Geospatial Database System for Water & Land Resource Management

EthioGIS-2
DATA CATALOG
National Geospatial Database System Ethiopia

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1 Introduction

Geographic information and communication technologies (GeoICT) are widely used by experts and scientists to improve public sector governance, to increase efficiency among service providers, and to enhance the exchange and accessibility of geospatial data among planners and decision-makers in key organizations and institutions. Geographic information systems (GIS) are used to compile, manage, and statistically analyse spatial information and thus provide the foundation for any spatial data infrastructure (SDI). Corresponding technology, software apps, and infrastructure can be implemented in a targeted way to enable sharing of geospatial information within a single organization, or more broadly to enable data sharing at the national, regional, or global level.

The **Geospatial Information System Ethiopia (EthioGIS2)** is a collection of geospatial information, data, and models covering all the states of Ethiopia. It is a compilation of selected raster- and vector-based data layers designed to support research, planning, and policy advice on sustainable water and land resource management. The foundation of the file system is based on public domain data, mainly terrain and earth observation models, and research work conducted at the Water and Land Resource Centre (WLRC), Addis Abeba, and the Centre for Development and Environment (CDE), University of Bern. The geospatial database EthioGIS2 is primarily intended to facilitate data sharing, mapping, and modelling at scales ranging between 1:100,000 and 1:1,000,000. Release 2 is an updated and enhanced version of EthioGIS1, which was jointly published in 1999 by the Ministry of Agriculture and the Soil Conservation Research Project (SCRP) of the Swiss Agency for Development and Cooperation (SDC).

EthioGIS2 may be obtained ether

- as an **offline** database (on a 500GB hard disk) available by request from the WLRC in Addis Abeba (wlrc.eth@gmail.com), comprising shapefiles , an ESRI file-based **GeoDatabase** system, and raster files; or
- as a **download** from WLRC's **Water and Land Resources Information System** (WALRIS) at www.wlrc-eth.org

2 File Naming System

Data storage and file naming follow a strict system. Names are kept short and consistent due to limitations that arise when files are used and copied outside of ESRI's file-based systems:

The first four digits of the dataset represent the **geographic location**: two digits for the abbreviation of the **country name** (et = Ethiopia), and two digits for the **basin** or **region name** (te = Tekeze Basin or so = Somali). In cases where an entire country is covered, the region abbreviation is replaced with the abbreviation for **national** (na = national).
*Sample data: **etna**|xxxx|yyyy|zzzz*

The subsequent four digits represent the **topic**, **satellite sensor**, or **data provider** of the dataset (national administration level 0 = adm0).
*Sample data: etna|**adm2**|yyyy|zzzz*

The next four digits represent the **subtopic** of the dataset.
*Sample data: etna|xxxx|**zone**|zzzz*

The following four digits represent the **processing** of the dataset (optional).
*Sample data: etna|xxxx|yyyy|**line***

The final four digits represent **a further classification** of the processing (optional).
*Sample data: etna|xxxx|yyyy|zzzz|**class***

3 Metadata Catalog

Metadata facilitates the discovery of relevant information, enables resources to be found according to relevant criteria, and helps to organize electronic resources. Structural and descriptive metadata (data about data) are found in this document in the chapter on the **National Geospatial Database System** and in the **electronic catalog of the GeoDatabase**. Due to the lack of metadata viewer for shapefile format, the key information about the individual shapefiles is stored in this document. More details about the features are stored in each feature class of the Geodatabase. Please use ArcCatalog to obtain full access to metadata. For some of the data layers you will find a detailed described in the **Documents** folder.

4 Geospatial Data Catalog

This catalog serves as an inventory of the spatial data layers compiled in the **National Geospatial Database System EthioGIS2**. The Geographic Information System of Ethiopia contains a vast amount of spatial information providing a firm basis for sharing, analysing, modelling, and disseminating geospatial information on behalf of natural resource management.

The folder "**FeatureData**" contains a set of reduced-size vector data in shapefile format (< 1 GB/dataset) so that data users with slower computers and OpenGIS software can access the files for their work.

