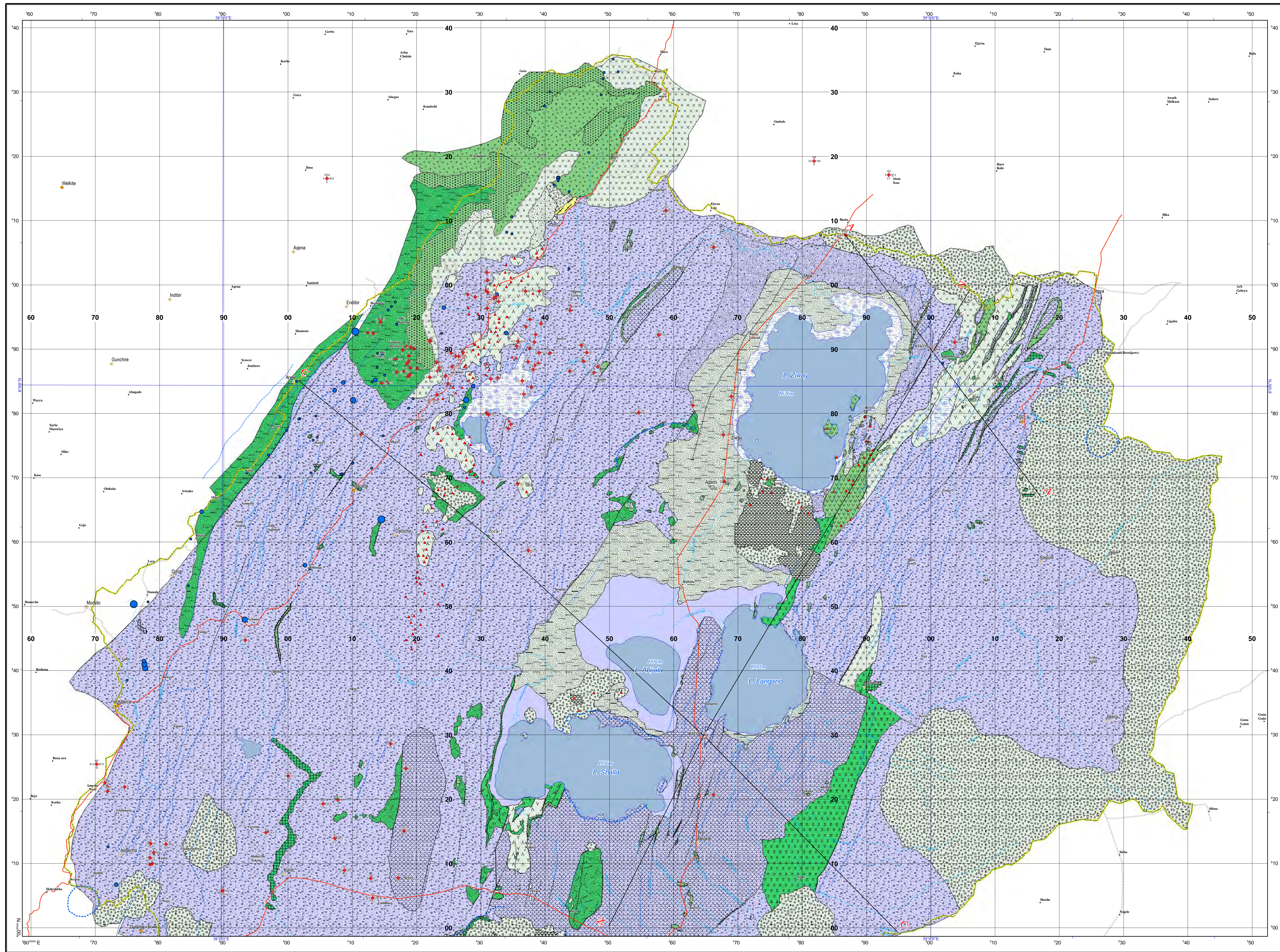
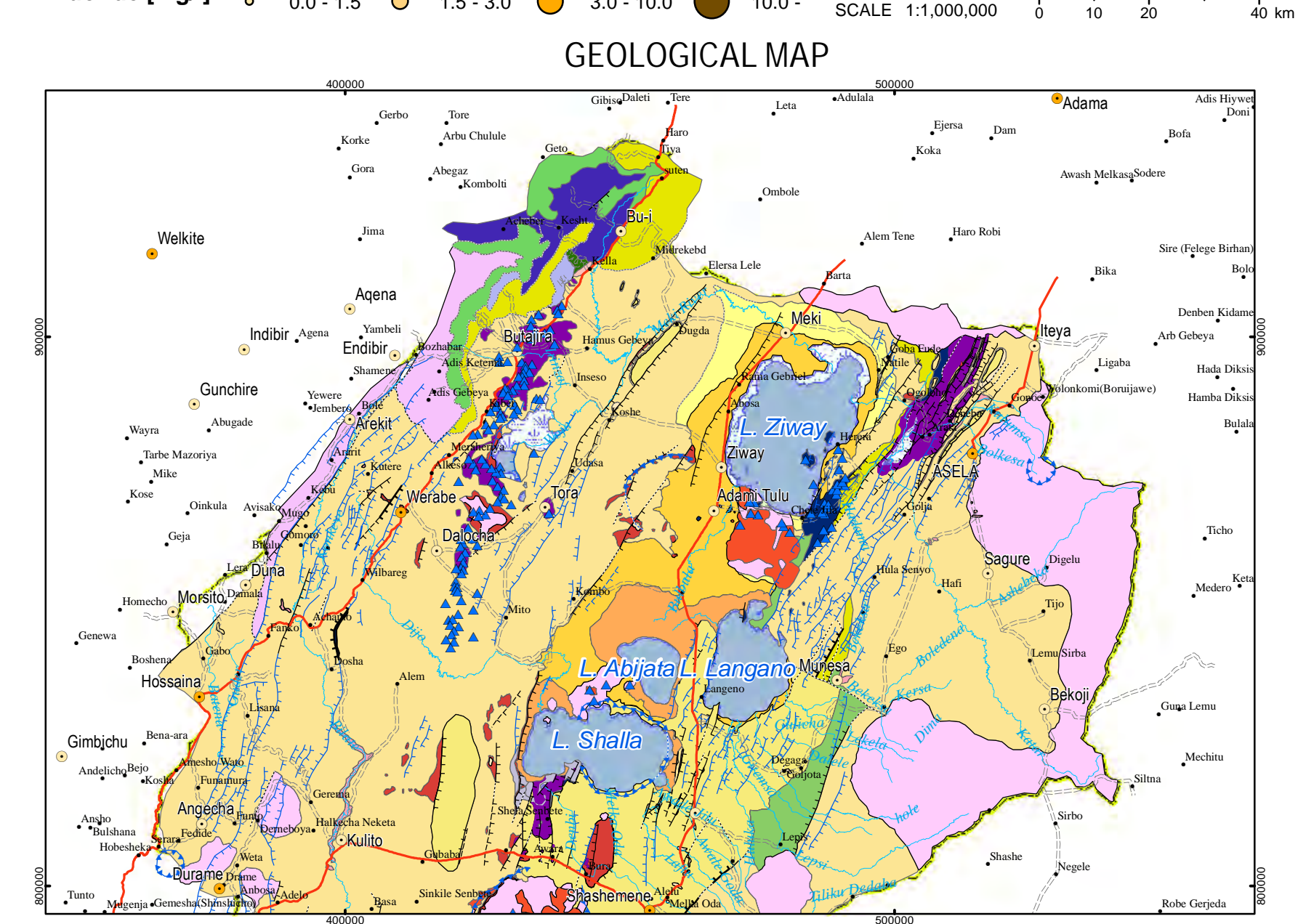
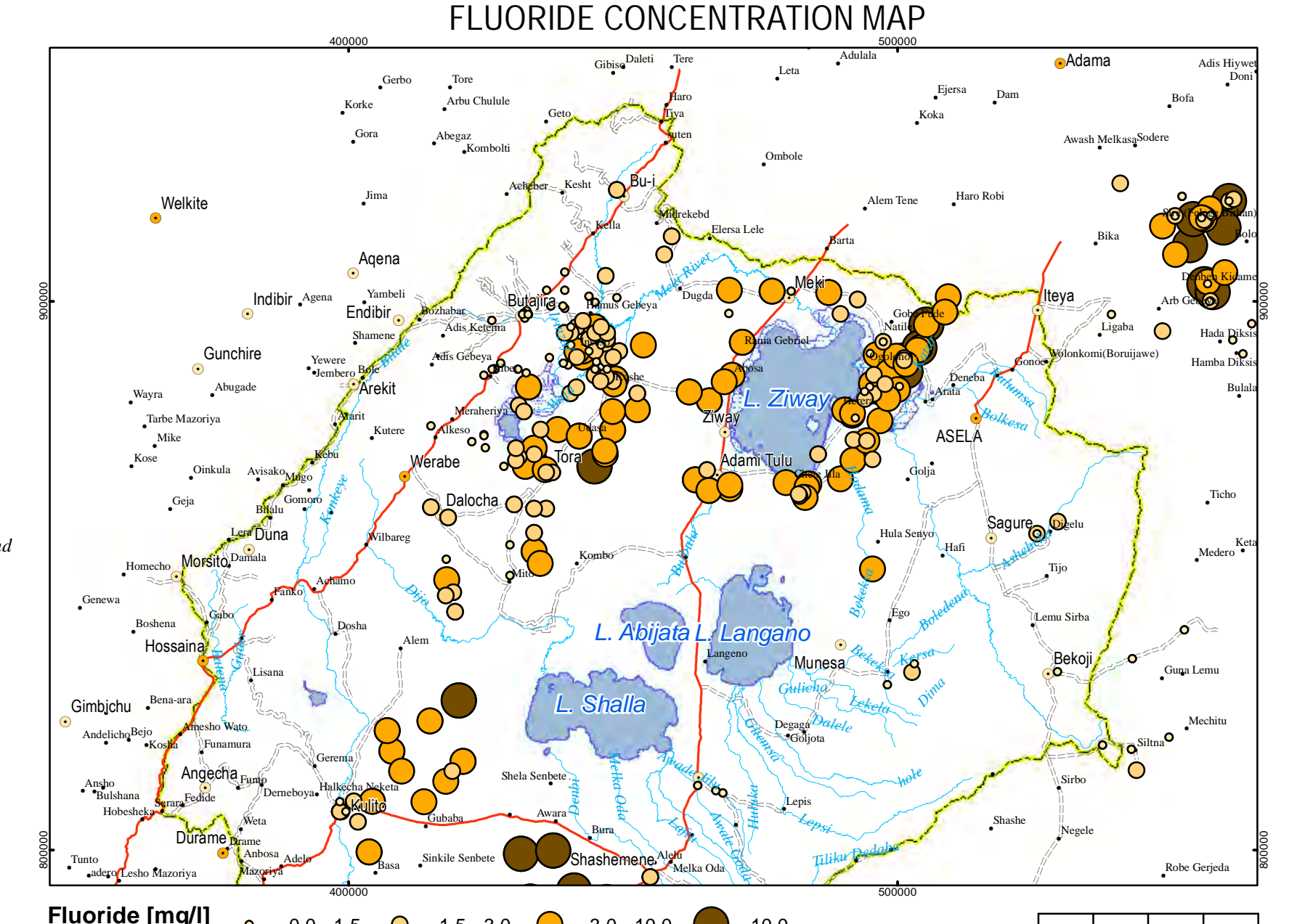
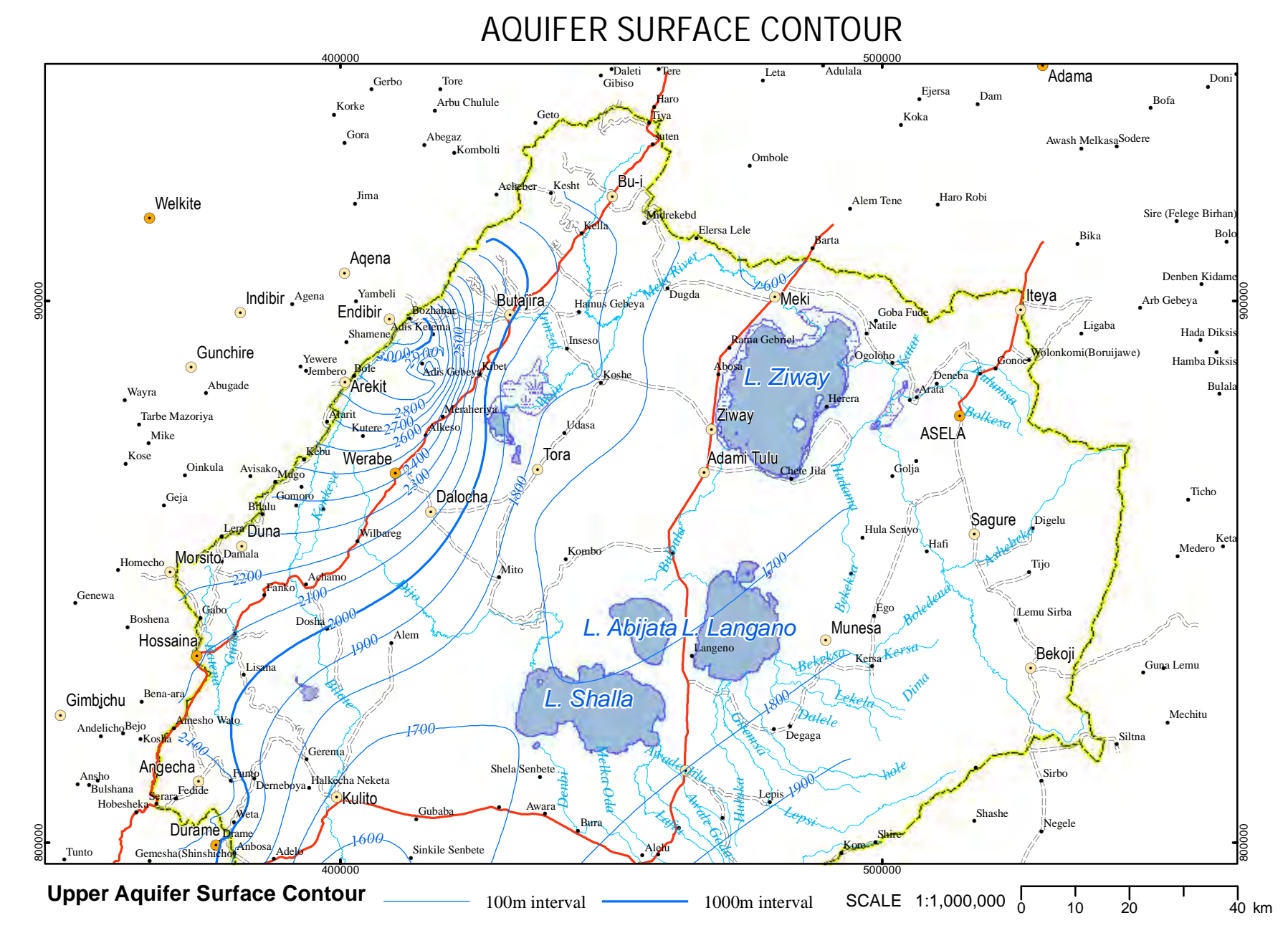
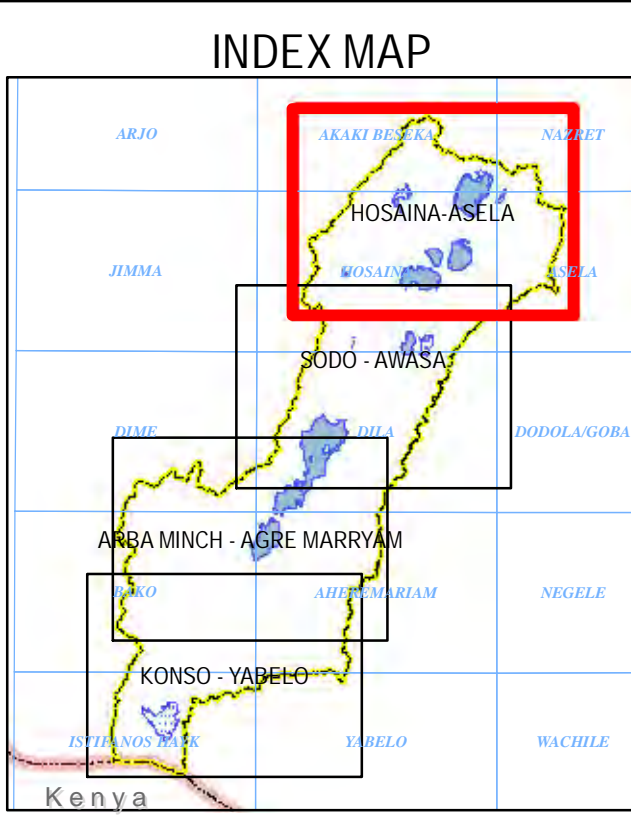


HYDROGEOLOGICAL MAP OF HOSAINA - ASELA AREA

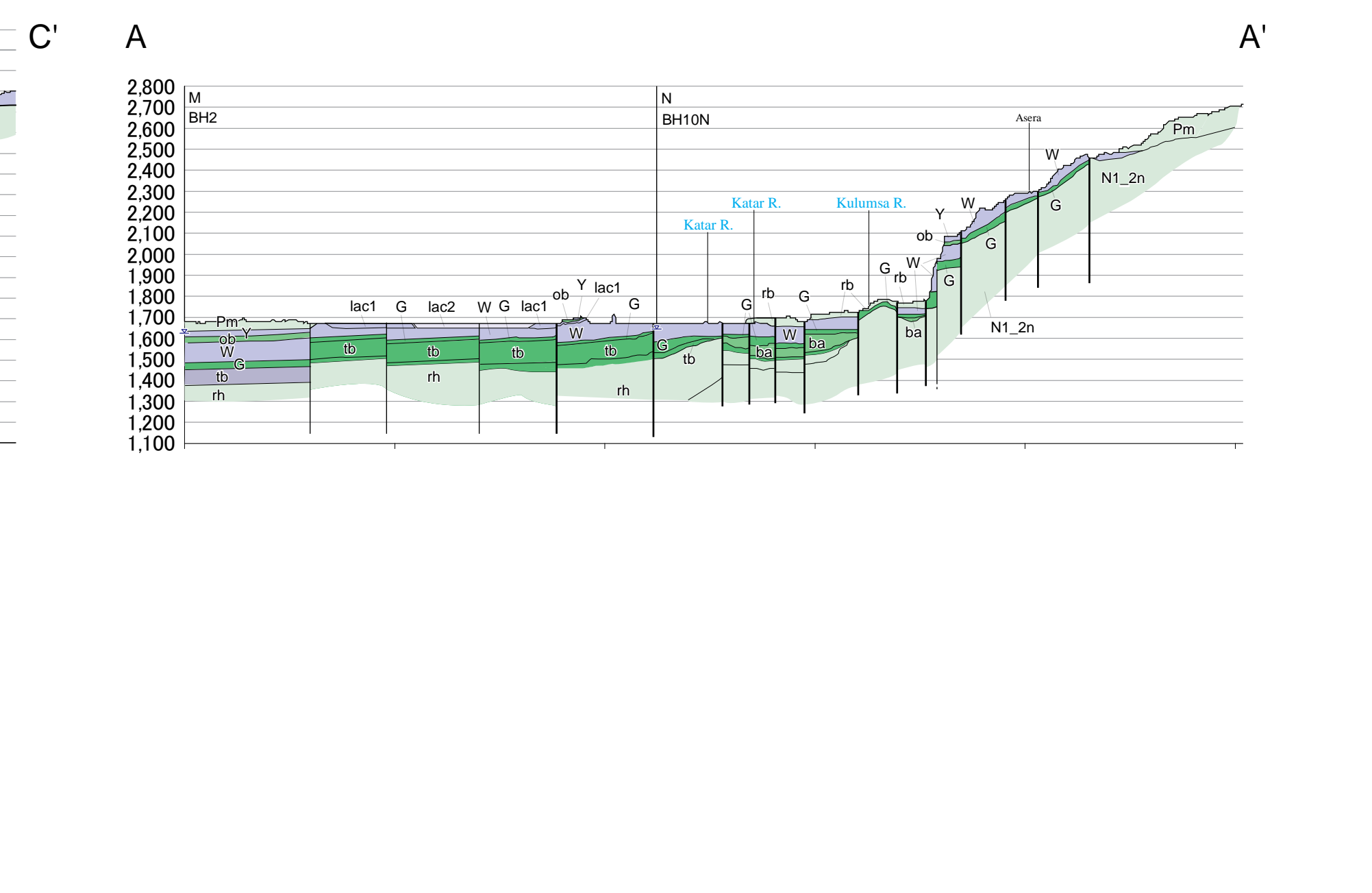
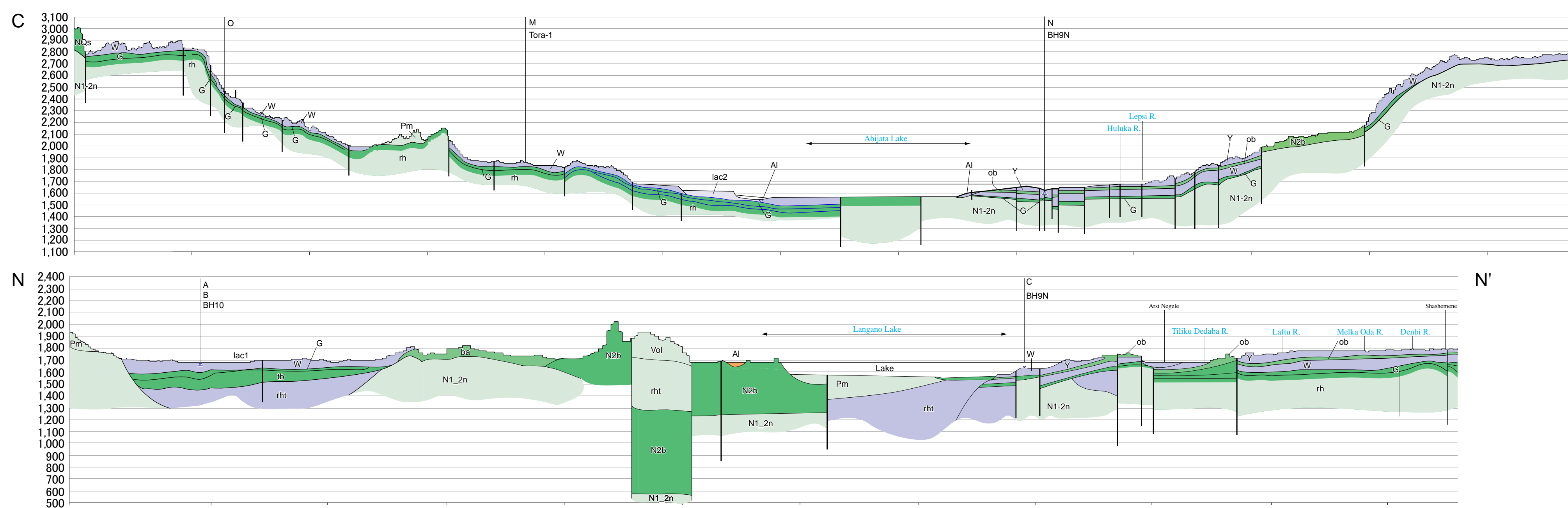


- Towns**
- Region Capital
 - Zone Capital
 - Woreda Capital
 - Developed Area
- Roads**
- Asphalt
 - Gravel
- Rivers**
- Major Rivers
- Lakes**
- Swamp
 - Lake
- Boundaries**
- Basin Boundary
 - National Boundary
- Spring Discharge [l/s]**
- 0.01 - 0.75
 - 0.75 - 2.50
 - 2.50 - 6.00
 - 6.00 - 16.00
 - 16.00
- Geological Structure**
