			778	24	1017	24	588	25.8	1278	26.9
458			777	24	1021	25	589	26.3	1231	27.1
460			767	25	1050	24	596	26.5	1219	27.8
462			766	25	1051	24	596	26.4	1278	27.1
464			776	24	1042	24	597	26.6	1192	26.9
466			775	24	1052	24	595	26.5	1252	27.2
468			774	23	1048	24	589	26.6	1261	26.1
470			777	22	1106	27	585	26.2	1271	27.1
472			767	23	1150	27	586	26	1211	26.3
474			776	24	1152	27	587	26.2	1190	26.4
476			778	24	1200	27	590	26.5	1227	27.1
478			767	22	1214	28	588	26.6	1281	26.9
480			764	22	1227	27	582	26.8	1271	25.2
482			767	22	1150	27	584	26.6	1270	25.1

Depth, m	ABH21		ABH22		ABH23		ABH24		ABH25	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
484			678	24	1015	26	582	26.4	1274	25.3
486			677	23	1016	26	583	26.5	1261	25.4
488			676	22	1019	25	584	26.5	1265	25.3
490			678	22	1015	26	581	26.5	1259	25.1
492			676	24	1027	28	579	26.4	1251	25.4
494			676	24	1034	28	573	26.5	1248	25.6
496			676	25	1024	27	577	26.4	1228	25.8
498			678	25	1011	27	572	26.5	1227	25.9
500			677	23	1010	26	578	26.5	1228	26.3
502			674	23	1011	26	576	27	1226	26.4
504			676	24	1018	27	577	26.8	1226	26.9
506			674	24	1021	28	564	26.9	1217	27.2
508			677	25	1019	28	566	27	1205	27.1
510			677	24	1021	28	560	26.9	1044	28.3
512			667	24	1017	27	553	27.1	1191	25.4
514			676	23	1025	27	555	27.3	1141	25.4
516			675	23	1021	27	552	26.9	1121	24.9
518			677	24	1019	26	553	26.8	1192	26.1
520			674	22	1011	28	549	26.9	1271	26.9
522			674	22			545	27	1210	26.9
524			678	24			544	26.8	1190	26.1
526			677	24			545	26.9	1227	26.3
528			676	24			544	26.7	1276	26.1
530			677	25			545	26.7	1227	25.9
532			676	24			550	26.1	1217	25.8
534			677	24			552	27	1190	25.8
536			676	23			553	27.2	1196	25.2
538			676	24			561	27.1	1210	27
540							563	27.4	1220	26.1
542							562	27.2	1240	28.9
544							561	27	1238	28.7
546							560	26.8	1239	28.7
548									1240	28.9
550									1241	28.8

Electrical conductivity and Temperature data of Akaki area (6)

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
2			110	23.4		
4			110	23.5		
6			110	23.3		
8			110	21.3		
10			110	20.8		

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
12			110	23.7		
14			110	23.6		
16			110	21.5		
18			110	21.8		
20			110	22.7		
22			110	23.4		
24			310	23.6		
26			410	24.5		
28			200	22.3		
30			280	22.6		
32			260	22.5		
34			270	22.6		
36			300	22.5		
38			260	22.3		
40			280	22.5		
42			290	22.7		
44			420	23.3		
46			430	23.5		
48			330	23.6		
50			340	23.8		
52			310	23.9		
54			330	23.1		
56			350	22.9		
58			340	23.2		
60			310	21.4		
62			310	21.7		
64			320	21.8		
66			330	21.7		
68			340	21.8		
70			340	21.8		
72			580	24.8		
74			390	23.6		
76			340	23.4		
78			520	23.8		
80			510	23.5		
82	380	20.2	360	23.1		
84	388	21.1	390	23	563	24.1
86	387	20.8	350	23.2	541	23.1
88	390	21.1	420	23.1	561	23.7
90	390	21.5	460	23	531	26.1
92	395	21.5	410	23.5	563	25.1
94	394	21.3	400	23.8	571	23.7
96	397	21.6	420	23.3	569	24.1
98	398	21.7	420	23.2	516	23.9

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
100	400	21.6	400	23.1	554	24.2
102	401	21.5	380	23.2	523	24.7
104	402	21.3	390	23.5	519	23.2
106	403	21.2	400	23	531	25.4
108	404	21.2	380	23.2	561	24.1
110	409	21.5	390	25.4	528	24.5
112	415	21.7	580	26	521	23.7
114	412	21.7	590	25	519	23.4
116	416	21.7	550	24	545	22.8
118	418	21.8	540	23	523	22.6
120	415	21.9	520	24.6	517	22.9
122	418	21.9	550	24.2	513	22.4
124	419	21.8	560	25.6	521	24.1
126	420	21.9	570	26	516	24.3
128	425	22	600	26	519	23.5
130	428	22.01	540	23	510	23.7
132	425	22.08	500	23.2	501	23.1
134	420	22.1	540	24.2	509	22.7
136	417	22.1	560	25.5	512	22.4
138	415	22.3	570	25.8	551	21.1
140	409	22.5	550	24.5	541	23.9
142	412	22.7	560	25.6	533	24.1
144	410	22.8	580	24.5	519	21.9
146	414	22.6	520	25.5	527	23.7
148	424	22.9	540	26	541	24.7
150	423	22.8	530	26.1	531	25.1
152	425	22.7	550	26.5	540	25.1
154	426	22.8	560	26.5	541	25.2
156	429	22.9	530	26.5	539	25.2
158	432	22.9	550	26.5	542	25.2
160	436	22.9	540	26	541	25.1
162	438	23.2	550	26.1	543	25.3
164	443	23.2	520	26.3	540	25.3
166	448	23.2	520	24.5	534	25.1
168	449	23.4	540	25	542	25.3
170	449	23.5	580	26.1	541	25.3
172	451	23.5	560	26	542	25.2
174	453	23.5	560	26	541	25.1
176	451	22.6	540	26.1	540	25.3
178	452	22.9	560	26.2	542	25.3
180	450	23.9	580	26	543	25.3
182	465	23.8	540	26.2	544	25.4
184	667	23.8	520	26.2	543	25.3
186	670	23.9	510	26.2	547	25.2

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
188	472	23.8	540	26.5	545	25.2
190	477	24.2	560	26.6	546	25.2
192	476	24.4	570	26.4	543	25.2
194	476	24.4	560	26	547	25.3
196	474	24.6	550	26	546	25.3
198	473	24.6	630	26.5	546	25.2
200	473	24.5	630	25.5	544	25.3
202	468	24.5	600	25.5	547	25.1
204	468	24.5	580	26	546	25.2
206	466	24.5	580	25.5	545	25.3
208	469	24.4	600	26	546	25.2
210	468	24.3	570	26.2	546	25.3
212	468	24.3	600	25.8	547	25.2
214	470	24.3	650	25.7	544	25.3
216	471	24.2	600	25.8	543	25.2
218	475	24.2	570	26	545	25.3
220	473	24.1	550	25.6	542	25.2
222	474	24.1	570	25.8	544	25.3
224	475	24	580	25.6	546	25.3
226			600	25.8	547	25.2
228	474	24	560	26.2	546	25.3
230			600	26	548	25.3
232			580	25.7	551	25.2
234	475	25	550	25.5	546	25.2
236	493	25.3	580	25.4	547	25.2
238	491	25.4	570	25.6	545	25.2
240	491	25.8	580	25.7	548	25.3
242	488	25.8	570	25.7	541	25.3
244	483	25.9	560	25.8	548	25.3
246	492	25.8	550	26	549	25.3
248	498	25.7	600	26	546	25.3
250	523	25.6	580	25.5	546	25.2
252	496	21.2	600	25.6	545	25.2
254	493	21.5	590	26	550	25.2
256	491	21.3	560	26.1	554	25.1
258	491	21.2	560	26	547	25.1
260	490	21.3	590	25.8	581	25.2
262	492	22.6	560	25	612	25.3
264	492	23.1	550	25.1	624	25.1
266	493	23.5	520	25	627	25.3
268	493	24.2	600	25	630	25.4
270	494	24.5	600	25	671	25.1
272	498	25	570	25.5	674	25.3
274	503	24.9	600	25	714	25.4

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
276	508	24.8	560	25	841	25.6
278	506	24.9	560	25	837	25.5
280	506	23.7	560	25	949	25.6
282	496	23.5	550	25.5	971	25.4
284	508	22.9	570	25.5	978	26.2
286	507	22.1	550	26	981	26.1
288	501	22.7	570	25	980	26.4
290	506	22.8	550	25	987	26.1
292	503	22.6	570	25	984	25.7
294	510	22.2	560	25	991	25.1
296	503	22.8	600	25	991	25.1
298	508	22.4	560	25.2	993	21.3
300	503	22.7	600	25	990	24.1
302	511	22.9	580	25	991	23.4
304	515	24.7	550	25.1	984	23.3
306	510	24.5	570	26	990	23.3
308	502	24.9	600	25.2	971	23.3
310	503	23.1	570	25.6	981	23.3
312	496	22.9	560	25.8	975	23.4
314	502	22.8	570	25	980	23.5
316	502	23.7	560	25.5	987	23.6
318	496	24.4	520	25.6	984	25.4
320	507	24.7	540	26	985	23.2
322	510	24.3	560	26.1	989	23.4
324	515	24.6	530	26.3	993	23.3
326	503	24.9	550	26	995	23.2
328	506	24.6	540	25.8	962	24.5
330	510	24.5	520	25.6	971	24.4
332	507	24.7	550	25.6	968	24.3
334	503	24.6	540	25.8	969	24.2
336	510	24.7	570	26	978	24.4
338	496	24.8	520	26	975	24.5
340	505	24.6	500	26.2	964	24.6
342	503	24.9	520	26.3	971	24.8
344	506	23.4	540	25.8	973	24.6
346	507	23.1	560	25.5	978	24.7
348	506	22.8	530	25.8	973	24.7
350	508	22.4	550	26.3	968	24.6
352	510	22.1	540	26	969	24.7
354	513	22.3	570	26.2	971	24.9
356	515	22.6	550	25.8	974	25.3
358	510	22.9	560	25.8	973	25.2
360	509	23.9	640	25.8	971	25.1
362	506	22.7	610	25.6	973	25.3

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
364	508	22.9	620	25.1	974	25.4
366	510	23.1	640	25.3	975	25.3
368	518	22.2	610	25.4	973	24.7
370	516	23.4	620	25.4	971	24.3
372	508	23.1	1250	25.4	971	24.1
374	510	24.1	1250	25.4	974	24.5
376	506	23.8	1250	25.4	971	24.3
378	503	24.1	1250	25.4	973	24.7
380	503	24.3	1230	25.4	973	24.1
382	501	24.2	1220	25.7	974	24
384	503	24.7	1220	26.1	980	24.2
386	493	25	1200	26.1	978	23.8
388	503	24.9	1100	26.1	978	23.7
390	501	24.7	1000	26.1	979	23.6
392	508	24.5	1100	26	981	23.5
394	516	24.3	1200	26	986	23.5
396	510	23.9	1200	26.2	988	23.6
398	503	22.8	1200	26.1	985	23.4
400	506	22.7	1120	26.2	989	23.5
402	510	22.9	1140	26.1	986	23.5
404	508	22.9	1120	26.2	985	23.6
406	502	22.7	1100	26	987	23.5
408	496	22.5	1120	26	989	23.4
410	502	22.6	1140	26.2	989	23.5
412	505	22.9	1080	26.3	986	23.4
414	506	23.9	1060	26.1	988	23.5
416	501	24.4	1060	26.2	986	23.5
418	505	24.9	1040	26.1	989	23.5
420	508	24.3	1050	26.1	989	23.4
422	505	25.1	1060	26.1	987	23.4
424	506	25.2	1070	26.7	985	23.5
426	502	24.3	1080	26.2	988	23.5
428	501	23.9	1090	26.1	987	23.4
430	505	22.9	1100	26.2	988	23.4
432	503	22.9	1090	26.1	988	23.5
434	507	23.4	1100	26.1	986	23.5
436	502	22.7	1090	26.3	989	23.5
438	496	22.5	1070	26.2	987	23.4
440	501	22.4	1090	26.2	987	23.5
442	501	23.4	1070	26.1	989	23.6
444	502	22.9	1050	26.1	989	23.6
446	502	23.2	1040	26.1	989	23.5
448	502	24.1	1090	26.4	987	23.6
450	507	24.4	1080	26.9	987	23.6