Some of the EthioGIS2 layers have been derived from remote sensing data sources and exceed the two gigabyte limitation set by the open shapefile format (mainly contours derived from ASTER-GDEM V2 data. These layers are stored in the file-based folder **Geodatabase.gdb** in full resolution and are solely accessible via ESRI's ArcMap software version 10.0 or later. This is the **main folder carrying all spatial feature layers in full resolution**.

Some of the raster layers (mainly time series from earth observation satellites) are stored in the "**RasterData**" folder as GeoTIFF to make them accessible via many OpenGIS software and image processing tools. A few of the raster files contain several individual bands in a spatial resolution between 15 and 30 meters. These files are large in size due to the layers' national coverage and are therefore difficult to handle when using less powerful computers and OpenSource software. To process these layers, we highly recommend use of professional image software such as ArcGIS, ERDAS, ENVI, PCI, etc. and use of a powerful computer.

This document also provides interested third parties with an overview of the database system and the topics covered by the information base.

The data catalog of the **National Geospatial Database System Ethiopia** is grouped into three main sections (similar to the EthioGIS2 data storage system):

A **Feature Data** (Shapefile format)

B **GeoDatabase** (ESRI ArcGIS File Geodatabase format 10.x)

C **Raster Data** (GeoTIFF format)

All folders are structured **in thematic subfolders** respective **feature classes** covering relevant geospatial information to enable sharing, analysis, and synthesis of data for water, natural resource and infrastructure management. The catalog should be updated following any addition or deletion of any compiled datasets. Updates of the datasets themselves are not reflected here unless an update results in changes to the attributes of the dataset. We recommend that users consult the digital version of this document on the hard disk for the most up-to-date data catalog.

5 Disclaimer

The administrative boundaries, denominations, and any other information stored in the datasets are **not authoritative** and do not imply any judgment about the legal status of any territory, or constitute any official endorsement or acceptance of the boundaries of Ethiopia or neighbouring countries.

The publishers – the Water and Land Resource Centre (WLRC) Ethiopia and the Centre for Development and Environment (CDE), University of Bern, Switzerland – do not accept responsibility for any consequences or claims by any third party arising from use of the data or information herein. Users of the **National Geospatial Database Ethiopia EthioGIS2** should rely on their own skill and judgment when utilizing the data and information.

6 Acknowledgement

Please note that when data and information is used for your products, the source of the data must be credited or cited **WLRC/CDE: National Geospatial database System EthioGIS-2/Release 2014**. Please be advised that in addition to CDE, University of Bern, WLRC, Ethiopia, and contributing institutions from Ethiopia, EthioGIS-2 was derived from publicly available information under a **Creative Commons Attribution License** from the following sources:

SRTM-C: Public Domain Data. (Credit: U.S. Geological Survey Department of the Interior/USGS), used pursuant to http://www.usgs.gov/laws/info_policies.html.

ASTER: Public Domain Data (Credit: NASA/METI, public domain data); ASTER GDEM is a product of METI and NASA, used pursuant to https://lpdaac.usgs.gov/products/aster_policies

Landsat 4/5/7/8 and TerraMODIS: Public Domain Data. (Credit: USGS, Land Processes Distributed Active Archive Center LP DAAC), USGS/EROS, Sioux Falls, SD. Used pursuant to http://lpdaac.usgs.gov

GeoNames Geographical Database and Webservice: Public Domain Data. http://www.geonames.org/

OpenStreetMap OSM: Open Data License; http://www.openstreetmap.org

Secondary data extracted from publications provided by:

Ethiopian Mapping Agency, P.O.Box 597, Addis Abeba; http://www.ema.gov.et/

National Meteorological Agency of Ethiopia, Addis Abeba, P.O.Box 1090; http://www.ethiomet.gov.et/

Central Statistical Agency Ethiopia, P.O.Box 1143, Addis Abeba, Ethiopia; http://www.csa.gov.et/

7 National Geospatial Database System Ethiopia

The three data sections of the **EthioGIS2 file system** are alphabetically stored (similar to the default listing in your **Windows Explorer** or in ESRI's **ArcCatalog**). Please use ESRI's ArcMap and ArcCatalog software to get access to the data on the **EthoGIS2** hard disk.

In the **Documents** folder you will find valuable information related to processing steps, attribute lists, feature codes, and indices for selected data layers. Please check this folder if metadata do not answer all you questions.

