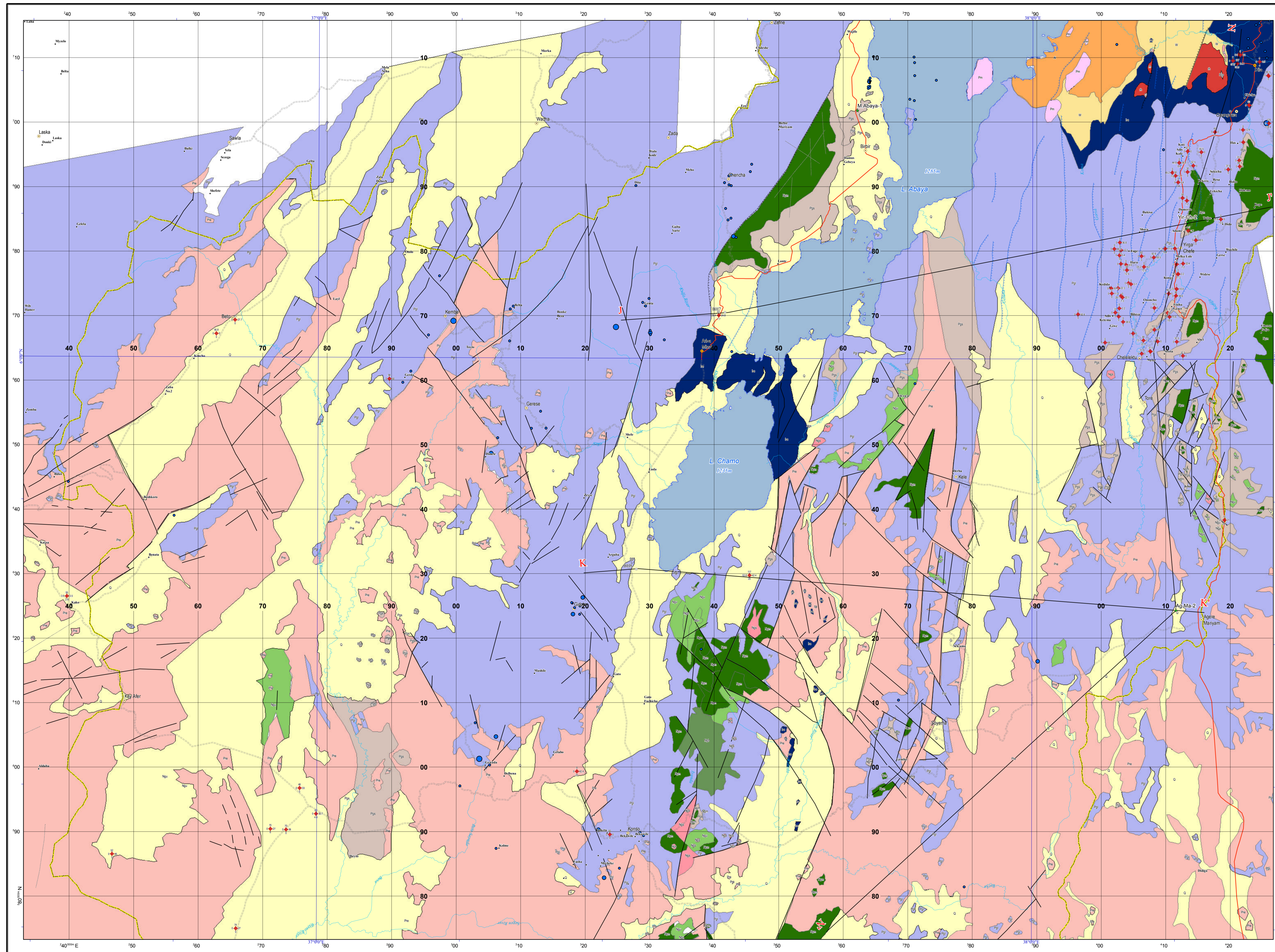