Depth, m	ABH26		ABH27		ABH28	
	EC	Temp.	EC	Temp.	EC	Temp.
452	507	25.1	1070	27.3	981	26.1
454	502	24.7	1070	27.5	1110	25.3
456	498	25.1	1030	27.3	1212	24.9
458	502	24.7	1160	27.5	1310	25.1
460	507	24.9	1080	26.8	1120	23.7
462	508	25.1	1110	26.5	1218	23.3
464	501	25.3	1070	26.5	1292	24.5
466	502	24.1	1070	27.1	1381	23.4
468	504	24.1	1060	27	1258	23.9
470	510	25	1030	27.1	1317	24.7
472	512	24.7	1050	26.4	1278	25.9
474	508	23.1	1040	26.6	1339	26.7
476	502	23.7	1020	26.2	1378	26.4
478	496	22.9	1010	26.6	1309	26.2
480	504	22.7	1020	26.9	1296	25.3
482	503	22.8	1010	27.3	1283	23.9
484	501	22.7	1010	27.1	1278	23.2
486	492	22.7	1020	26.8	1308	23.1
488	482	22.6	1010	26.8	1256	23.7
490	498	22.5	1010	26.9	1344	23.4
492	501	22.7	1010	26.5	1148	24.2
494	498	22.9	990	26.9	1278	24.7
496	489	22.6	990	27.3	1138	24.4
498	498	22.4	990	28.3	1089	24.9
500	496	22.7	990	27.8	1183	25.3
502	492	22.9				
504	486	23.5				
506	496	24.2				
508	501	24.9				
510	492	24.1				
512	486	24.3				
514	490	24.6				
516	502	24.7				
518	496	24.8				
520	490	24.4				
522	486	24.6				
524	496	24.6				
526	502	25.2				
528	503	24.7				
530	498	25.2				
532	505	25.3				
534	502	25.1				
536	503	24.7				
538	502	25.3				

Depth, m	ABH26		ABH27		ABH28	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
540	498	23.2				
542	496	23.7				

Electrical conductivity and Temperature data of Adaa area(1)

Depth, m	ADBH1		ADBH2		ADBH3		ADBH4		ADBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2					337	19.7	391	20.3	508	20.2
4					345	19.5	353	21.2	425	20.2
6					348	20	264	21.4	409	20.4
8					322	18.3	304	19.4	395	21.7
10					352	18.9	300	20.1	409	22.6
12					361	19.2	308	20.4	412	23.2
14					368	21	302	21.3	416	22.2
16					278	24.5	322	20.1	409	23.1
18					464	23.3	326	25.4	405	23.5
20					394	24.9	498	21.2	435	18.2
22					492	30.7	384	20.7	451	18.5
24					864	32	472	21.6	429	18.4
26					394	26.6	460	26.5	443	18.3
28					492	27.3	402	22.6	433	18.1
30					524	32	398	23.2	413	20.1
32					450	32	401	27.2	435	19.1
34					332	26.6	431	27.1	424	17.9
36					345	26.5	426	26.7	421	18.3
38					332	22.5	411	26.6	430	18.5
40					517	21.8	408	24.3	456	18.9
42	480	22.6			452	26.8	379	23.2	418	19.8
44	450	22.5			345	26	365	21.4	390	19.8
46	550	24			524	27.1	376	20.8	416	19.9
48	620	24.8			434	21.3	379	19.7	417	20
50	670	23.4			623	26.4	365	20.8	418	20.1
52	590	21.5	440	23.2	474	30.3	376	20.1	407	20.2
54	690	23.4	443	22.1	534	25.1	384	26.3	411	20.6
56	670	23.7	422	25.2	479	20.3	398	24.7	413	20.4
58	710	22.3	440	24.3	534	28.4	386	24.3	393	21.1
60	690	24.3	445	23.2	799	27	379	23.8	406	21.3
62	680	23.2	446	22.3	534	24.4	394	20.4	405	21.2
64	720	26	447	24.3	449	25.2	358	21.7	393	20.8
66	750	27.5	446	23.4	292	23.9	370	21.2	395	21.4
68	650	27.4	440	22.2	384	21.5	370	23.9	393	20.8
70	630	25.7	448	23.5	440	21.5	377	23.8	406	21.4
72	650	23.6	449	22.4	432	24.8	378	24	396	21.5
74	670	24.7	447	22.2	335	25.1	380	24.1	398	21.3
76	670	25.6	446	23.2	430	23.5	380	23.4	394	21.7
78	690	27.3	449	22.3	432	21.8	377	23.8	390	20.2
80	660	25.7	510	22.3	375	24.3	376	24.1	394	21.7
82	710	27.6	525	22.4	430	22.5	378	24	386	22
84	690	23.7	530	22.5	457	22.8	334	23.9	396	22.8
86	690	25.2	549	22.1	432	23.3	350	23.7	348	23.1

Depth, m	ADBH1		ADBH2		ADBH3		ADBH4		ADBH5	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
88	710	27.3	549	22.2	425	21.8	345	23.9	382	23.1
90	700	25.4	550	22.4	440	24.6	375	23.8	373	23
92	670	27.6	552	23.2	458	22.2	376	23.7	394	23.2
94	760	16.8	555	22.5	432	25.3	370	23.9	408	23.4
96	780	14.8	565	22.4	423	23.8	374	23.9	408	23.1
98	770	15.5	560	22.1	426	24.1	358	23.8	418	23
100	760	18.6	566	23.2	445	21.9	365	24	422	23.2
102	660	24.6	560	22.3	438	21.9	370	23.3	414	22.4
104	667	25.4	570	22.2	432	26.4	362	23.5	408	20.7
106	660	27.1	550	21.4	443	25.1	334	23.4	422	18.2
108	660	25.3	555	22.2	445	24.3	290	22.9	414	18.5
110	730	24.2	550	22	425	24.2	257	22.3	408	17.5
112	710	27.3	555	22.5	433	24.8	258	22	401	16.8
114	780	27.3	557	22.4	437	25.2	264	21.2	398	18.1
116	810	27.1	553	22.1	423	25.7	408	22.3	400	18.3
118	800	27.2	460	23.3	439	26.3	426	21.8	392	18.9
120	600	23.2	480	22.4	438	22.9	400	20.7	391	19.7
122	740	19.4	501	24.2	445	21.8	356	23.4	394	20.4
124	590	23.2	552	23.1	513	24.7	311	22.8	397	21.2
126	600	22.2	548	23.6	509	22.6	300	22.4	407	21.3
128	700	24.5	545	24.1	495	25.3	352	20.8	401	21
130	880	22.5	550	24	529	24	394	21.4	422	20.8
132	810	29.3	552	22.3	498	23.9	304	22.4	408	20.1
134	860	27.6	555	25.5	477	23.8	294	23.6	411	20.3
136	840	26.5	510	24	484	25.4	318	23.9	422	19.7
138	810	23.9	530	24.6	522	25.8	300	22.4	400	19.9
140	870	26.5	548	23	515	25.7	276	23.6	406	18.5
142	920	27.5	560	23.1	492	22.9	304	24.4	413	18.4
144	860	26.9	580	24.6	427	23.1	256	24.7	408	17.2
146	520	23.1	590	25	510	23.8	284	25.3	400	18.2
148	550	23.5	530	24.7	452	21.9	254	22.7	406	18.4
150	560	22.7	540	24.6	458	24.4	247	25.5	394	18.3
152	540	23.5	570	24.3	395	25.2	283	23.4	432	20.7
154	520	21.7	545	24	460	24.9	264	21.7	420	20.9
156	550	23.4	565	25	512	23.2	286	22.6	414	20.3
158	490	27.6	542	24.4	493	23.8	300	22.4	411	21.4
160	500	27.2	570	24.3	445	24.4	289	23.8	400	22.6
162	510	23.4	540	24.2	540	22	276	24.7	398	22.2
164	550	24.3	541	24.2	523	21.8	241	22.7	405	21.1
166	480	24.6	550	25.3	532	24.4	229	22.8	424	24.6
168	470	25.2	514	25.2	499	22	216	24.6	410	25.1
170	470	23.7	555	25.3	532	24.7	241	25.3	406	23.1
172	460	24.8	550	25.2	532	22.8	237	21.6	406	23.1
174	-	-	-	-	499	25.4	261	21.8	409	22.1

Depth, m	ADBH1		ADBH2		ADBH3		ADBH4		ADBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
176	440	25.1	540	25.1	496	21.9	226	26.8	398	21
178	430	24.1	540	25.1	338	23.8	254	21.6	404	22.4
180	430	24.3	545	25.2	347	22	283	21.2	400	19.8
182	420	17.8	540	24.4	480	24.4	214	26.8	408	18.1
184	370	27.8	543	21.3	462	24.8	208	25.2	397	17.9
186	410	27.3	546	22.1	488	22.9	237	25.7	396	18.2
188	360	23.2	538	23.5	512	23.4	224	25.6	414	19.7
190	370	23.4	550	24.4	521	22	216	22.8	416	19.1
192	360	24.3	535	25.3	490	22.8	231	23.1	400	20.4
194	360	21.3	541	25.1	586	23.4	217	23.4	406	21.5
196	350	21.5	542	24.2	620	24.9	226	27.4	409	21
198	380	22.9	546	23.4	431	25.3	211	26.7	411	21.3
200	370	23.2	540	22.1	432	26.7	231	24.2	406	21.4
202	390	20.4	548	25.3	405	26.3	257	23.8	406	22
204	430	23.9	450	24.1	203	30	264	23.6	411	21.4
206	450	22.5	550	25.5	623	26.4	274	23.4	411	20.5
208	430	23.5	555	23.4	588	25.4	294	24.1	400	20.1
210	470	19.5	550	21.1	592	24.8	275	22.7	401	20.1
212	460	21.4	552	25.6	622	26.7	282	22.5	400	20
214	470	22.3	550	25.3	632	24.8	287	22.8	406	20.4
216	450	22.2	555	25.1	612	23.2	276	22.4	398	21
218	400	23.5	550	24	670	27.2	298	21.9	394	21.1
220	360	25.1	553	23.1	662	26.3	291	26.9	393	21.4
222	380	24.2	550	22.1	662	26.9	288	27.1	399	21.7
224	350	23.4	554	22.3	583	25.5	300	26.3	400	22.3
226	370	23.2	555	23.4	672	27.2	309	25.4	406	22.7
228	360	22.3	540	22.5	598	28.1	327	22.6	408	22.4
230	450	22.3	535	23.4	610	26	319	23.5	409	22.3
232	470	22.2	510	24.1	698	25.7	314	22.9	406	22
234	440	21.5	506	22.3	672	28.1	331	24.2	409	22.1
236	460	23.5	440	24.6	698	24.2	309	29.7	406	22.1
238	390	20.9	430	26.1	672	30	325	28.3	412	21.7
240	420	21.2	400	25.3	530	25.7	317	23.4	409	21.1
242	370	23.2	480	25.2	640	27.8	347	25.6	417	21.4
244	350	21.5	500	25.3	628	29.2	341	23.9	411	20.1
246	390	22.4	510	24.2	610	28.3	450	23.7	422	18.9
248	420	22.9	500	22.4	522	26.1	452	23.6	418	17.9
250	380	24.1	408	23.6	532	29.3	348	22.8	424	17.5
252	360	23.5	460	24.5	618	26.1	356	22.3	403	.19.8
254	400	22.4	420	25	585	21.9	352	22.7	417	20.1
256	440	21.9	485	23.4	459	23	340	23.6	410	19.5
258	480	20.3	510	24.1	221	25.7	331	23.4	421	19.9
260	420	21.4	510	23.4	389	24.9	339	23.2	405	19.1
262	440	22.8	500	25	660	21.4	356	23.5	400	18.9