7A FeatureData Folder

This folder contains shapefiles for ArcGIS software 9.x and earlier versions, OpenGIS software and low performance computers. For metadata information please refer to section 7B: GeoDatabase!

Most of the Geodatabase features in section 7B have been converted into shapefile in this folder to make EthioGIS-2 accessible for older software systems. Due to limitations in the shapefile format (file size < 2GB) ASTER-GDEM V2 contour layers etna-astr-xxxx are not part of this folder!

7B GeoDatabase Folder

The **GeoDatabase** is the main EthioGIS-2 data container. All vector and most of the raster data are stored in this folder. The **GeoDatabase** is the main source for mapping and modelling.

Administration

etnaadm0nati: Administrative polygons level 0; international boundary, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery April 2013

etnaadm1regn: Administrative polygons level 1; regions, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)
Attribute: R_Name, R_Code = names and codes of regions

etnaadm1regnline: Administrative lines level 1; regions, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)

etnaadm2zone: Administrative polygons level 2; zones, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)

Attribute: Z_Name, Z_Code = names and codes of zones

etnaadm2zoneline: Administrative lines level 2; zones, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)

etnaadm3were: Administrative polygons level 3; weredas, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)
Attribute: W_Name, W_Code = names and codes of weredas

etnaadm2wereline: Administrative lines level 3; wereda, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)

etnaadm4kebe: Administrative polygons level 4; kebele, for population statistics the layer does not include the lake area; feature class does not cover Somali region
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)
Attribute: RK_Name, RK_Code = names and codes of kebele region T_Name = town names, KK_Name = Kebele name of town

etnaadm2wereline: Administrative lines level 3; wereda, for population statistics the layer does not include the lake area
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery (April 2013)

etnaadmnbndr: Administrative polygons level 0; international boundary (bndr) without lakes
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery April 2013

etnaadmnbndrline: Administrative lines level 0; international boundary line without lakes
Data source: base line information as provided by CSA; delineation of lakes and boundaries along river lines based on Landsat8 imagery April 2013

etnaadmnbuff02km: Administrative polygon level 0; international boundary with a buffer of 2km used for clipping of data that includes boundary features (i.e. rivers)
Data source: base line information as provided by CSA; delineation along etnaadmnbndr plus 2 km

Climate

etnanmaemets: Point feature layer of the National Meteorological Agency of Ethiopia (nmae) showing locations of meteorological stations (mets)
Data source: National Meteorological Agency Ethiopia
Attribute: long = longitude as provided by NMA, lat = latitude as provided by NMA, alt = Altitude as provided by NMA, RK_Name, RK_Code = names and codes of kebele region, station_na = station name; class = classifica-

tion of meteo station, Region, Zone, Wereda,

Demography

etnaadm3popl2007: Polygon feature layer adapted from CSA combining administrative boundaries of Ethiopia level3 (Weredas), Somali area and 2007 CSA population census data.
Data source: Central Statistical Agency Ethiopia
Attribute: W_name = Wereda name, W_code = Wereda code, regions and zones, Dens = population density, Wstat_N/Wstat_C = Wereda name/code from the census statistic (Rstat_C/RstatN= codes and names of regions

Hydrology

etnaastrdams2015: Polygon feature layer showing filled water level of Grand Renaissance Damsite (dams) based on ASTER-GDEM V2 Digital Terrain Model (astr). Model development dated 2015.
Data source: ASTER-GDEM (terrain) and Google Earth (location)
Attribute: none

etnahydranno: Point feature layer showing names of hydrological (hydr) annotations (mainly lakes).
Data source: www.geonames.org
Attribute: field DSG LK = lake, SPNG = spring, PND = pond, WTR = water point, other features see document GeonamesFeatureCodes

etnahydrgstn: Point feature layer showing locations of hydrological (hydr) gauging stations (gstn). Source data from MoWE have been replaced according to drainage model and Google Earth imagery.
Data source: www.movr.gov.et
Attribute: Insta_Date = Installation date, remark = operational

etnahydrpnts: Point feature layer showing objects and names of hydrological (hydr) features (pnts). Processing includes spatial adjustments, removal of duplicates and final compilation.
Data source: www.geonames.org; compilation of all hydro features done by CDE
Attribute: Object = waterfall, well, water point, river name, marshland, wadi; see document GeonamesFeatureCodes