- Major fault, downthrow shown
 - Major fault, downthrow shown
 - Normal fault, downthrow shown
 - Normal fault
 - Inferred fault, downthrow shown
 - Inferred fault
 - Major fault, downthrow shown, by satellite images
 - Major fault, downthrow shown, by satellite images
 - Normal fault, downthrow shown, by satellite images
 - Normal fault, by satellite images
 - Inferred fault, downthrow shown, by satellite images
 - Inferred fault, by satellite images
 - Geology boundary
 - Inferred geology boundary
 - Caldera edge
 - Volcano / Volcanic Cone
- Borehole (Well)**
- Total depth [mbgl]
 - Specific capacity [l/min/m]
 - Static water level [m]
 - Draw down [m]
 - JICA Well
- TEM**
- Survey Point of Transient phenomenon (or Time-domain) Electromagnetic Exploration Method
- Geology**
- Holocene**
- Alluvium; Fine sand - mud
 - Unclassified Fluvial Deposits; Sandy gravel-mud
 - Bulbula Lacustrine Deposits; Lake deposits such as gravel, sand and mud
 - Corbetti Pumice Flow & Fall Deposits; Pumice falls and pumice flow deposits
 - Corbetti Rhyolitic Volcanics; Rhyolite lava flows and Obsidian lava flows
 - Banajira Recent Basalt; Basalt lavas and reddish brown basaltic scoria
 - Maki Lacustrine Deposits; Lake deposits such as poorly-sorted gravel, sand, pumice, tuff, and volcanic sand
- Pleistocene**