Depth, m	ADBH1		ADBH2		ADBH3		ADBH4		ADBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
264	400	23.4	510	24.2	592	23.7	360	26.4	406	18.4
266	380	23.9	515	26.2	513	22.3	362	27.5	411	18.5
268	390	22.8	480	25	685	19.5	331	27.1	394	18.5
270	410	24	455	25.2	541	20.4	327	27.8	398	18.5
272	370	24.5	455	25	615	19.5	331	25.6	400	19.7
274	430	25.2	430	25.1	634	20.4	340	25.8	406	20.1
276	400	24.9	440	24.3	549	21.5	334	25.4	409	20.3
278	350	22.8	415	22.4	585	22.4	351	25.1	411	21.8
280	380	20.4	430	24.1	625	23.5	376	24.6	407	22.4
282	430	23.3	418	22.6	641	19.6	359	24.4	417	23.8
284	480	21.7	440	24.2	634	20.4	361	24.2	421	24.1
286	450	20.2	455	23.4	630	22.9	384	23.7	404	24.6
288	500	23.4	410	25.1	432	20.8	356	24.4	400	25.3
290	520	24.2	550	22.6	625	20.8	374	25.1	409	22.9
292	430	21.7	515	23.1	625	23.4	363	25.4	411	21.7
294	390	20.2	505	23.1	635	29.1	391	24.5	410	20.9
296	450	22.4	510	23.8	631	23.2	361	23.6	408	20.4
298	500	20.3	490	23.9	638	21.1	370	22.9	410	20.3
300	430	23.6	470	24.3	617	20.9	386	23.6	418	21.1
302	490	21.2	515	24.4	622	23.2	398	24.1	418	21.1
304	410	22.4	510	24.6	628	21.1	398	24.8	402	21
306	380	19.8	605	23.6	625	22.9	408	26.7	395	20.7
308	440	19.1	615	24.4	630	23.2	404	26.5	387	20.9
310	390	20.2	645	25.3	630	23.7	409	21.2	394	21.4
312	370	21.7	595	25.4	629	20.4	417	20.7	402	20.5
314	420	22.4	605	23.1	757	28.2	405	22.3	395	19.9
316	500	19.7	555	22.4	630	25.9	410	23.4	387	19.8
318	520	19.2	600	23.5	580	27.3	417	23	394	21
320	500	20.9	545	25.1	540	24.7	414	23.1	393	20.7
322	480	20.8	590	22.6	590	26.3	415	23.5	396	22.7
324	440	23.1	565	23.1	640	25.9	421	24.3	398	21.9
326	470	22.7	570	25	632	23.8	419	24.8	394	22.1
328	390	23.8	495	24.3	630	24.2	416	24.7	400	22.6
330	360	23.2	483	24.1	625	24.2	394	26.8	394	22.7
332	400	22.1	490	25	595	25.9	386	28.7	396	21.9
334	420	21.4	493	25.1	649	25.4	379	29.2	398	20.5
336	390	20.9	493	25.2	991	26.2	392	28.7	396	20.1
338	450	19.6	499	25	839	23.7	381	25.8	394	21.9
340	470	19.8	515	24.3	625	25.7	372	26.1	380	23.1
342	430	20.2	505	24.5	632	24.3	368	26.5	388	21.7
344	400	20.9	510	23.1	895	25.3	390	23.6	397	21.7
346			512	22.9	711	26.5	394	24.1	392	23
348			505	23.1	736	26.4	380	24.3	395	23.6
350			508	23.6			378	24.6	407	25.1

Depth, m	ADBH1		ADBH2		ADBH3		ADBH4		ADBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
352							390	24.2	402	25.4
354							386	24.7	406	25.4
356							379	25.2	397	26.4
358							384	26.3	394	26.1
360							373	25.2	402	26
362							378	25.1	400	23.3
364							380	24.9	398	23.1
366							371	25	399	23
368							373	25.1	408	22.8
370							389	24.9	401	22.1
372							381	25.2	400	22.5
374							382	25.2	411	22.8
376							373	25.4	418	22.6
378							375	25.6	414	22.1
380							382	25.3	423	20.8
382							380	25.6	410	21.9
384							382	25.2	404	22
386							378	25.4	395	22.1
388							373	25.2	390	22.6
390							375	25.4	404	22
392							376	25	398	19.7
394							376	25.6	401	19.9
396							373	25.3	400	20.1
398							374	25.4	390	20.3
400							378	25.7	385	19.6
402							360	25.1	396	20.1
404							364	25.4	398	20.7
406							362	25.1	390	21.8
408							370	25.3	401	21.9
410							332	25.5	403	21.5
412							314	25.4	409	21.9
414							310	25.3	411	23.6
416									467	21.5
418									460	21.9
420									472	23.6

Electrical conductivity and Temperature data of Adaa area (2)

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	758	17.1	422	19.7	250	16.5	526	22.8		
4	789	17.3	426	19.3	252	16.1	514	23.4		
6	814	16.9	329	19.8	258	16.7	521	23.6		
8	743	24.3	451	20.3	253	16.3	527	24		

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
10	712	17.6	439	20.3	259	16.6	446	23.1		
12	698	18.1	541	25.3	260	18	414	23.4		
14	718	23.8	456	22.4	268	18.8	421	23.1		
16	697	20.1	532	20.2	272	18.5	498	22.8		
18	668	17.9	541	21.7	270	18.6	506	23.1		
20	647	18.3	527	23.4	266	18.9	416	23.2		
22	651	24.5	539	23.7	271	19.3	494	23.8		
24	634	23.8	458	24.2	273	19.5	492	24		
26	681	18.7	479	23.8	271	19.1	496	23.8		
28	634	24.5	471	21.4	278	19.5	458	24		
30	653	23.8	464	25.5	280	19.1	496	24.1	672	23.2
32	621	18.7	351	27.4	281	19.8	484	24.3	676	20.3
34	623	19	438	22.6	283	19.1	491	25.1	674	21.8
36	617	19.1	471	23.4	281	19.9	511	25	721	27.8
38	608	25.7	494	22.7	283	19	524	25.8	663	27.4
40	598	20.2	529	23.5	281	19.6	538	25.3	665	27.4
42	593	20	639	25.8	289	19.2	528	26.1	662	26.9
44	568	20.1	646	24.4	281	19.8	429	25.4	673	26.7
46	583	20.3	449	24.3	288	19.6	458	26	668	22.2
48	556	21.1	657	22.5	290	20.6	486	26.4	659	22.7
50	596	19.6	661	20.7	295	20.5	498	25.8	667	20.8
52	610	20.2	681	21.4	300	20.1	505	25.5	674	20.2
54	567	19.8	493	21.6	305	20.8	459	26.2	658	20.7
56	543	20.7	607	20.8	327	22.7	427	26.8	660	22.8
58	527	20.4	614	21.2	312	21.4	406	27.1	661	23.5
60	556	21.3	598	21.4	311	22.1	405	27.3	736	23.5
62	596	21.4	576	24.6	315	24.2	376	26.2	715	26.8
64	610	21.2	578	26.1	376	25.8	384	26	756	23.1
66	567	21.8	628	21.3	440	23.2	368	25.7	694	24.3
68	543	22.1	607	20.4	436	22.8	376	25.2	692	26.8
70	559	22.5	612	20.6	390	22.2	384	25.4	691	23.4
72	546	25.9	615	21.4	355	23.1	439	24.6	707	24.1
74	746	25.7	589	23	370	23.1	408	22.4	722	29.2
76	563	24.3	598	22.9	416	23.6	423	22.8	691	23.5
78	585	23.5	623	21.4	426	23.9	419	23.2	695	21.1
80	576	25.4	631	20.7	320	23.1	428	23.8	688	28.1
82	553	24.8	642	20.8	450	23.9	431	23.4	715	22.3
84	537	25.3	588	26.4	424	22.5	378	23.2	663	27.1
86	564	21.4	600	26.2	432	23.5	398	23	708	20.8
88	601	21.7	574	25.3	485	23.5	396	23	748	28.1
90	597	21.5	583	24.8	497	23.9	411	24.2	735	23.5
92	603	20.5	617	24.6	496	25.5	402	23.1	707	25.5
94	578	21.3	624	23.8	504	25.2	406	23.4	665	24.3
96	584	22.1	641	21.4	508	24.8	408	23.9	657	28.3

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
98	563	25.8	653	21.2	516	25.5	480	22.8	668	22.5
100	586	25.4	647	22.4	560	28.8	355	22.8	666	28
102	593	22.5	615	26.5	520	24.6	340	21.4	736	23.8
104	610	22.7	697	26.7	535	25.3	360	21.8	658	24.5
106	606	22.8	605	27.1	562	26.1	265	20.7	646	21.7
108	627	23.1	477	26.9	566	26.5	274	22.1	735	28
110	643	23.3	666	27.2	563	23.9	286	23.4	697	23.8
112	638	23.4	672	27.3	559	23.7	306	23.6	695	24.5
114	591	23.7	657	26.9	559	23.4	318	23.1	696	21.7
116	658	22.5	670	27.3	569	23.6	334	23.4	736	28
118	639	25.8	658	26.9	590	24.6	268	24.6	669	24.2
120	652	25.3	649	27.2	605	25.2	319	27.4	689	21.9
122	659	25.1	671	27.1	638	26.5	398	26.4	688	21.7
124	631	23	665	27.4	638	26.8	426	26.7	740	27.8
126	609	22.7			622	26.3	433	27	678	27.4
128	587	22.8	487	23.8	646	26.9	519	27.8	676	28.1
130	594	22.6	442	21.4	623	25.3	516	28.2	710	28
132	610	22.5	576	25.3	612	24.8	512	26.7	654	28.5
134	693	22.9	582	24.7	590	24.5	538	25.6	674	24.2
136	691	23	541	23.4	559	24.4	530	25.6	736	22.3
138	676	24.7	576	23.8	605	25.4	547	25.3	668	25.3
140	683	24.2	589	24.4	635	25.4	539	26.4	629	24.2
142	692	25.1	563	24.2	586	24.4	458	24.2	621	22.3
144	654	24.3	596	21.8	568	25.4	494	28.3	629	28.1
146	623	23.1	563	20.9	610	25.4	486	27.4	613	26.5
148	613	23.5	584	21.7	625	27.9	513	27.6	628	27.1
150	586	23.4	543	21.8	607	24	506	27.2	638	20.5
152	574	23.7	554	20.9	617	24.3	514	24.3	628	20.4
154	556	23.8	579	21.7	608	26.8	549	24.2	635	27.2
156	547	22.4	587	23.4	584	26.9	550	24.8	626	25.7
158	574	23.5	622	21.2	575	24.6	569	25.1	658	21.8
160	563	23.1	596	22.3	598	25.4	576	24.8	620	25
162	646	22.3	611	22.1	480	27.8	586	25.2	615	21
164	642	22.2	596	21.3	614	25.7	583	24.6	631	20.5
166	645	22.2	601	20.5	630	26.2	582	24.3	641	23.5
168	645	22.3	588	23.9	621	25.5	586	24.4	635	23.5
170	646	22.1	642	24.3	604	24.8	582	24.6	651	28
172	694	23	614	26.4	619	24.3	416	26.3	658	23.5
174	649	23.2	698	27.3	595	24.2	452	26.7	635	27.5
176	650	23.6	678	26.1	565	24.8	506	27.1	626	22.8
178	649	23.5	655	25.2	597	25.1	578	26.4	649	23.7
180	527	23.6	641	24.3	586	25.4	591	25.8	648	21.8
182	650	23.5	674	22.4	592	25.8	598	25.8	654	22.5
184	653	22.9	624	22.6	601	25.5	587	25.7	664	24.8

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
186	650	22.7	562	21.3	632	26.2	576	23.6	652	27.7
188	651	22.2	579	22.3	609	25.6	557	24.9	647	28.9
190	646	22.3			619	25.9	591	24.1	639	25.7
192	652	22.4			612	25.3	586	25.6	650	21.2
194	650	22.3			642	24.8	594	25.2	646	24.5
196	644	22.3			608	24.5	597	25.1	651	23.7
198	651	22.2			622	24.1	598	25.1	660	20.4
200	655	22.3			610	24.4	598	25.1	643	25.9
202	643	22.4			616	24	596	25.4	650	23.2
204	644	22.3			600	23.8	631	24.2	665	28
206	650	22.2			607	23.5	613	24.9	648	28.1
208	644	22.2			618	23.2	607	24.1	659	29.1
210	650	22.3			611	25.2	612	23.6	664	29.8
212	644	22.7			602	25.7	604	22.9	641	30
214	641	22.6			622	24.8	626	23.8	655	29.6
216	660	22.8			616	24.5	608	23.6	668	23.9
218	658	22			632	24.1	596	23.8	686	22.1
220	651	22.1			617	24.3	571	23.9	663	22.1
222	649	22.3			581	24.1	568	23.4	689	22.6
224	651	22.2			595	24.3	598	23.5	676	28.2
226	655	22.4			581	24.1	594	23.7	669	28
228	654	22.3			595	23.7	587	24.1	676	26.8
230	660	22.3			606	23.9	578	24.2	669	24.2
232	649	22.2			593	24.1	572	24	665	27.5
234	651	22.5			582	24.3	568	23.2	681	26.7
236	654	22.2			602	24.2	571	23.2	689	25.8
238	646	22.3			619	24.6	591	23.9	686	26.2
240	650	22.3			634	26.9	584	23.3	684	26.3
242	652	22.3			623	25.8	576	23.8	687	26
244	656	22.3			611	25.4	590	23.4	692	24.2
246	651	22.4			644	24.5	582	23.9	690	23
248	644	23			621	24.2	598	24.2	696	22.3
250	650	23.1			611	24.8	583	24.7	692	22.6
252	645	23.2			634	26.8	581	24.8	690	20.8
254	650	23.4			613	26.1	574	25.2	696	27.4
256	645	23.2			602	25.3	486	24.6	668	27.8
258	651	23.4			590	25.6	474	24.2	694	30
260	610	23.3			611	24.8	468	24.3	691	30.9
262	613	23.5			602	24.3	464	26.4	673	28.2
264	590	23.5			612	25.3	472	24.6	703	30.9
266	565	23.4			594	25.8	623	25.3	694	30
268	540	23.5			615	26.2	638	26.2	685	27.4
270	532	23.4			601	27.2	664	25.1	676	30.2
272	649	23.4			591	27.3	673	25.4	702	29.5