etnalndsdrlk: Polygon feature layer showing temporary or seasonal water surfaces and dry lakes (drlk) based on 2013 Landsat8 imagery of dry period.
Data source: www.lpdaac.usgs.gov
Attribute: type = dry lake

etnalndssrfw: Polygon feature layer showing permanent surface water and lakes (srfw) based on 2013 Landsat8 imagery of dry period.
Data source: www.lpdaac.usgs.gov
Attribute: type = dam lake, natural lake

etnasrtm500p: Line feature layer showing stream lines hierarchy with a threshold level of 500 SRTM pixels for drainage. Sinks of terrain data from SRTM-C version 4.1 have been corrected for optimal drainage. This layer is the primary layer for modelling!
Data source: www.usgs.gov: www.cde.unibe.ch
Attribute: Grid_Code = 1-8 (1 = minor tributary; 8 = major river)

etnasrtm500psml5: Line feature layer showing stream lines hierarchy with a threshold level of 500 SRTM pixels for drainage. Sinks of terrain data from SRTM-C version 4.1 have been corrected and smoothed for optimal display. This layer is

the primary layer for mapping!
Data source: www.usgs.gov: www.cde.unibe.ch
Attribute: Grid_Code = 1-8 (1 = minor tributary; 8 = major river)

etnasrtmmainbasin: Polygon feature layer showing main (main) drainage basins (internal and external) of Ethiopia.
Data source: www.usgs.gov
Attribute: name = name of basin

etnasrtmshrlclip: Polygon feature layer showing shorelines (shrl) clipped for the Horn of Africa. The layer is meant for mapping!
Data source: www.usgs.gov; www.cde.unibe.ch;
Attribute: none.

Etnasrtmsink: Point feature layer used to define internal drainage (no outlet of streams). Based on these sinks basin and sub-basin layers have been developed! The layer is meant for modelling only!
Data source: www.cde.unibe.ch
Attribute: none.

etnasrtmsubbasin: Polygon feature layer showing sub (subb) drainage basins (internal and external) of Ethiopia.
Data source: www.usgs.gov; www.cde.unibe.ch;
Attribute: none

etnasrtmwatrshed: Polygon feature layer showing ungauged watersheds defined by stream orders.
Data source: www.usgs.gov; www.cde.unibe.ch;
Attribute: none

Infrastructure

etnabuilding: Polygon feature layer showing buildings and compounds of larger settlements (digitized by OpenStreetMap)
Data source: www.openstreetmap.org; www.cde.unibe.ch;
Attribute: fclass = building

etnageonames2008: Point feature layer showing the complete set of geographic objects as distributed by GeoNames in 2008. No processing added by CDE.
Data source: www.geonames.org; accuracy of spatial location > 1km
Attribute: see document GeonamesFeatureCodes

etnageonames2012: Point feature layer showing the complete set of geographic objects as distributed by GeoNames in 2012. All duplicates removed and processing added by CDE!
Data source: www.geonames.org; www.cde.unibe.ch; accuracy of spatial location > 1km
Attribute: see document GeonamesFeatureCodes

etnareligion: Point feature layer showing a subset of geonames features with reference to the religion. All duplicates removed and processing added by CDE!
Data source: www.geonames.org; www.cde.unibe.ch; accuracy of spatial location > 1km
Attribute: see document GeonamesFeatureCodes

etnaroadosm1: Line feature layer showing infrastructure for transports as compiled by the Ethiopian Road Authority, extracted by CDE from satellite imagery and compiled from OpenStreetMap data 2013. All duplicates removed and processing added by CDE!
Data source: www.rta.gov.et; www.openstreetmap.org; www.cde.unibe.ch; accuracy of spatial location < 15m
Attributes: fclass, fcode = 1-8 (1 = main road, 2 = secondary road, 3 = ter-

tiary road, 4 = dirt road, 5 = track, 6 = airstrip, 7 = railway, 8 = street (OSM)

etnastlmmerg: Point feature layer showing a compilation of EMA, Geonames and extracted settlement (stlm) locations from satellite imagery. Locations are cross-checked by Google Earth and Landsat 7/8 iImagery and EMA. All sources have been merged (merg). Some of the locations extracted from imagery do not have annotations (NN). Spelling of names has not been checked!
Data source: www.geonames.org; www.ema.gov.et; www.cde.unibe.ch; accuracy of spatial location > 1km
Attribute: TownName; hierarchy of settlements = large, medium, small, not classified;