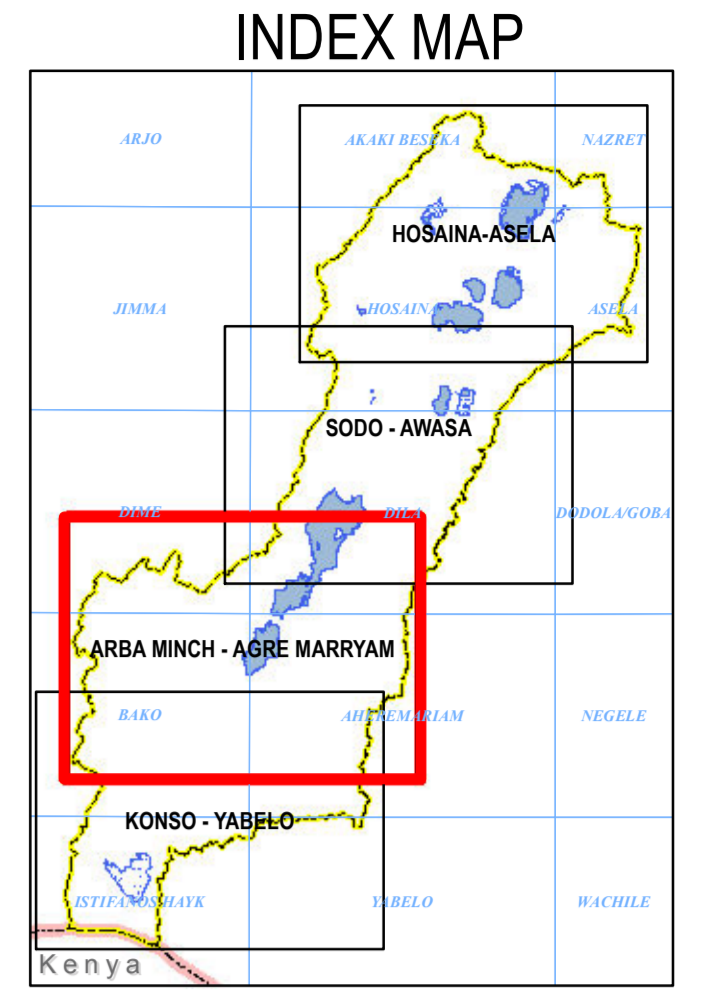