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
274	668	23.7			528	27.7	594	25.8	699	24.6
276	664	23.8			556	26.8	592	25.8	672	24.6
278	666	23.7			582	25.6	573	25.6	645	25.8
280	665	24			601	25.2	584	25.7	630	23.9
282	662	24.1			578	24.6	596	24.8	647	25
284	665	23.9			585	24.4	591	24.2	642	24
286	664	23.9			590	24.9	594	20.8	640	25.4
288	660	24.1			598	24.6	625	24.3	647	23.2
290	664	24			594	27.1	594	24.7	650	22.4
292	645	24.1			588	27.6	585	24.5	633	26.3
294	659	24.3			572	25.6	590	23.8	645	22.4
296	648	24.5			592	25.5	611	25.8	618	26.9
298	656	24.4			586	25.2	486	25.1	586	23
300	660	24.4			590	24..9	431	25.3	613	27.3
302	658	24.7			580	25.1	426	24	613	27.3
304	656	24.5			599	26.3	470	24.5	630	25.2
306	674	24.3			583	26.7	384	24.7	733	25.4
308	674	24.2			595	26.4	389	24.3	750	28.3
310	660	24.4			601	26.1	367	24.8	642	23.4
312	656	23.9			610	25.2	394	25.3	743	28.6
314	652	24.1			586	25.4	406	25.2	760	24.5
316	661	24.3			598	25.7	467	24.1	747	23
318	653	23.9			611	25.7	431	24.3	581	28.3
320	663	24			592	26	454	24.9	759	28.3
322	666	23.9			599	26.5	432	27.3	765	29.2
324	656	24.1			607	26.1	422	27.1	757	30.1
326	667	24.5			612	25.8	418	26.5	708	24.8
328	661	25.9			601	25.7	410	25.1	756	21.7
330	660	25.7			595	25.3	430	25.6	725	30.2
332	656	25.2			580	25.7	417	24.3	750	27.1
334	672	24.9			592	26.1	397	25.4	723	24.7
336	668	24.7			588	25.9	413	24.3	732	25.2
338	676	25			592	25.7	406	25.1	752	25.3
340	670	24.8			601	26.1	418	27.1	745	27.5
342	668	24.9			611	25.8	405	27.4	740	24.7
344	676	25			603	26.3	423	25.2	751	23.9
346	672	24.7			595	26.7	432	25.4	630	30.2
348	670	24.6			588	26.9	428	24.3	672	23.9
350	677	24.7			600	27.3	454	23.6	735	24.1
352	676	24.6			611	27.1	456	23.6	727	25.7
354	677	24.7			579	26.8	448	23.8	734	28.3
356	673	24.6			595	26.7	461	24.1	732	24.1
358	677	24.5			601	26.4	456	24.4	732	25.2
360	678	24.7			618	25.7	426	25.5	730	22.4

Depth, m	ADBH6		ADBH7		ADBH8		ADBH9		ADBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
362	669	24.9			620	26.7	428	24.9	733	24.1
364	671	25			633	27.6	424	25.1	743	20.2
366	668	24.9					423	26.8	755	22.2
368	672	24.8					411	26.4	735	21.5
370	659	25.1					406	27.9	741	23.5
372	670	25.5					398	25.7	735	22.8
374	668	25.9					407	25.3	732	25.5
376	679	25.8					405	25.1	725	27.7
378	677	26					417	25.2	712	21.1
380	675	25.9					411	25.4	690	29.5
382	679	25					422	24.6	687	21.2
384	680	24.9					403	25.4	646	24.5
386	692	25					401	25.8		
388	699	24.9					394	26.1		
390	710	25.1					396	25.7		
392	721	25.2					398	25.3		
394	726	25					400	25.1		
396	732	25.3					406	25.2		
398	741	25.2					339	24		
400	744	25.1					342	24.8		
402	742	25.3					364	25.9		
404	748	24.9					362	26.2		
406	750	24.9					407	28.2		
408	758	25.1					417	27.2		
410	756	25.3					405	26.1		
412	749	25.5					401	25.3		
414	760	25.4					408	25.7		
416							423	25.4		
418							343	24.9		
420							360	25.2		
422							368	25.2		

Electrical conductivity and Temperature data of Allaidege area

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	1623	27.1	1841	30.1			1860	30.41	1680	37.5
4	1616	26.9	1843	31			1830	31.3	1713	37.7
6	1596	26.7	1827	31.4	1730	29	1870	31.7	1732	38.1
8	597	28.1	1832	30.7	1720	28	1913	32.3	1773	37.6
10	1593	28.3	1829	30.5	1718	28.1	1876	33	1740	37.4
12	1583	28.5	1817	29.8	1720	28.1	1883	32.1	1678	37.5
14	1588	28.3	1796	29.1	1345	25.1	1861	31.8	1688	37.4
16	1577	28.3	1831	29.4	1334	25	1872	31.5	1695	39.2
18	1567	28.7	1791	32.7	1347	25.3	1869	31.7	1714	39
20	1553	29.3	1763	32.7	1346	26.6	1871	30.8	1735	38.9
22	1544	28.8	1756	33.1	1576	31.2	1861	31.6	1740	39.1
24	1541	29.3	1717	31.1	1579	30.1	1857	30.8	1784	38.8
26	1531	29.3	1684	29.2	1157	24.8	1883	31.3	1659	36.4
28	1539	28.7	1661	28.7	1156	24.8	1864	32.5	1670	38.2
30	1533	28.3	1642	28.4	1152	23.6	1870	31.7	1543	38.4
32	1523	28.3	1651	30.1	1156	24.6	1865	31.6	1619	36.5
34	1517	28.4	1521	29.5	1159	24.9	1872	32.1	1549	37.8
36	1508	28.5	1492	29.7	1157	24.3	1876	31.6	1638	37.9
38	1511	28.5	1481	29.3	1152	22.62	1863	31.3	1642	38.3
40	1507	28.9	1432	28.1	1156	23.7	1864	30.8	1538	38.6
42	1505	28.3	1391	28.4	1130	21.3	1897	30.4	1570	38.9
44	1497	28.3	1386	29.1	1129	24	1845	33.1	1671	38.5
46	1491	28.2	1379	28.7	1131	23.5	1842	33.5	1510	38.7
48	1487	29.3	1376	28.4	1130	23.8	1841	33.4	1534	38.5
50	1490	29.3	1294	29.1	1212	22.5	1837	32.5	1485	38.1
52	1492	29.3	1241	29.2	852	22.8	1796	31.6	1433	38.2
54	1492	28.8	1230	28.9	880	22.8	1794	30.4	1540	38
56	1492	29.1	1227	29.1	847	23.3	1783	31.3	1478	38.3
58	1460	28.3	1225	28.8	846	24.9	1641	32.5	1496	38.2
60	1473	28.6	1219	28.7	865	23.4	1637	31.2	1448	38.4
62	1540	28.3	1223	29.1	855	23.3	1596	32	1540	38.5
64	1520	28.2	1221	29.4	859	23.43	1573	32.3	1457	38.6
66	1531	28	1224	28.7	860	23.5	1574	31.2	1473	38.6
68	1536	27.8	1218	28.4	849	23.7	1563	31	1413	38.2
70	1465	27.2	1221	29.3	847	23.5	1450	31.5	1439	38.4
72	1470	26.8	1230	29.7	843	23.8	1435	31.7	1473	38.2
74	1450	26.5	1226	29.4	841	23.7	1413	32	1425	38.3
76	1320	26.5	1219	28.7	843	23.6	1410	31.5	1437	38.4
78	1380	25.8	1192	29.7	831	29.4	1400	31.2	1416	38.9
80	1390	25.7	1178	30.1	837	28.1	1412	30.8	1440	39
82	1245	25.3	1190	30.4	831	24.3	1410	31.3	1421	38.9
84	1240	24	1126	30.5	825	23.9	1391	32.1	1410	39.1
86	1276	24.6	1097	29.7			1393	31.9	1434	39.3

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
88	1260	23.8	1094	29.5	808	23.7	1382	31.7	1428	39.2
90	1260	23.5	1076	29.4	813	23.3	1385	31.2	1441	39.3
92	1263	24	1078	28.7	825	24	1381	32	1452	38.9
94	1230	24.2	1071	29.1	825	30.1	1378	31.3	1421	38.7
96	1176	24.4	1064	28.9	828	29.9	1296	30.4	1435	38.5
98	1170	29.6	1059	28.7	828	28	1273	30.9	1378	38.4
100	1150	30.1	1043	29.1	826	31.9	1192	31.6	1398	38.5
102	1105	30.4	1037	29.3	825	31.7	1173	31.4	1375	38.8
104	1110	32	1034	30.4	822	30.9	1184	32.1	1437	38.9
106	1076	29.1	1029	31.6	828	27.8	1163	32.4	1406	38
108	992	33.8	1031	30.9	822	25.9	1142	30.1	1423	39.2
110	1030	30.1	1027	30.7	821	28.6	1121	31.3	1401	39.1
112	990	27.5	1034	30.4	749	25.1	1094	31.4	1432	39.3
114	988	33.5	1053	30.3	749	25.1	1083	31.7	1453	39.4
116	970	30.1	1061	30.1	743	25.1	1074	31.5	1410	39.4
118	985	31.8	1074	30.7			1073	30.4	1443	39.3
120	990	29.4	1078	30.4	751	26.9	1069	30.1	1431	39.1
122	1063	29.2	1069	29.7	751	28.8	1072	30.8	1450	38.7
124	1081	29	1072	29.3	751	27.8	1075	30.7	1471	38.8
126	1090	29.1	1074	30.1	752	28	1067	30.5	1410	39
128	1092	30.1	1077	30.4	771	27.5	1065	31.3	1378	39.1
130	1060	31.6	1071	31.1	1156	23.7	1083	32.1	1394	39.2
132	1058	31.2	1068	31.7			1108	31.4	1469	39.5
134	1049	30.5	1066	31.4	1129	24	1110	32.7	1411	39.4
136	1031	29.3	1064	31.3	1131	23.5	1107	33.1	1450	39.3
138	943	30.9	1058	30.7	1130	23.8	1103	32.5	1378	39.4
140	1408	31.3	1067	30.5	1212	22.5	1078	32.7	1359	39.5
142	1396	29.4	1071	30.1	852	22.8	1094	33	1388	39.3
144			1057	30.8	880	22.8	1087	33.2	1415	39.4
146	1322	33.1	1048	31.4	847	23.3	1107	32.7	1347	39.6
148	1341	33	1037	31.7	846	24.9	1103	32.1	1421	39.5
150	1350	31.4	1034	31.8	865	23.4	1084	31.7	1371	39.6
152	1334	30.6	1031	31.6	855	23.3	1105	31.2	1354	39.7
154	1322	29.5	1028	32	859	23.43	1109	31.5	1398	39.5
156	1325	29.8	1026	31.8	860	23.5	1110	32.3	1439	39.4
158	1275	30	1021	32	849	23.7	1114	31.1	1336	39.3
160	1252	31.8	1029	32.4	847	23.5	1106	30.8	1385	39.5
162	1222	31.2	1032	32.1	843	23.8	1117	31.2	1411	39.4
164	1201	28.4	1034	31.8	841	23.7	1112	31.4	1376	42.1
166	1162	28.9	1028	31.7	843	23.6	1113	30.9	1418	44.2
168	1197	29.9	1031	32.1	831	29.4	1108	31.6	1457	44
170	1205	29.9	1028	32.3	837	28.1	1109	31.3	1470	43.7
172	1129	30.8	1031	31.8	831	24.3	1114	30.7	1491	44.1
174	1098	32.1	1027	31.6	825	23.9	1116	31.2	1449	43.8