Land Resources

etnafarmlandanno: Point feature layer showing state and commercial farm annotations!
Data source: www.geonames.org;
Attribute: see document GeonamesFeatureCodes

etnalst8landsegm: Polygon feature layer showing non classified landsat8 (lst8) land cover (land) segments based on LS8channels 432. Intermediate product!
Data source: http://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: grid_code = 1-16 (non classified scheme based on multi-resolution segmentation)

etnanatnfrstanno: Point feature layer showing state forest annotations
Data source: www.geonames.org;
Attribute: see document GeonamesFeatureCodes

etnanatnparkanno: Point feature layer showing national park annotations
Data source: www.geonames.org; www.cde.unibe.ch;
Attribute: see document GeonamesFeatureCodes

Mapping

etnabndrmask: Polygon feature layer showing the area outside of the international boundary. Used for masking neighbouring countries in support of mapping.
Data source: www.csa.gov.et; www.cde.unibe.ch;
Attribute: none

etnalndspath: Polygon feature layer showing path (path) and rows of landsat (lnds) imagery; used for download and mosaicking of landsat imagery!
Data source: http://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: path, row, daytime class.

etnamape100k: Polygon feature layer showing path and rows of map sheets. Mainly used for printing of map series related to map extent (mape) and scale (100k)!
Data source: www.cde.unibe.ch;
Attribute: map sheet and title are not indicated!

etnamape250k: Polygon feature layer showing path and rows of map sheets. Mainly used for printing of map series related to map extent (mape) and scale (250k)!
Data source: www.cde.unibe.ch;
Attribute: map sheet and map title are listed.

etnamape500k: Polygon feature layer showing path and rows of map sheets. Mainly used for printing of map series related to map extent (mape) and scale (500k)!
Data source: www.cde.unibe.ch;

Attribute: map sheet and map title are listed.

Soil Resources

etnageollava: Point feature layer showing locations of volcanic activities
Data source: www.geonames.org; www.cde.unibe.ch;
Attribute: see document GeonamesFeatureCodes

etnageolmome: Polygon feature layer showing geological informations as digitized from the Geological Map of Ethiopia (Ministry of Mines of Ethiopia MoMe).
Data source: www.mom.gov.et; www.cde.unibe.ch;
Attribute: Age, GLG = Geology

etnasoiltype: Polygon feature layer showing regional soil units as modelled by Brunner, Marcel 2011. Dominant soil groups are listed under reference soil groups. See document: SoilTypeModel; Lyr-file is located in the corresponding feature class!
Data source: www.cde.unibe.ch;
Attribute: RSG = Leptosols (LP), Nitisols (NT), Vertisols (VR), Cambisols (CM), Calcisols (CL), Gypsisols (GY), Luvisols (LV), Fluvisols (FL), Alisols (AL), Solonchaks (SC), Regosols (RG), Arenosols (AR), Andosols (AN), Phaeozems (PH), Gleysols (GL), Lixisols (LX), Acrisols (AC), Chernozems (CH), Solonetz (SN), Histosols (HS), Ferralsols (FR);

Topography

etnaastrcontb025: Line feature layer showing contour lines (cont) based on ASTER-GDEM V2 (astr): basis 25m/interval 100m
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 125m, 225m, 325m, …

etnaastrcontb050: Line feature layer showing contour lines (cont) based on ASTER-GDEM V2 (astr): basis 50m/interval 100m
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 150m, 250m, 350m, …

etnaastrcontb075: Line feature layer showing contour lines (cont) based on ASTER-GDEM V2 (astr): basis 75m/interval 100m
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 175m, 275m, 375m, …

etnaastrcontb100: Line feature layer showing contour lines (cont) based on ASTER-GDEM V2 (astr): basis 00m/interval 100m
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 100m, 200m, …