# GEOLOGICAL MAP OF ARBA MINCH - AGRE MARRYAM AREA

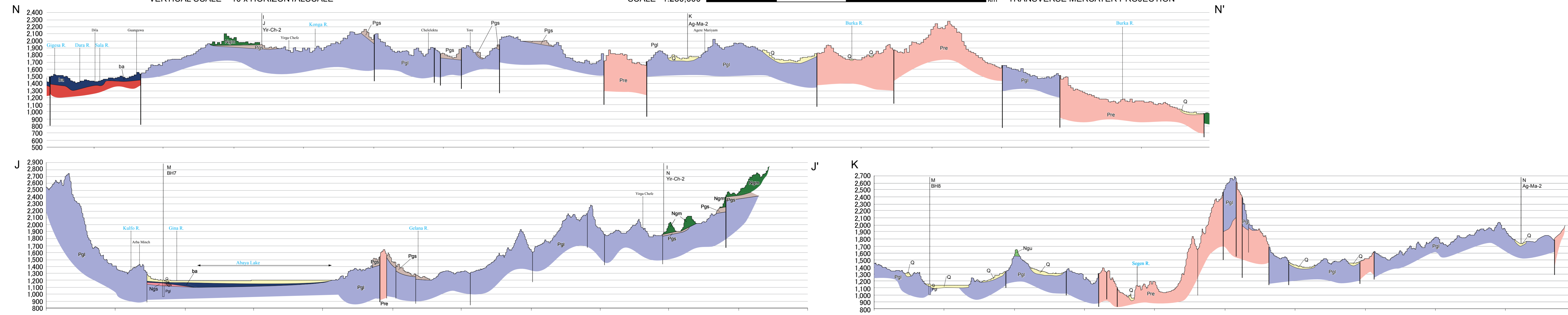


VERTICAL SCALE = 10 x HORIZONTALSCALE SCALE 1:250,000 TRANSVERSE MERCATOR PROJECTION

- 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, downthrown shown
  - Major fault
  - Normal fault, downthrow shown
  - Normal fault
  - Inferred fault, downthrown shown
  - Inferred fault
  - Major fault, downthrown shown, by satellite images
  - Normal fault, downthrow shown, by satellite images
  - Normal fault, by satellite images
  - Inferred fault, downthrown shown, by satellite images
  - Inferred fault, by satellite images
  - Geology boundary
  - Inferred geology boundary
  - Caldera edge
  - Volcanic Cone
- Borehole (Well)**
  - Total depth [m]
  - 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**
  - Al Alluvium; Fine sand - mud
  - Q Unclassified Fluvial Deposits; Sandy gravel-mud
  - lac2 Bulbula Lacustrine Deposits; Lake deposits such as gravel, sand and mud
  - Pm Corbetti Pumice Flow & Fall Deposits; Pumice falls and pumice flow deposits
  - Vol Corbetti Rhyolitic Volcanics; Rhyolite lava flows and Obsidian lava flows
  - rb Butajira Recent Basalt; Basalt lavas and reddish brown basaltic scoria
  - lac1 Meki Lacustrine Deposits; Lake deposits such as poorly-sorted gravel, sand, pumice, tuff, and volcanic sand
- Pleistocene**
  - Y Langano Poorly Welded Pumiceous Pyroclastics; Yellowish white rhyolitic pumice tuff
  - ob Kulumusa Highly Welded Tuff; Rhyolite to andesitic welded tuff
  - W Ketar River Acidic Volcanic Sedimentary Rocks; Rhyolite tuffs and pumice tuffs
  - G Gonde Strongly Green Welded Tuff; Rhyolite to andesitic welded tuff
  - tb Adami Tulu Basaltic Pyroclastics; Basaltic tuff breccias and lapilli tuffs
  - ba Ogoche Pleistocene Basalt; Massive basalt lavas
  - lake Lekansho Lacustrine Deposits; Lake deposits such as sand stone and alternate layer
- Plio-Pleistocene**
  - rh Gademotta Rhyolite; Rhyolite lava flows and rhyolitic tuffs
  - N2b N2b Basalt; Basalt lavas and basaltic pyroclastics
  - NQs NQs Rhyolite; Rhyolitic tuffs
- Pliocene**
  - rht N1\_2n Rhyolitic Volcanics; Plagioclase rhyolite tuff and rhyolite lava flows containing obsidian
  - N1\_2n N1\_2n Rhyolitic Tuff; Plagioclase rhyolite tuff, pumice tuff and crystal tuff
  - N1n N1n Basalt; Anchar Basalt
  - N1ar N1ar Rhyolite; Rhyolite
- Miocene**
  - NgS Sharenga Rhyolite; Rhyolite piles and necks
  - NgU Upper Basalt; Porous basalt lavas
  - NgD Beyana Tuff; Lapilli tuff with minor laminated tuff
  - NgM Middle Basalt; Porphyritic basalt lavas
- Eocene-Oligocene**
  - PgS Shole Welded Tuff; Densely-welded rhyolite welded tuff
  - PgI Lower Basalt; Porphyritic basalt lavas
- MESOZOIC**
  - Mes Adigrat Sandstone, Antaro Limestone; Sandstone, Shale and Limestone
- PRECAMBRIAN**
  - Pre Biotite Gneiss, Pegmatite; Biotite Gneiss, Granite, Biotite Metgranite



**Geological Map** **March 2012**  
**THE STUDY ON GROUNDWATER RESOURCES ASSESSMENT IN THE RIFT VALLEY LAKES BASIN**  
**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**