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
176	1120	33.6	1027	31.7	820	24.1	1114	30.6	1479	43.7
178	1112	34.2	1031	32	808	23.7	1117	31.5	1523	44
180	1085	32.1	1026	31.6	813	23.3	1109	31.7	1432	42.1
182	1098	31.5	1027	31.4	825	24	1116	31.4	1456	42.7
184	1072	33.1	1024	31.8	825	30.1	1115	32.1	1479	43.2
186	1050	32.4	1021	32.2	828	29.9	1108	31.6	1514	43.5
188	1162	32.1	1019	33.1	828	28	1117	31.4	1497	43.7
190	1360	31.5	1022	33.2	826	31.9	1113	31.2	1435	43.5
192	1440	31	1017	33.4	825	31.7	1109	31	1421	43.6
194	1432	30.1	1012	33.1	822	30.9	1114	30.9	1456	43.8
196	1428	29.5	1010	33.5	828	27.8	1118	31.3	1468	43.7
198	1420	29.3	1008	33.2	822	25.9	1120	30.7	1425	43.9
200	1432	35.4	1012	33.7	821	28.6	1117	31.6	1385	42.2
202	1419	29	1016	33.4	749	25.1	1104	32.1	1410	42
204	1468	29.1	1007	33.8	749	25.1	1103	31.4	1435	42.1
206	1444	29	1004	33.1	743	25.1	1078	31.7	1398	42.5
208	1410	29.5	1016	33.4	751	27	1091	32.3	1406	42.7
210	1419	30.6	1007	32.9	751	26.9	1076	31.4	1423	42.6
212	1468	31.2	1004	33.2	751	28.8	1081	30.7	1386	42.5
214	1444	30.8	1010	33.7	751	27.8	1073	31.1	1375	42.2
216	1410	30.9	1013	34	752	28	1069	32	1407	42.1
218	1390	30.2	1009	33.8	771	27.5	1078	31.4	1423	41.9
220	1365	30.2	1014	33.2	801	28.7	1103	30.7	1366	42.2
222	1345	29.1	1017	32.8	796	28.2	1108	31.4	1387	41.8
224	1390	28.6	1012	32.4	793	28.8	1084	31.1	1390	41.9
226	1420	27.8	1006	32.6	798	29	1086	30.9	1452	41.7
228	1405	27.8	1004	33.1	732	28.6	1102	31.6	1378	42
230	1397	27.8	1002	34.5	734	29.7	1105	30.7	1389	42.3
232	1392	27.9	1000	34.7			1078	31.4	1421	42.1
234	1388	28.5	1004	34.1	756	30.6	1074	31.1	1432	41.8
236	1380	28.5	1006	33.8	785	31.8	1082	30.8	1409	41.6
238	1366	28.8	1010	33.6	793	28.1	1063	31.2	1385	41.9
240	1359	29.1	1008	33.9	796	29.2	1058	31.4	1397	41.7
242	1357	29.1	1006	33.7	802	32.2	1060	31.2	1377	41.8
244	1325	29.4	1012	33.4	886	31.9	1057	32	1385	42
246	1390	29.1	1004	33.8	879	31.2	1054	32.1	1411	42.2
248	1306	31.4	1010	34.1	809	32	1061	32.5	1406	41.9
250	1254	31.1	1009	34.1	812	30.9	1058	31.2	1380	41.7
252	1238	31.9	1006	34.4	892	29.8	1054	32	1376	41.5
254	1276	31.2	1004	34.6	799	29.8	1072	31.7	1412	41.2
256	1257	33.2	1001	34.7	794	29.6	1063	31.6	1426	41.3
258	1301	28.2	1000	34.9	794	29	1061	31.2	1383	41.1
260	1291	28.1	990	34.7	798	27	1057	31.4	1397	40.9
262	1297	27.8	994	33.9	789	29.6	1051	32.3	1380	41.1

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
264	1289	27.6	996	34.1			1049	31.4	1370	40.8
266	1293	27.4	1000	34.3	798	31.8	1053	32	1368	40.2
268	1306	27	1004	34.7	896	31.2	1064	31.1	1456	40.8
270	1310	27.1	1006	34.6	892	30.9	1071	31.8	1372	43.2
272	1310	26.8	1009	34.8	886	29.8	1068	32.1	1386	43.1
274	1320	26.6	1002	34.2	872	28.9	1063	31.4	1378	43.2
276	1331	26.6	996	34.9	899	32.3	1074	30.9	1377	43.6
278	1350	26.7	998	35.1			1103	30.7	1366	43.8
280	1361	26.4	996	35	868	29.8	1106	31	1384	43.4
282	1358	26.6	1002	34.8	1330	28.9	1124	30.7	1440	42.8
284	1372	26.6	1004	34.7	1328	29.3	1127	30.4	1428	42.6
286	1372	26.4	996	34.4	1323	29.3	1130	31.6	1397	42.9
288	1351	26.5	994	34.6	1384	30.1	1129	31.4	1386	43.1
290	1370	25.8	991	34.7	1381	30.3	1141	32.1	1412	43.3
292	1395	28.1	993	34.2	1378	30.5	1152	32.7	1375	43.2
294	1130	28.3	990	34.7	1374	30.6	1151	31.9	1366	43.4
296	1139	29	994	34.8	1347	30.9	1162	32.6	1415	43.1
298	1130	31	987	34.7	1368	30.9	1174	32.4	1387	43.3
300	1132	31.9	993	35	1554	28.8	1171	32.7	1364	43
302	1158	32	996	34.9	1552	30	1175	33	1388	42.5
304	1179	31	984	35.1	1538	30.4	1169	32.1	1359	42.8
306	1168	31.9	986	35.4	1499	31.9	1173	32.8	1379	42.9
308	1160	31.8	987	35.2	1422	31.4	1177	31.7	1360	42.7
310	1130	31.5	982	34.7	1504	31.2	1167	32.4	1376	42.8
312	1125	30.6	984	34.9	1506	31.3	1171	32.6	1418	41.2
314	1120	30.3	990	35.1	1500	31.4	1176	31.7	1435	40.4
316	1118	31.5	996	35.4	1810	26.3	1180	31.4	1478	38
318	1105	31.8	994	35.2	1743	29.3	1184	31.8	1417	37.7
320	1163	30.4	998	35	1740	31.9	1181	32.1	1432	38.5
322	1097	35.2	996	35.2	1718	31.8	1179	31.2	1408	38.9
324	1090	33.2	990	34.9	1700	33.3	1183	32	1396	38.8
326	1088	32.8	994	35.1	1695	33.5	1180	32.1	1378	39.4
328	1095	31	991	35.3	1692	33.2	1185	32.4	1285	38.7
330	1090	30	990	35.2	1690	33.9	1179	32	1351	38.3
332	1088	31.1	993	35	1685	34.5	1183	32.6	1364	38.5
334	1065	31	987	35.1	1666	34.5	1204	32.9	1379	38.7
336	1058	32	992	35.4	1698	34.5	1186	31.6	1347	39
338	1065	32.4	989	35.2	1701	34.4	1184	31.3	1358	38.7
340	1058	33.3	994	34.9	1684	34.4	1179	32.1	1341	38.4
342	1063	32.9	991	35.4	1683	34.4	1167	32.4	1356	38.6
344	1055	30.5	989	35.2	1681	34.5	1171	32.7	1335	38.5
346	1042	30.9	987	35.1	1678	34.5	1168	31.6	1347	38.3
348	980	31.3	985	35	1675	34.3	1163	30.9	1329	38.6
350	998	31.8	988	35.1	1677	34.6	1171	31.4	1358	38.9

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
352	1000	32	985	35.3	1661	34.8	1164	31.7	1342	38.7
354	1010	32.1	989	35.4	1675	34.7	1176	32.8	1363	38.8
356	1624	32.6	987	35.1	1677	34.6	1184	33.1	1338	38
358	1576	34.5	986	35	1178	34.9	1186	33.4	1344	37.5
360	1480	32.4	990	35.4	1648	35.5	1204	31.7	1341	37.3
362	1520	31.2	994	34.9	1648	35	1207	32.1	1359	37.2
364	1610	34.6	989	35.1	1649	34.8	1210	32.4	1337	37.6
366	1605	33.2	993	34.8	1404	34.8	1213	31.7	1348	38
368	1618	32.8	987	35.1	1672	34.3	1214	32.1	1356	38.7
370	1615	32.3	984	35.4	1673	34.3	1217	32.7	1335	38.5
372	1620	31.3	981	35.3	1678	34.5	1214	31.6	1351	38.7
374	1542	34.2	983	35	1659	34.6	1218	31.8	1342	38.8
376	1580	34.6	987	34.8	1670	34.8	1220	32.7	1328	39
378	1518	34.1	980	35.1			1224	33.1	1346	39.8
380	1530	33.8	981	34.6	1668	35.8	1221	33.4	1334	41
382	1498	32.5	978	34.4	1662	34.9	1218	32.7	1355	42.3
384	1478	36.6	983	34.8	1680	33.6	1216	33.1	1369	43.7
386	1416	32.1	984	35.1	1622	33.5	1214	33.4	1347	43.5
388	1458	31.9	979	35.4	1666	29.8	1221	33.7	1321	43.2
390	1483	32	980	35.2	1615	31.2	1224	33.4	1335	43.4
392	1450	31.2	882	35	1562	31.8	1218	33.1	1340	43
394	1452	32.8	881	35.3	1535	33.9	1220	32.8	1327	43.1
396	1447	35.8	819	35.1	1482	32.9	1216	32.7	1339	43.3
398	1456	35.1	772	36.9	1483	33.7	1219	32.3	1352	43.7
400	1438	32.9	770	37.4	1442	32.3	1215	32.7	1248	45.6
402	1428	32.4	772	37.6	1667	33.7			1279	46.4
404	1487	33.1	770	37.9	1500	33.7			1215	47.5
406	1514	32.6	768	38.1	1396	33.6			1235	47.2
408	1427	32.7	766	38	1701	34.4			1226	47.7
410	1382	32.9	763	37.8					1273	48.1
412	1452	32.8	771	38	1683	34.4			1289	48.3
414	14 35	32.1	768	37.9	1681	34.5			1310	48.4
416	1387	31.7	763	37.6	1678	34.5			1276	48.1
418	1362	35.5	774	38.1	1675	34.3			1297	48.5
420	1365	35.3	768	37.8	1677	34.6			1281	48.6
422	1370	33.2	771	37.4	1661	34.8			1284	48.5
424	1320	32	766	38.2					1291	48.6
426	1308	31.8	764	38	1677	34.6			1273	48.5
428	1343	34.7	765	37.8	1178	34.9			1254	48.4
430	1267	33.7	760	38.1	1648	35.5			1247	48.7
432	1285	34.7	758	38.3					1265	48.6
434	1280	33.8	756	38					1287	48.5
436	1306	32.8	752	38.4					1276	48
438	1286	32.1	741	38.6					1259	47.4

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
440	1328	32	756	39.1					1268	47.2
442	1350	31.5	758	38.9					1281	46.9
444	1336	32.8	770	39.3					1259	46.5
446	1301	32.1	768	38.4					1247	46.3
448	1336	32	771	38.2					1238	46.1
450	1301	31.5	772	38.1					1256	45.9
452	1270	30.2	774	37.6					1225	46.2
454	1289	32.8	776	37.4					1240	45.5
456	1272	32.6	782	37					1267	45.3
458	1271	33	781	37.1					1249	44.8
460	1278	32.8	782	38					1253	45.2
462	1286	33.1	789	37.8					1266	45.4
464	1281	33.6	801	38.4					1278	46
466	1293	35.4	817	38.6					1241	45.9
468	1262	34.9	832	39.3					1233	46.2
470	1260	34.1	851	39.6					1248	45.9
472	1277	33.6	845	38.9					1154	48.6
474	1285	32.3	824	39.2					1168	48.4
476	1281	33.2	813	39.4					1175	48.2
478	1316	35.8	796	38.8					1214	48
480	1320	36.8	784	39.3					1183	48.5
482	1326	34.3	792	39.7					1206	48.4
484	1316	31.5	786	39.1					1213	48.3
486	1362	34.8	784	39.4					1179	48.5
488	1347	34.6	763	38.8					1154	48.8
490	1309	33.7	760	39.2					1138	48.9
492	1301	35.8	759	39.7					1147	48.7
494	1328	35.4	754	38.8					1136	48.8
496	1297	35.8	752	39.3					1180	48.9
498	1279	36.2	760	39.5					1165	48.4
500	1030		745	39.6					1131	48.1
502	1070								1121	48.4
504	1172								1084	48.9
506	1135									
508	1140									
510	1136									
512	1130									
514	1134									
516	1115									
518	1131									
520	1114									
522	1115									
524	1115									
526	1098									

Depth, m	ALBH1		ALBH2		ALBH3		ALBH4		ALBH5	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
528	1088									
530	1086									
532	1088									
534	1081									
536	1125									
538	1018									
540	1011									
542										
544										
546										
548										
550										
552										
554	1030	35								
556	1070	34.6								
558	1172	35.2								
560	1135	33.7								
562	1140	33.9								
564	1136	33.7								
566	1130	33.4								
568	1134	33.2								
570	1115	34.1								
572	1131	35.2								
574	1114	34.3								
576	1115	36.6								
578	1115	37.6								
580	1098	37.4								
582	1088	37.7								
584	1086	37.4								
586	1088	37.7								
588	1081	37.4								
590	1125	37.7								
592	1018	35.1								
594	1011	37.6								