etnamntnanno: Point feature layer showing mountain (mntn) peaks and annotations (anno); all locations have been cross-checked with DEM/hillshade.
Data source: www.geonames.org; www.cde.unibe.ch;
Attribute: see document GeonamesFeatureCodes

etnaplananno: Point feature layer showing planes and annotations; no processing added!
Data source: www.geonames.org;
Attribute: see document GeonamesFeatureCodes

etnaplatanno: Point feature layer showing plateaus and annotations; no processing added.
Data source: www.geonames.org;
Attribute: see document GeonamesFeatureCodes

eetnasrtmcontb050: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 50m/interval 100m (b050); contours are smoothed and smaller lines are eliminated.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 050m, 150m, 250m, …

etnasrtmconti100: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 100m (i100); contours are smoothed and smaller lines are eliminated.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 100m, 200m, …

etnasrtmconti100anno: Annotation layer showing hypsometry in meters placed in the centre of the contours (cont) SRTM V4.1 (srtm). This layer has to be used together with the corresponding mask and base layers for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmconti100base: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 100m (i100); contours are reduced, smoothed and smaller lines are eliminated. This contour layer has to be used together with the corresponding anno and mask layer for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 100m, 200m, …

etnasrtmconti100mask: Polygon feature layer showing small masks for labelling. This layer has to be used together with the corresponding base and anno layer for contour labelling (interrupts the contour line for labelling)!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmconti250: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 250m (i250); contours are smoothed and smaller lines are eliminated.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 250m, 500m, …

etnasrtmconti250anno: Annotation layer showing hypsometry in meters placed in the centre of the contours (cont) SRTM V4.1 (srtm). This layer has to be used together with the corresponding mask and base layers for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmconti250base: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 100m (i100); contours are reduced, smoothed and smaller lines are eliminated. This contour layer has to be used together with the corresponding anno and mask layer for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 100m, 200m, …

etnasrtmconti250mask: Polygon feature layer showing small masks for labelling. This layer has to be used together with the corresponding base and anno layer for contour labelling (interrupts the contour line for labelling)!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmconti500: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 100m (i500); contours are smoothed and smaller lines are eliminated.

Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 500m, 1000m, …

etnasrtmconti500anno: Annotation layer showing hypsometry in meters placed in the centre of the contours (cont) SRTM V4.1 (srtm). This layer has to be used together with the corresponding mask and base layers for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmconti500base: Line feature layer showing contour lines (cont) based on SRTM V4.1 (srtm): basis 000m/interval 100m (i100); contours are reduced, smoothed and smaller lines are eliminated. This contour layer has to be used together with the corresponding anno and mask layer for contour labelling!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: Contour = 000m, 100m, 200m, …

etnasrtmconti500mask: Polygon feature layer showing small masks for labelling. This layer has to be used together with the corresponding base and anno layer for contour labelling (interrupts the contour line for labelling)!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: TextString and related items according to ESRI annotation standards

etnasrtmspothght: Point feature layer showing spot heights derived from SRTM data; model developed by CDE based on curvature and a reduced set of contour polygons < 10km2!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: height in meters.

etnavalyanno: Point feature layer showing annotations for valleys
Data source: www.geonames.org; www.cde.unibe.ch;
Attribute: see document GeonamesFeatureCodes

Watersheds

etabsrtmmriv: Line feature layer showing main river lines (mriv) of Abbay/Blue Nile basin (etab) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

etabsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Abbay/Blue Nile basind (etab) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etabsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Abbay/Blue Nile basin. Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etawsrtmmriv: Line feature layer showing main river lines (mriv) of Awash basin (etaw) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

etawsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Awash basind (etaw) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;

Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etawsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Ayisha basin (etay). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etaysrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Ayisha basind (etay) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etaysrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Ayisha basin (etaw). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etbasrtmmriv: Line feature layer showing main river lines (mriv) of Baro Akobo basin (et-ba) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

etbasrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Baro Akobo basind (etba) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etbasrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Baro Akobo basin (etba). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etdesrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Denakil basind (etde) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etdesrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of De-nakil basin (etde). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etgdsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Genale Dava basind (etgd) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etgdsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Genale Dava basin (etgd). Delineation of watershed based on stream or-der.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etmgsrtmmriv: Line feature layer showing main river lines (mriv) of Mereb Gash basin (etmg) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

etmgsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Mereb Gash basind (etmg) derived from the hydroDEM (drainage corrected SRTM

data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etmgsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Mereb Gash basin (etmg). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etodsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Ogaden basind (etod) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etodsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Ogaden basin (etod). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etogsrtmmriv: Line feature layer showing main river lines (mriv) of Omo Gibe basin (etog) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

etogsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Omo Gibe basind (etog) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etogsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Omo Gibe basin (etog). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etrvsrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Rift Valley basind (etrv) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etrvsrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Rift Valley basin (etrv). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

ettesrtmmriv: Line feature layer showing main river lines (mriv) of Tekeze basin (ette) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: rivclass = order of streams: 1 = smallest/ 8 = largest

ettesrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Tekeze basin (ette) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

ettesrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Tekeze basin (ette). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

etwssrtmtrib: Line feature layer showing tributaries (trib) to main river lines of Wabe

Shebele basind (etws) derived from the hydroDEM (drainage corrected SRTM data)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: gridcode = order of streams: 1 = smallest/ 8 = largest

etwssrtmwshed: Polygon feature layer showing ungauged sub-watersheds (wshed) of Wabe Shebele basin (etws). Delineation of watershed based on stream order.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: HydroID = individual number for each watershed

GeoDatabase Raster Models

etnaastrdem0030m: Raster model showing elevations in meters (dem0); mosaiced and projected from ASTER-GDEM V2 (astr) tiles, spatial reolution 30m. This layer is the foundation for all derivatives based on ASTER-GDEM data.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = elevation in meters

etnaastrhil3030m: Raster model showing exaggerated hillshade by factor 3 (hil3) based on ASTER-GDEM V2 (astr), spatial reolution 30m. This layer is the foundation for mapping.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnalscnpopl2012: Raster model showing ambient population density per km2tions in meters (dem0); Population density model developed by Oak Ridge National Laboratories.
Data Source: www.ornl.gov/landscan/
Attribute: value = population density in pop/km2

etnanmaeprecmodl: Raster model showing spatial distribution of mean annual precipitation based on NMA data from 168 stations and an orographic model; records from 1965-2005 have been used for modelling
Data Source: www.ethiomet.gov.et/; www.cde.unibe.ch;
Attribute: value = rainfall in millimeter

etnasrtmastrdiff030m: Raster model showing differences (diff) in elevation between SRTM V4.1 and ASTER-GDEM V2, spatial resolution 30m. This layer is the foundation for modelling.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = diff of elevation in meters (subtraction: ASTER-SRTM)

etnasrtmcurv090m: Raster model showing ESRI curvature based on SRTM data 90m resolution.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnasrtmcurvplan: Raster model showing ESRI curvature plan based on SRTM data 90m resolution.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnsrtmcurvprof: Raster model showing ESRI curvature profile based on SRTM data 90m resolution.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnasrtmdem0030m: Raster model showing SRTM elevation data resampled to 30m spatial resolution.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = elevation data in meters

etnasrtmdem0090m: Raster model showing SRTM reference data for elevation modelling; origi-

nal spatial resolution of 90m. This is the foundation for any SRTM-based models.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = elevation data in meters

etnasrtmhil3090m: Raster model showing exaggerated hillshade by factor 3 (hil3) based on SRTM (srtm), spatial resolution 90m. This layer is the foundation for mapping.
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnasrtmslp0degr: Raster model showing slopes as degree (degr)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnasrtmslp0faoclass: Raster model showing slopes as faoclass (faoc); 8 classes according to FAO standards!
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

etnasrtmslp0perc: Raster model showing slopes as percent (perc)
Data Source: https://lpdaac.usgs.gov; www.cde.unibe.ch;
Attribute: value = gray color ramp

7C RasterData Folder

The **Raster Data Folder** contains mainly time series and remotely sensed data for land resources management. It's a supplementary data folder. The individual files do not have metadata but the file list and data catalog below provides all information about the third party contributors. The **RasterData Folder** is the main source for further processing and modelling.