- Langano Poorly Welded Pliocene Pyroclastics; Yellowish white rhyolitic pumice tuff
 - Kulumsa Highly Welded Tuff; Rhyolite to andesite welded tuff
 - Ketar River Acidic Volcanic Sedimentary Rocks; Rhyolite tuffs and pumice tuffs
 - Gonde Strongly Green Welded Tuff; Rhyolite to andesite welded tuff
 - Adam Tulu Basaltic Pyroclastics; Basaltic tuff breccia and lapilli tuffs
 - Ogoleche Pleistocene Basalt; Massive basalt lavas
 - Lekansho Lacustrine Deposits; Lake deposits such as sand, silt, and alternate layer
- Plio-Pleistocene**
- Gademota Rhyolite; Rhyolite lava flows and rhyolitic tuffs
 - N2b Basalt; Basaltic lavas and basaltic pyroclastics
 - NQ Rhyolite; Rhyolitic tuffs
- Pliocene**
- N1_2a Rhyolitic Volcanics; Plagioclase rhyolite tuff and rhyolite lava flows containing obsidian
 - N1_2a Rhyolitic Tuff; Plagioclase rhyolite tuff, pumice tuff and crystal tuff
 - N1a Basalt; Anchar Basalt
 - N1a Rhyolite; Rhyolite
- Miocene**
- Sharenga Rhyolite; Rhyolite piles and necks
 - Upper Basalt; Porous basalt lavas
 - Beyana Tuff; Lapilli tuff with minor laminated tuff
 - Middle Basalt; Porphyritic basalt lavas
- Eocene-Oligocene**
- Shale Welded Tuff; Densely welded rhyolite welded tuff
 - Lower Basalt; Porphyritic basalt lavas
- MESOZOIC**
- Adigala Sandstone, Antano Limestone; Sandstone, Shale and Limestone
- PRECAMBRIAN**