Electrical conductivity and Temperature data of Allaidege area (2)

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2		28.4	1983	35.3		29.7		29.8	1103	32
4		28.4	1966	35.7		28.5		29.9	1115	33.2
6		29	1971	36.6		29.6		27.8	1124	30.2
8		30.33	1920	36.5		29.7		28	1122	32
10		32.5	1901	36.4		29.7		29.7	1129	33.3

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
12		33.7	1893	36.5		29.7		29	1125	32.5
14		32.6	1920	36.6	1315	32.5		30.6	1123	30.6
16		30.7	1918	36.7	1866	29.8		30.7	1124	31.1
18		31.8	1887	36.5	1866	32.6		32.8	1129	32.5
20		31.6	1893	36.3	1600	29.7		32.5	1150	30.5
22	1158	36.2	1876	36.5	1147	30		32	1128	31.1
24	1167	36.7	1899	35.6	1150	31.8		31.8	1104	32.7
26	1680	35.5	1909	35.8	1139	31.5		31.9	1104	33
28	1870	36.2	1923	36.7	1025	31.5		31.9	1103	32.1
30	1885	36.5	1904	37.1	1035	31.5		32	1106	31
32	1810	32.7	1863	37.3	1054	31.8		32.1	1109	31
34	1876	32.2	1862	37.3	1488	31.9		32.1	1105	31.3
36	1122	32.7	1862	35.5	1267	31.7		32.2	1104	31.1
38	1479	32.6	1909	35.1	1411	31.6		32	1106	31
40	1875	32	1894	34.9	1011	31.8		32	1112	30
42	1828	32.7	1886	34.1	1359	34.5		32.3	1115	30
44	1887	32.8	1901	33.1	1454	34.4	1999	33	1120	31
46	1809	32.5	1901	32.9	1227	34.6	1566	33.1	1122	31.1
48	1781	32.7	1867	33.1	1139	34.4	1495	35.4	1120	30
50	1922	32.8	1886	33.7	1129	35	1495	35.3	1128	29.8
52	1876	32.8	1885	32.5	1622	35.6	1468	35.6	1114	30.5
54	1646	32.8	1863	32.6	1602	36	1498	35.8	1120	30.5
56	1113	32.8	1870	33.3	1411	36.2	1520	35.2	1106	30.4
58	1564	32.5	1873	33.1	1494	36.3	1510	35.8	1115	30.8
60	1842	31.4	1877	32.7	1477	35.6	1518	35.5	1113	32
62	1836	32.8	1876	32.6	1465	36.6	1506	35.7	1120	32.3
64	1863	33.4	1877	33.7	1444	36.7	1523	35.3	1123	32.5
66	1135	33.5	1867	34	1384	36.8	1556	35	1121	32.3
68	1872	34.7	1864	34.3	1325	36.7	1576	35.9	1124	33.1
70	1772	34.5	1833	34.3	1319	36.5	1516	36.8	1122	33.5
72	1856	34.8	1834	35.5	1409	33.5	1574	36.8	1126	33.3
74	1865	34.3	1855	35.7	1400	34.1	1582	36.7	1123	33.1
76	1829	37.7	1867	34.8	1333	34.6	1593	36.8	1123	33.3
78	1823	38	1855	35.7	1410	33.9	1499	36.8	1124	32.6
80	1810	37.1	1864	36	1411	34.6	1533	36.7	1126	33
82	1801	37.1	1834	36.3	1673	36.6	1546	36.2	1121	33.5
84	1775	38	1876	35.3	1104	37.9	1533	36.9	1120	33.5
86	1830	38.01	1864	35.4	1515	38	1544	37.4	1116	33.1
88	1840	38.5	1878	35.7	1563	38	1537	37.3	1118	32.8
90	1982	38.7	1871	36	1159	38.1	1698	38.6	1120	32.6
92	1764	37.1	1869	35.5	1079	38.2	1644	38.8	1121	32.9
94	1703	37.1	1870	35.3	1085	37.6	1597	39.7	1124	33.5
96	1794	37.3	1865	35.2	1175	37.7	1543	39.8	1109	33.4
98	1644	37.1	1866	35.4	1015	38	1537	38.4	1113	36

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
100	1726	37	1863	34	1095	38.3	1523	38.7	1110	36.1
102	1884	37.5	1860	35.6	1077	38.2	1535	38.5	1108	36
104	1864	37.8	1862	35.7	1054	38.1	1547	38.8	1116	36
106	1735	37	1859	35.8	1090	38.1	1650	38.1	1118	35.9
108	1746	37.4	1859	35.6	1414	38	1678	38.4	1117	35.8
110	1794	36.9	1858	34.5	1440	37.9	1675	38.2	1116	35.4
112	1703	36.7	1860	34.3	1332	36.8	1648	39.5	1118	35.8
114	1893	37.3	1859	33.9	1357	36.5	1637	38.7	1120	35.9
116	1864	37.4	1859	33.7	1360	35.9	1250	38.9	1121	36
118	1754	37.4	1862	33.9	1356	34.9	1342	38.1	1123	36.1
120	1666	37.4	1861	34	1241	35.1	1380	39.1	1124	36.1
122	1543	37.2	1858	32	1235	35.3	1200	39.6	1130	36
124	1835	36.8	1833	32.3	1356	35	1265	39.5	1130	36.2
126	1767	36.5	1844	33.2	1459	35.5	1206	40	1126	36.1
128	1793	36.9	1842	33	1454	35.8	1308	40.1	1113	36.3
130	1874	37.8	1862	32.9	1433	37.7	1414	40.19	1120	36.4
132	1867	37.5	1832	32.8	1308	37.5	1775	41.6	1124	36.6
134	1818	37.6	1833	32.7	1223	37.8	1765	40.8	1127	36.3
136	1813	38.6	1861	32.1	1346	37.4	1644	40.9	1126	36
138	1780	39.05	1835	33	1442	38.9	1738	41.1	1098	35.3
140	1784	39.2	1843	32.9	1556	39.7	1590	41.2	1110	35.5
142	1705	38.9	1840	32.9	1556	39.5	1608	41.1	1113	35.7
144	1894	39.3	1839	32.9	1546	39.6	1623	41.3	1116	35.4
146	1840	39.4	1839	33.1	1444	39.5	1620	41.5	1114	34.9
148	1846	39.6	1835	34.1	1449	39.3	1605	39	1111	34.7
150	1833	39.5	1832	34.2	1344	40.1	1620	39.2	1121	35
152	1864	37.8	1833	34.3	1034	40.2	1465	35.5	1124	36
154	1167	37.6	1832	35.5	1222	40.6	1563	38	1129	36.1
156	1847	37.7	1834	35.6	1036	40.2	1527	35.9	1128	36.2
158	1900	37.5	1832	35.4	1077	40.1	1621	35.7	1126	36
160	1888	37.8	1831	35.3	1337	40.1	1475	36	1124	35.8
162	1883	37.9	1829	34.9	1334	39.9	1456	35.9	1126	32.2
164	1870	37.9	1829	34	1446	40.2	1480	36.2	1123	32.1
166	1861	38	1830	34.1	1449	40.1	1479	36.8	1122	32.3
168	1859	38	1828	34.2	1576	40.1	1457	36.5	1120	32.1
170	1862	38.1	1827	33.9	1382	40.2	1458	36.4	1118	32.3
172	1775	36.9	1826	33.8	1227	39.6	1460	35.7	1120	33.9
174	1769	39.9	1831	33.9	1328	39.6	1412	35.9	1150	35.1
176	1643	40.8	1828	32	1327	35.9	1398	36.7	1123	33.4
178	1580	40.7	1829	32.3	1325	36	1418	36.5	1122	33.7
180	1558	41.8	1827	33	1324	36.1	1416	35.7	1125	33.4
182	1549	42.4	1814	34.5	1326	36.1	1412	35.9	1126	33.8
184	1546	42.5	1818	34.2	1325	36.2	1408	36	1123	33.2
186	1542	42.3	1817	34.2	1327	36.2	1410	36.2	1120	33.4

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
188	1540	42.2	1816	33.2	1804	37	1401	35.9	1121	33.5
190	1538	42.2	1817	33	1741	38.5	1389	36.2	1119	33.3
192	1555	42.7	1815	33.5	1751	38.8	1395	36.2	1134	33.7
194	1578	42.5	1814	32.8	1745	39.1	1340	36	1128	33.8
196	1548	42.6	1808	32.7	1731	39.3	1415	35.5	1121	33.9
198	1523	43.3	1806	32.8	1730	39.3	1455	35.8	1125	33.7
200	1510	43.5	1799	32.8	1730	39.1	1408	36.1	1126	33.5
202	1503	43.7	1804	32.8	1799	39.8	1397	36.1	1128	33.3
204	1500	43.5	1798	32	1788	40	1384	36	1125	33.1
206	1480	42.2	1798	33.3	1784	40.2	1355	35.9	1123	33.8
208	1494	41	1789	32.2	1780	40.4	1288	35.9	1129	33.6
210	1486	41	1789	32.3	1777	41	1249	35.8	1127	33.5
212	1527	41.1	1792	32.3	1803	40.1	1404	36.9	1123	333.2
214	1476	41.1	1795	32.3	1717	40	14.5	37.5	1128	34.2
216	1382	42.4	1797	32.4	1720	40	1434	37.2	1126	34.8
218	1384	42	1796	33.1	1718	40.1	1492	37.6	1123	34.5
220	1385	42.1	1787	33.1	1713	40.2	1395	36.9	1127	35.8
222	1389	42.3	1789	33.1	1715	40.4	1375	37	1123	35.7
224	1435	41.7	1788	33.2	1659	40.3	1321	37.8	1121	33.9
226	1424	41.6	1781	33.3	1490	40.6	1279	37.4	1124	33.7
228	1481	40.7	1787	32.7	1448	41	1268	37.9	1126	34.9
230	1438	40.4	1767	32.5	1453	41	1267	38.6	1128	35.6
232	1543	40.6	1777	33.1	1457	41	1242	37.2	1120	35.7
234	1444	40.9	1776	32.7	1460	41.5	1295	37.8	1122	35.6
236	1384	40.7	1773	32.5	1476	40.6	1187	36.5	1126	33.8
238	1247	44.9	1779	33.1	1494	39.5	1232	36.8	1128	33.6
240	1220	44.7	1776	33.5	1484	42	1172	36.3	1127	33.5
242	1215	44.7	1777	33.5	1465	42	1160	36.1	1129	33.3
244	1216	44.8	1776	34.2	1435	42	1159	36	1126	33.2
246	1220	44.8	1773	34.2	1424	42	1156	36.8	1124	33
248	1225	50.1	1774	34.2	1423	42	1267	35.2	1123	33.1
250	1226	44.8	1775	35.2	1424	42.1	1315	34.5	1125	33.3
252	1308	42.4	1774	35.1	1424	43.3	1254	33.6	1128	33.5
254	1306	42.4	1773	35.2	1423	43.35	1297	36.5	1129	32.3
256	1294	45.2	1772	35.2	1430	43.35	1285	36.8	1127	33.2
258	1288	46.7	1773	36.1	1432	43.37	1273	36.9	1128	33.1
260	1254	46.8	1776	36.2	1434	43.37	1237	42	1129	33.2
262	1244	47.8	1774	36.1	1435	43.38	1246	41.5	1126	33
264	1234	48	1770	35.1	1437	43.4	1250	38	1124	33.5
266	1295	51.1	1769	35.1	1438	43.41	1232	38.9	1127	33.7
268	1255	51.3	1770	35.2	1435	43.43	1222	37.5	1129	33.5
270	1305	49.9	1769	35.3	1434	43.43	1245	37.2	1125	33.3
272	1285	49.9	1768	34.9	1432	43.44	1358	36.8	1123	33.4
274	1278	49.8	1770	34.5	1434	43.44	1329	37.4	1124	33.2