AgroEcology

etnaagroeco1: Raster model showing agro eco belts according to Hurni, K. 2008 based on climate and topography. For further details please consult the corresponding document in the document folder.
Data Source: www.cde.unibe.ch;
Attribute: see related document

Climate

etnatempmeanxxxx: Raster model showing mean temperature by month (mean of 27 years)
Data Source: www.worldclim.org;
Attribute: see data source

etnaprecsum1xxxx: Raster model showing sum of precipitation (sum1) by month (mean of 27 years)
Data Source: www.worldclim.org;
Attribute: see data source

LandResources

etnaglobcovr2009: Global raster model (glob) for Ethiopia showing land cover units (covr) based on MERIS data from ESA; release date: 2009
Data Source: http://due.esrin.esa.int/globcover/;

Attribute: see data source

Landsat 4-8 and derivatives

etnalst4m30m1990: Landsat 4 mosiac (lst4) showing multi-spectral 30m resolution (m30m) color-corrected imagery; compiled from cloud-free data dated between 1989 and 1991.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst7m15m2000: Landsat 7 mosiac (lst7) showing pansharpend multi-spectral (m15m) color-corrected imagery; compiled from cloud-free data dated between 1999 and 2001.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst7m60m2000: Resampled landsat 7 mosiac (lst7) showing pansharpend multi-spectral (m60m) color-corrected imagery; compiled from cloud-free data dated between 1999 and 2001.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst7m90m2000: Resampled landsat 7 mosiac (lst7) showing pansharpend multi-spectral (m90m) color-corrected imagery; compiled from cloud-free data dated between 1999 and 2001.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst8m30m2013: Landsat 8 mosiac (lst8) showing multi-spectral (m30m) RGB imagery; compiled from cloud-free scenes dated between April and June 2013.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst8m30m2014: Landsat 8 mosiac (lst8) showing multi-spectral (m30m) band 1-4 normal 321/false colour imagery 432; compiled from cloud-free scenes dated between Dec 2013 and April 2014.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnalst8p15m2014: landsat 8 mosiac (lst8) showing panchromatic channel (m15m) imagery; compiled from cloud-free scenes dated between Dec 2013 and April 2014.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

Terra MODIS NDVI and derivatives

etnamodtndvi20xx: TerraMODIS (modt) 16 days NDVI (ndvi) time series covering the period 2000 to 2013.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodt/ndvidiff20xx: TerraMODIS (modt) 16 days NDVI / Difference of maximum NDVI value and minimum value by year (2000 to 2013)
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodt/ndvimax20xx: TerraMODIS (modt) 16 days NDVI / Maximum NDVI value by year (2000 to 2013)
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodt/ndvimean20xx: TerraMODIS (modt) 16 days NDVI / Mean NDVI value by year (2000 to 2013)
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodt/ndvimin20xx: TerraMODIS (modt) 16 days NDVI / Minimum NDVI value by year (2000 to 2013)
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodtndvitrnd: TerraMODIS (modt) 16 days NDVI (ndvi) trend (trnd) covering the period between 2000 and 2013
Data Source: http://lpdaac.usgs.gov
Attribute: not available

etnamodtqual20xx: TerraMODIS (modt) 16 days quality file (qual) time series covering the period 2000 to 2013.
Data Source: http://lpdaac.usgs.gov
Attribute: not available

Topography

etnasrtmrghn: Raster model showing terrain roughness (rghn) index based on SRTM data (srtm)
Data Source: http://lpdaac.usgs.gov
Attribute: see details in document Topography-etnasrtmrghn.pdf

Etnasrtmtri1: Raster model showing terrain ruggedness index (tri1) based on SRTM data (srtm)
Data Source: http://lpdaac.usgs.gov
Attribute: see details in document Topography-etnasrtmtri1.pdf

Watersheds

etxxflowaccu: Raster model showing flow (flow) accumulation (accu) for the main drainage basins (xx) based on SRTM data; names of main drainage basin see data layer: **etnasrtmmainbasin.**
Data Source: http://lpdaac.usgs.gov
Attribute: see details in ESRIS's help "flow accumulation"

etxxflowdire: Raster model showing flow (flow) direction (dire) based on SRTM data (srtm); names of main drainage basin see data layer: **etnasrtmmainbasin.**
Data Source: http://lpdaac.usgs.gov
Attribute: see details in ESRI's help "flow direction"