- Biotite Gneiss, Pegmatite; Biotite Gneiss, Granite, Biotite Metagranite

No.	Description	Lithology	Productivity Classes
1	Extensive aquifer with intergranular permeability	Unconsolidated sediments, alluvium, claystone, siltstone, sandstone, poorly cemented sandstone	A High B Moderate C Low
2	Extensive aquifers with fracture and/or karstic permeability	Consolidated sediments and metamorphosed carbonate; Limestone, sandstone, shale, marl, evaporite marble	High, moderate, low (A, B, C) (Note: Not applicable in this map)
3	Extensive aquifers with fracture permeability	Volcanic rocks, basalts, rhyolites, trachytes, gabbroites	A High B Moderate C Low
4	Localized aquifers with fracture and intergranular permeability	New carbonate metamorphic rocks, granitic intrusives/dolerites	D Poor C Low B Moderate A High
5	Main geothermal areas	Molasses with high thermal groundwater in fractured volcanic rocks and subordinate unconsolidated sediments	(Note: Not applicable in this map)



VERTICAL SCALE = 10 x HORIZONTALSCALE SCALE 1:250,000 TRANSVERSE MERCATOR PROJECTION



Hydrogeological Map **March 2012**

THE STUDY ON GROUNDWATER RESOURCES ASSESSMENT IN THE RIFT VALLEY LAKES BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Geological Map of the Rift Valley Lakes Basin in Ethiopia (Hosaina, Asele, and Lake Tana) (Scale: 1:250,000) (March 2012) (JICA)