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
276	1067	50.2	1771	34.8	1435	43,45	1298	28.5	1126	33
278	1032	50.2	1768	34	1436	43.46	1346	30.7	1128	33.3
280	1025	50.2	1767	34.5	1455	43.4	1325	32.8	1127	33.5
282	1223	41.8	1766	33.5	1401	43.39	1284	31.7	1125	33.4
284	1208	41.2	1768	34.5	1457	43.38	1297	30.9	1124	33.2
286	1330	42.3	1769	35.1	1455	43.36	1323	32.1	1122	33
288	1309	42.3	1769	35.1	1451	43.37	1312	31.1	1128	33.1
290	1304	42.3	1768	35	1441	43.39	1448	32.2	1126	33.3
292	1300	42.5	1767	34.9	1444	43.4	1408	32.7	1125	33.9
294	1299	42.4	1767	34.8	1441	43.41	1396	33	1121	33.8
296	1278	42.9	1766	34.7	1431	43.38	1398	32.8	1126	33.6
298	1269	42.7	1754	34.6	1437	43.42	1360	34.5	1128	33.4
300	1272	41.6	1722	39.3	1435	43.43	1468	36.4	1125	33.2
302	1271	41.6	1684	39.7	1396	42	1497	36.5	1124	33.1
304	1269	42.3	1688	39.9	1455	43.1	1350	35.9	1122	33.3
306	1266	42.3	1676	39.5	1477	42	1329	36	1115	34
308	1257	42.4	1674	38.9	1459	41.8	1288	36.6	1119	34.1
310	1258	42.3	1672	38	1449	41.1	1449	37.7	1121	34.4
312	1254	42.1	1669	37.9	1436	40.3	1377	38.6	1113	34.1
314	1250	42	1671	37.2	1434	39.3	1315	39.2	1113	34
316	1256	42.5	1668	37.5	1431	39.2	1317	39.2	1122	33.8
318	1259	41.9	1664	37.5	1428	39.6	1422	38.9	1124	33.7
320	1244	42.2	1662	36.9	1413	38.3	1431	39.2	1127	33.8
322	1240	42.6	1660	36.9	1423	37	1420	39.4	1126	33.7
324	1230	41.8	1658	37.5	1421	37.2	1417	38.9	1124	33.8
326	1223	41.5	1660	37.2	1420	37.3	1415	38.7	1123	33.6
328	1208	41.2	1659	36.7	1416	37.4	1418	39	1119	34
330	1161	43	1658	36.8	1417	37.4	1410	39.3	1122	34.1
332	1162	43	1660	37.1	1416	37.8	1385	40.1	1125	34.3
334	1153	42.6	1658	37.2	1416	37.8	1305	40.2	1121	33.9
336	1153	42.6	1656	37	1408	37.9	1295	40.2	1126	33.7
338	1163	42.6	1657	36.9	1414	36.3	1313	39.8	1124	33.8
340	1156	42.7	1658	34.5	1414	36.1	1308	39.9	1126	33.6
342	1155	44.8	1656	34.5	1415	36	1362	38.9	1123	33.4
344	1124	44.9	1654	34.2	1414	37.9	1320	37.2	1121	33.2
346	1193	43.4	1652	34.2	1413	37.8	1318	36.2	1123	33.3
348	1183	43.7	1648	33.9	1411	37	1295	36.8	1126	34
350	1171	44.8	1650	34.1	1411	37	1284	36.5	1120	34.7
352	1170	45.6	1647	34	1412	37.2	1252	36.4	1125	34.9
354	1134	45.4	1649	39.2	1403	37.3	1283	36.8	1119	35
356	1137	42.2	1648	34	1397	37.5	1279	36.3	1117	34.8
358	1123	46.4	1646	33..9	1399	37.4	1277	36.5	1115	34.3
360	1123	45.7	1644	33.9	1385	34.7	1276	36.7	1121	34.5
362	1119	46.3	1642	34	1488	33.7	1287	36.8	1126	34.6

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
364	1053	42.9	1648	34.1	1520	34.5	1284	36.9	1124	34.3
366	1080	43.1	1646	39.1	1516	34.7	1294	36.7	1127	34.1
368	1066	43.1	1644	38.9	1480	34.6	1288	36.8	1125	34.5
370	1062	43	1640	38	1508	34.5	1278	38.9	1124	34.2
372	1060	43.2	1638	38.1	1590	34.3	1280	38.9	1119	34.5
374	1059	43.3	1638	37.9	1506	33.9	1277	39.6	1120	34.3
376	1058	43.4	1639	36.1	1444	37.5	1258	39.8	1122	34.1
378	1059	43.5	1639	35.9	1433	37.6	1216	39.9	1123	34
380	1056	43.6	1637	35.8	1423	37.7	1194	40	1129	34.2
382	1060	43.7	1638	36	1398	37.9	1186	39.9	1127	34.1
384	1061	43.8	1636	35.7	1385	37.8	1097	40	1125	34.9
386	1075	43.4	1637	35.6	1380	36.9	1188	37.2	1126	35.7
388	1062	43.1	1636	35.3	1365	37.2	1182	37.1	1127	36
390	1056	43.4	1635	35.2	1378	37.3	1093	37.5	1121	36.1
392	1054	43.4	1634	35.1	1365	37.6	1067	37.8	1117	36.3
394	1050	44	1632	34.9	1345	38	1149	37.6	1120	36.3
396	1025	45.7	1633	35	1404	38.3	1076	36.8	1122	36.4
398	1017	45.9	1584	36.9	1335	38.5	1052	37	1121	36.4
400	1015	46	1498	37.5	1302	38.7	1043	37.6	1134	36.5
402	1014	46.2	1494	37.8	1300	38.9	1029	37.9	1132	36
404	1015	46.2	1488	38	1311	38.1	1051	38.6	1131	36.5
406	1110	47	1476	38.5	1304	38.5	1076	38.5	1133	36.3
408	1020	45.2	1463	38.9	1291	38.9	1162	38.1	1129	36.5
410	1017	45.5	1454	39.4	1295	38.9	1083	38.3	1131	36.5
412	1014	45.9	1434	38.1	1294	38.9	1110	38.7	1134	36.8
414	1113	46	1408	38.7	1293	38.9	1096	37.9	1130	37.3
416	1111	46.2	1355	38.9	1294	40	1078	37.8	1135	37.5
418	1012	46.3	1435	38.1	1293	40	1088	38.8	1137	37.6
420	1010	46.4	1523	38	1280	40.5	1087	39	1136	37.4
422	1000	46.5	1529	38.1	1279	40.6	1086	39.5	1134	37.3
424	957	43.5	1492	38	1279	40.7			1132	37.1
426	952	43.4	1433	37.8	1270	40.81			1135	36.8
428	950	43.3	1432	37.4	1278	40.9			1147	37.8
430	947	44	1430	37.4	1278	40.8			1143	38.09
432	955	43.7	1423	36.8	1279	40.89			1150	38.1
434	994	44.7	1433	36.4	1277	40.9			1157	39.5
436	984	43.9	1430	36.2	1276	40.95			1155	39.8
438	982	44.5	1428	36.1	1274	40.96			1153	39
440	985	44.7	1426	36.1	1275	40.97			1790	38.7
442	988	44.6	1428	36.3	1277	40.97			1217	38.5
444	990	45			1275	40.98			1195	39.1
446	992	45.1			1274	40.99			1210	39.2
448	982	46			1270	41.3			1220	39.4
450	988	46.3			1268	41.3			1225	39.2

Depth, m	ALBH6		ALBH7		ALBH8		ALBH9		ALBH10	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
452	995	46.7							1240	39.4
454	993	46.8							1253	39.5
456									1171	39.3
458									1273	39.5
460									1275	39.2
462									1114	38.8
464									1123	39
466									1130	38.3
468									1151	38.4
470									1147	38.8

Electrical conductivity and Temperature data of Alliedege area(3)

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
2	778	29.8	1300	30.5	1380	27.2	2310	26.8	778	29.8
4	779	30.1	1319	30.1	1360	27.1	2330	27	779	30.1
6	781	29.9	1309	29.8	1356	27.1	2330	27.2	781	29.9
8	778	30	1372	30.2	1360	27	2340	27.3	778	30
10	777	29.7	1312	30	1358	27.4	2330	27.2	777	29.7
12	776	28.6	1099	30.1	1321	27.6	2330	27.2	776	28.6
14	781	28.3	1067	28.5	1305	27.6	2320	27.4	781	28.3
16	775	28.3	1080	28.1	1325	27.9	2316	27.3	775	28.3
18	780	28.1	1121	28.2	1318	30	2308	27.5	780	28.1
20	781	28.6	1097	28.5	1310	30.1	2308	27.4	781	28.6
22	779	28.6	1111	28.8	1318	30.2	2290	27.1	779	28.6
24	778	28.6	1092	28.4	1306	30.2	2288	27.5	778	28.6
26	778	28.1	1087	28.9	1291	30.3	2290	27.5	778	28.1
28	776	28	1129	29.5	1271	30.5	2284	27.6	776	28
30	779	30.1	1131	29.8	1296	30.2	2228	28.5	779	30.1
32	776	29.2	1121	29.1	1286	30	2220	29.1	776	29.2
34	779	29.2	1090	29.5	1277	29.2	2212	28.9	779	29.2
36	778	30	1089	29.2	1260	29.4	2198	28.7	778	30
38	780	30.1	1130	29.8	1268	29.4	2190	28.7	780	30.1
40	775	29.2	1142	30.9	1261	29.6	2186	28.5	775	29.2
42	776	29.2	1138	30.1	1258	29.3	2178	28.8	776	29.2
44	660	27.8	1141	30.2	1252	29.1	2182	29	660	27.8
46	595	27	1110	31.8	1250	29.6	2250	28.2	595	27
48	625	28.1	1084	31.9	1247	29.7	2260	28.6	625	28.1
50	713	27.2	1081	31.5	1220	28.1	2280	29.8	713	27.2
52	663	27.1	1088	32	1216	26.1	2270	29.5	663	27.1
54	662	27.7	1082	32.1	1126	27.6	2250	29.2	662	27.7
56	664	27.3	1079	32.5	1116	29.1	2240	28.9	664	27.3
58	640	26.9	1085	32.9	1019	26.8	2260	28.6	640	26.9
60	635	26.8	1062	32.8	1012	26.9	2250	28.5	635	26.8

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
62	600	27.4	1068	32.1	1024	23.1	2300	28	600	27.4
64	562	27.3	1072	32.5	1019	23.2	2280	28	562	27.3
66	500	27.2	1063	33	1078	23.8	2290	28.1	500	27.2
68	490	27	1054	32.5	1082	24.3	2280	28.2	490	27
70	495	27	1079	33.1	1062	24.4	2300	26.9	495	27
72	504	27.2	1061	32.8	1026	24.7	2210	27	504	27.2
74	510	27	1068	32.4	1037	25.2	1382	26.6	510	27
76	665	27.3	1066	33.2	998	25.1	1387	29.9	665	27.3
78	670	29	1042	33.5	994	25.3	1402	29.5	670	29
80	663	27.8	1049	33.1	1006	25.4	1397	28.4	663	27.8
82	668	28.1	1058	33.3	1009	25.7	1394	27.9	668	28.1
84	669	29	1087	32.9	1004	25.6	1396	28	669	29
86	665	28.5	1050	33	1006	25.9	1389	27.8	665	28.5
88	670	29	1048	31.1	1006	25.9	1390	27.4	670	29
90	680	28.3	1057	33	1003	26	1388	27.6	680	28.3
92	675	27.8	1076	32.8	996	26.2	1391	27.9	675	27.8
94	670	27.3	1082	33	992	26.5	1392	27.7	670	27.3
96	675	28.8	1084	32.9	974	26.6	1387	28.5	675	28.8
98	597	30.9	1073	33.2	976	26.9	1391	29.1	597	30.9
100	662	28.7	1034	33.3	974	27.6	1395	29.3	662	28.7
102	660	29.8	1056	32.4	975	27.4	1382	30.2	660	29.8
104	661	30.1	1034	32.2	974	27.3	1373	30.7	661	30.1
106	633	29.7	1077	33.2	965	27.1	1371	30.5	633	29.7
108	600	29.6	1050	32	958	26.8	1369	30.4	600	29.6
110	595	29.7	1049	32.8	954	26.6	1368	30.2	595	29.7
112	590	29.9	1056	33.1	952	26.1	1365	30.4	590	29.9
114	588	30	1077	31.9	948	26.2	1364	30.2	588	30
116	555	30.7	1068	32.3	942	25.8	1362	29 .9	555	30.7
118	552	31.8	1057	32.4	906	26.4	1363	29.7	552	31.8
120	545	31.2	1071	31.8	876	26.9	1361	29.7	545	31.2
122	540	31	1079	32	854	27.3	1365	29.5	540	31
124	532	30.7	1088	32.4	836	27.9	1363	29.4	532	30.7
126	533	29.9	1044	32.3	828	28.4	1365	29.5	533	29.9
128	540	31.2	1023	33	824	28.8	1366	29.4	540	31.2
130	532	31	1015	32.1	810	29.3	1365	29	532	31
132	560	29.7	1019	32.3	794	29.2	1368	28.9	560	29.7
134	578	29.5	1010	33	811	29	1371	29	578	29.5
136	576	29.3	989	33.8	812	29.2	1373	29	576	29.3
138	577	29.5	1015	34	811	29.3	1370	29.5	577	29.5
140	574	30.1	996	34.2	811	29.8	1368	30.2	574	30.1
142	570	30.5	987	34.1	824	28.9	1180	30.6	570	30.5
144	573	30.6	1000	33.2	823	27.8			573	30.6
146	578	31.2	996	33	821	25.8	1190	30.3	578	31.2
148	576	30.5	987	32.9	798	32.8	1180	30.3	576	30.5

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
150	574	31.2	980	33.5	768	32.6	1070	30.4	574	31.2
152	572	31.12	978	33.7	782	32.8	1130	29.4	572	31.12
154	576	31.1	965	33.8	783	32.6	1124	29.2	576	31.1
156	557	30.9	964	34.1	776	33.2	1122	29.1	557	30.9
158	530	30.7	982	32.5	781	31.4	1100	28.9	530	30.7
160	546	29.2	1008	34	802	32.6	1150	28.4	546	29.2
162	544	29.7	984	33.9	801	31.8	1154	28.6	544	29.7
164	543	29.8	991	34.1	786	31.2	1120	29.2	543	29.8
166	544	29.6	1012	33.2	776	29.3	1125	29.6	544	29.6
168	540	30.2	984	33.6	790	25.6	1150	30.2	540	30.2
170	538	30.1	993	33.7	792	26.3	1100	30.6	538	30.1
172	530	30.2	987	33.5	794	26.8	1100	30.2	530	30.2
174	529	29.9	982	33.9	796	27.4	1100	30.1	529	29.9
176	528	29.2	985	34.8	792	27.5	1107	30.2	528	29.2
178	526	29.3	674	34.5	798	30.3	1104	29.7	526	29.3
180	526	29.3	979	35	806	31.4			526	29.3
182	523	29.4	967	35.4	807	30.6			523	29.4
184	539	30.9	897	34.5	806	31.4			539	30.9
186	537	31.1	886	34.2	810	32			537	31.1
188	538	31.2	880	33.9	802	32.1	1106	29.6	538	31.2
190	536	31.6	878	34.1	792	29.6	1101	29.7	536	31.6
192	537	30.9	896	33.5	791	29.8	1104	29.2	537	30.9
194	540	30.1	897	34.2	792	27.3	1102	29.6	540	30.1
196	535	30.8	869	34	781	26.8	1104	29.8	535	30.8
198	586	31.9	885	33.5	772	26.6	1100	30.1	586	31.9
200	590	32	876	33.8	767	27.1	1080	30.1	590	32
202	591	31.5	874	34.2	790	27..0	1090	30.2	591	31.5
204	593	31.3	909	34.5	842	32.6	1100	30.4	593	31.3
206	589	31.4	899	35.8	832	32.7	1107	30.7	589	31.4
208	570	31.8	924	36.1	821	30.9	1094	29.8	570	31.8
210	562	31	906	35.1	770	28.2	1070	30	562	31
212	560	31.6	804	34.4	780	32.1	1060	30	560	31.6
214	563	31.3	905	35	782	32.6	1065	30	563	31.3
216	533	29.8	900	35.8	784	32.8	11708	29.9	533	29.8
218	523	29.9	912	36	798	32.9	1140	30	523	29.9
220	500	31.6	905	35.5	776	36.7	1135	29.9	500	31.6
222	496	31.2	1005	34.7	758	37.6	1104	30.2	496	31.2
224	494	31.3	987	34.9	768	36.8	1113	30.5	494	31.3
226	491	31.1	1002	35.5	776	35.6	1092	30.7	491	31.1
228	493	30.9	1011	34.8	787	34.8	1094	32	493	30.9
230	489	30.8	1021	34.6	786	34.7	1097	31.9	489	30.8
232	488	30.1	1055	34.5	787	35.6	1099	32	488	30.1
234	486	31.2	1009	34.1	789	36.5	1100	31.9	486	31.2
236	488	31.3	1025	33.8	789	37.8	1090	31.7	488	31.3

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
238	483	31.4	1035	34.1	776	38.7	1097	31.5	483	31.4
240	480	30.9	1056	34	786	38.6	1097	31.7	480	30.9
242	482	30.9	1064	33.5	782	37.4	1099	31.6	482	30.9
244	487	30.8	1078	34.8	804	37.8	1090	31.6	487	30.8
246	479	30.8	1121	35.2	806	38.3	1000	31.9	479	30.8
248	476	30.8	1012	34.1	792	38.6	980	32.2	476	30.8
250	478	30.9	1009	35.2	788	37.4	970	32.4	478	30.9
252	480	31.6	1028	34.1	784	37.5	980	32.7	480	31.6
254	482	31.9	1056	33.5	787	36.8	990	33.5	482	31.9
256	480	32	1007	33.8	892	34.6	1131	31.7	480	32
258			1100	34.1	974	32.2	1128	31.8		
260			1087	33.9	1001	31.1	1290	32.4		
262			1038	34.2	1126	32.5	1280	32.7		
264	484	29.9	1010	34.7	1162	32.6	1270	33.3	484	29.9
266	490	31.1	1005	35.2	1158	33.4	1290	34.1	490	31.1
268	489	31.9	1019	35.7	1120	32.6	1280	33.9	489	31.9
270	488	31.8	987	35.9	1124	33.5	1230	33.2	488	31.8
272	489	31.7	1001	37.5	1149	32.6	1120	33	489	31.7
274	487	32.2	1005	38.2	1150	31.5	1150	32.7	487	32.2
276	488	32.2	1008	37.1	1152	32.6	1148	32.6	488	32.2
278	486	31.9	1021	37.4	1146	32.5	1130	32.7	486	31.9
280	487	32.4	1045	38.5	1136	32.5	1140	32.8	487	32.4
282	485	32.8	1032	37.1	987	31.8	1110	32.5	485	32.8
284	483	32	1018	38.1	848	31.7	1112	32.5	483	32
286	482	32	1023	38.2	838	33.4	1120	32.6	482	32
288	480	31.9	1010	38.9	848	33.5	1107	32.6	480	31.9
290	487	32.1	1008	38	852	33.4	1090	32.7	487	32.1
292	492	32.2	1005	37.9	851	33.6	1080	32.7	492	32.2
294	487	32	1009	38.2	856	32.8	1080	32.9	487	32
296	505	32.1	1021	38.2	849	32.8	1070	32.2	505	32.1
298	507	32.3	1011	38.5	846	32.4	1070	33.6	507	32.3
300	498	33	1008	38.4	851	31.8	1070	33.8	498	33
302	500	32.8	999	37.8	848	31.6	1060	33.5	500	32.8
304	490	33	1024	37.4	984	32.3	1090	33.4	490	33
306	486	33.2	1009	37.1	1113	33.8	1104	33	486	33.2
308	485	33.1	1018	38.5	1092	33.4	1107	33.2	485	33.1
310	485	33.1	1020	37.5	1072	33.2	1109	33.2	485	33.1
312	486	33.2	1010	38.2	1054	33.6	1104	33.3	486	33.2
314	485	33.1	999	37.9	1026	33.4	1106	33.3	485	33.1
316	490	34.2	997	38.8	996	33.5	1107	33.2	490	34.2
318	492	35	1068	36.2	964	33.3	1106	33.3	492	35
320	495	35.1	1071	35.7	972	33.3	1105	33.6	495	35.1
322	494	36	1063	35.9	978	33.4	1104	33.5	494	36
324	495	36.1	1058	37	983	33.4	1110	33.5	495	36.1

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.	EC	Temp.
326	493	36.2	1069	36.1	986	33.2	1060	33.6	493	36.2
328	494	36.3	1089	35.5	981	33.4	1030	33.7	494	36.3
330	493	36.1	1072	35.2	972	33.5	1030	33.9	493	36.1
332	519	36.2	1088	35.8	866	33.7	1030	34.2	519	36.2
334	490	36	1076	36.9	854	33.3	1030	34.6	490	36
336	492	36.2	1065	36.5	856	33.5	1030	34.9	492	36.2
338	491	36.1	1070	36.6	843	33.6	1102	34.9	491	36.1
340	489	36	1091	35.9	867	33.9	1106	34.9	489	36
342	490	36.1	1080	36.3	878	34.1	1101	34.5	490	36.1
344	489	36	1072	36.9	889	34.5	1103	34.9	489	36
346	488	36.1	1068	36.8	878	34.6	1230	35.1	488	36.1
348	489	36.1	1089	37	878	33.7	1260	35.2	489	36.1
350	490	35.2	1082	38.2	886	34.5	1260	35.5	490	35.2
352	492	36.2	1077	37.7	972	34.6	1270	35.7	492	36.2
354	495	34.2	1079	37.6	976	34.7	1190	34.2	495	34.2
356	500	29.9	1087	38.2	984	34.7	1115	32.2	500	29.9
358	495	30	1080	37.4	876	34.2	1116	32.3	495	30
360	501	31.1	1090	37.3	885	34.5	1114	32.3	501	31.1
362	503	29.9	1094	37.2	892	34.4	1115	32.5	503	29.9
364	520	32.2	1058	37.5	898	33.8	1107	34.2	520	32.2
366	529	33.3	1069	37.1	902	33.6	1120	34.4	529	33.3
368	530	33.4	1071	37	911	34.2	1115	34.5	530	33.4
370	532	33.6	1087	36.8	928	34.1	1180	32.2	532	33.6
372	534	34	1095	36.5	952	33.8	1170	33.6	534	34
374	536	35	1090	36.9	974	33.6	1170	34.1	536	35
376	540	35.1	1093	37.2	981	33.4	1160	34.1	540	35.1
378	541	35.2	1090	37.5	984	34.2	1160	34.9	541	35.2
380	345	35.3	1085	38.2	987	34.6	1170	34.6	345	35.3
382	550	35.6	1067	38.7	994	34.7	1160	34.3	550	35.6
384	552	36	1068	39.7	986	33.8	1160	34.3	552	36
386	545	35.5	1049	39.6	984	33.6	1106	34.9	545	35.5
388	548	35	1051	39.5	972	34.4	1101	34.5	548	35
390	547	33.8	1050	39.2	974	34.6	1103	34.9	547	33.8
392	545	34	1054	39.8	894	34.8	1117	34.6	545	34
394	548	33.7	1079	39.2	892	34.6	1115	34.6	548	33.7
396	543	34	1047	39.4	881	34.5	1118	34.7	543	34
398	532	34.3	1068	38.1	892	33.7	1117	35.2	532	34.3
400	530	35.5	1065	38.5	921	33.6	1116	35.1	530	35.5
402	520	36	1054	39	942	34.2	1180	35.7	520	36
404	510	36.3	1036	39.9	964	33.8	1200	36.4	510	36.3
406	512	36.5	1038	39.8	975	33.7	1190	36.1	512	36.5
408	512	36.6	1026	39.8	968	33.8	1141	36.1	512	36.6
410	510	36.5	1032	39.9	969	34.3	1145	36.2	510	36.5
412	485	32.8	1030	39.7	972	34.6	1124	36.5	485	32.8

Depth, m	ALBH11		ALBH12		ALBH13		ALBH14		ALBH15	
	EC	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**	**EC**	**Temp.**
414	483	32	1033	39.8	981	34.8	1126	36.5	483	32
416	482	32	1036	39	967	34.4	1124	36.5	482	32
418	480	31.9	1038	39.5	958	33.7	1123	36.5	480	31.9
420	487	32.1	1045	38.1	845	34.7	1126	36.5	487	32.1
422			1009	37.9	846	34.6	1250	36.9		
424			1007	38	852	34.5	1260	36.8		
426			1020	37.2	854	33.8	1240	37.7		
428			1008	36.9	848	33.9	1170	36.6		
430			1012	37.2	846	34.5	1200	36.8		
432			1009	37.9			1130	35.7		
434			1003	37.7			1124	35.7		
436			1005	36.4			1131	36.1		
438			990	36.5			1126	36		
440			989	37.3			1130	36.1		
442			987	37.8			1129	36.1		
444			985	37.3						
446			968	37.5						
448			977	37.2						
450			972	36.9						
452			965	36.3						
454			987	37						
456			946	36.5						
458			954	36.8						
460			931	36.6						
462			945	37.2						
464			952	37.9						
466			951	37.7						
468			947	37.6						
470			952	38.1						
472			984	37.6						
474			949	37.9						
476			951	38						
478			966	38.2						
480			969	37.6						
482			967	37.9						
484			937	38.5						
486			949	38.3						
488			950	38.5						
490			948	39						
492			937	38.7						
494			959	38.5						
496			947	39						
498			932	39.1						
500			930	39.2						