

Download of Shuttle Radar Topography Mission data (SRTM) & import in ILWIS.

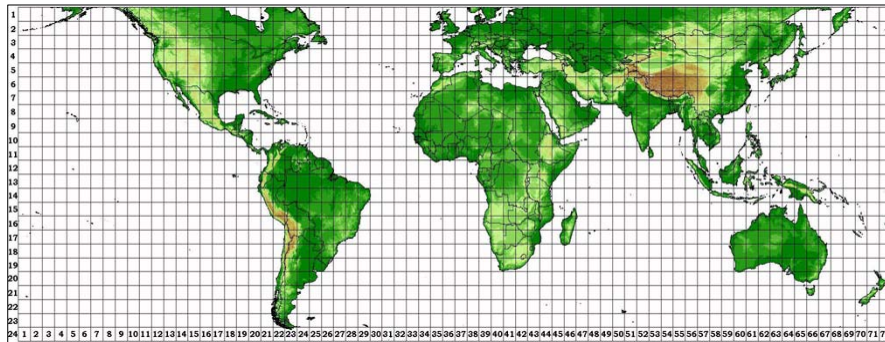
Global SRTM 3 arc second elevation data can be downloaded for free from the CGIAR-CSI website: <http://srtm.csi.cgiar.org/>. The data is already pre-processed to 90 meter pixels in GeoTIFF. This means that it has already a georeference of the World Geodetic System 1984, and Ellipsoid WGS1984.



A downloaded example SRTM data file is provided from the RiskCity area in Honduras (filename: RiskCity_SRTM). If the speed of your internet connection is fast enough, you can try to download SRTM data yourself.

First you select the SRTM tile to be downloaded on a global map; after this you download the data. The data, after being unzipped can be imported directly into the ILWIS program. Further processing can be carried out in the Hydro -DEM modeling module of ILWIS. In this module we can make a color hill shade, with good terrain expression.

More information on SRTM: <http://srtm.usgs.gov/>



A. Coordinates of area to be downloaded

First you select the coordinates in **Lat. / Long.** of area to be downloaded from the CGIAR website.

RiskCity (Tegucicalpa, Hond)	Latitude	Longitude	UTM X (Zone 16)	UTM Y (Zone 16)
Upper Left corner	14 ⁰ 15' 00" N	88 ⁰ 00' 00" W	448.000	1.570.000
Lower Right corner	13 ⁰ 30' 00" N	87 ⁰ 00' 00" W	497.000	1.532.000

Own study areav (optional):

Upper Left corner				
Lower Right corner				

Remark: Lat-Long to UTM Conversion: www.cellspark.com/UTM.html

B. Download of SRTM data from the CGIAR-CSI website

The SRTM data file has to be downloaded from the CGIAR-CSI Website in blocks of 5 x 5 degrees. Please note that the GeoTIFF data has an extension **tif** (so, without “Geo”) This file in WGS 84 with Lat. / Long. Coordinates. Make sure that the ***.tif** file has the header file and ***.tfw** file attached to it.

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- Browse to the **CGIAR-CSI website**:
<http://srtm.csi.cgiar.org/>
- Select under **SRTM Content: SRTM Data Search and Download**
- Select the Server to download from, the Data Selection Method and the File Format. You start with the following options: (later you can try different ones).
Remark: Try first the server **JRC (IT)**, which gives also the header files for the WGS84 Datum.
 - Server: **JRC (IT)**
 - Data Selection Method: **Input Coordinates (Decimal Degrees or Degrees, Minutes, Seconds)**
 - Type from **Longitude** and **Latitude** the **Min.** and **Max.** values.
 - Select File Format: **GeoTIFF**
- If done select: **Click here to Begin Search.**
A next webpage opens with Quick-looks and image information of the selected area(s). Check the areas you want to download.
- Select for the tile(s): **Data Download (HTTP).**
- Select: **Save** in the File Download window. Create one folder for all the SRTM data tiles.
- UNZIP the tile data. Make sure that not only the ***tif** file, but also the files ***.hdr** and ***.tfw** are given. (See example). .

Name	Modified	Size
readme.txt	9/19/2008 3:05 PM	2,479
srtm_19_10.hdr	9/20/2008 8:37 AM	1,140
srtm_19_10.tfw	9/20/2008 8:37 AM	156
srtm_19_10.tif	9/20/2008 8:37 AM	72,096,675

 Unfortunately this is not always the case with **TelaScience (USA)** and **AGDevSolutions**. Therefore use **Server JRC IT first.**
- Open the ***hdr** with Word. Read the details of the SRTM data.

C. Import and display of SRTM GeoTIFF data in ILWIS

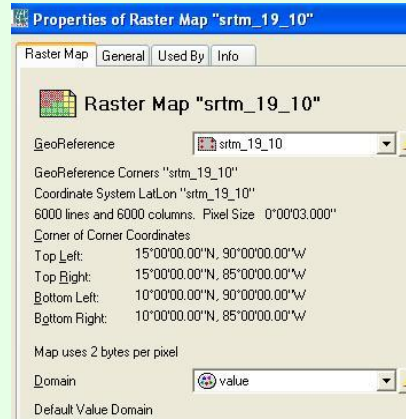
GeoTIFF data can be easily imported in the ILWIS program. The resulting file will still have Lat / Long coordinates and a pixel size in degrees. This size is 3 Arc Seconds, corresponding in the UTM coordinate system with approximately 90 meters.

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- Open the ILWIS program
- Browse with the Navigator to the folder with the downloaded and unzipped SRTM data
- Select in the ILWIS Main menu: **File > Import > Via GDAL**
- Select in the Import window the SRTM *.TIF file; type the

Output File name. If done: **OK**

- Display the SRTM by double clicking the Raster Map icon. Select in the Display – Raster map window:
 - Representation: **Elevation 1.**
 - Check Box: **Info**
 - Stretch: **Linear**
 - Leave all other values default
 - If done: **OK**
- Browse with the cursor through the display of the SRTM DEM. The values are in meters altitude
- Select **Properties** by double clicking. Read in the Properties of Raster map window the Pixel size and the Corner Coordinates. The pixel size and Coordinates are still in degrees and not yet in UTM WGS84 with meter values. The Domain should be **Value**.



D. Creating a subset in UTM WGS 84 and 90 meter pixels

To give the data UTM coordinates in meters in stead of Lat / Long and degrees, the dataset has to be resampled to a new **GeoReference**. First a ILWIS **Coordinate system** has to be created. Finally the dataset has to be **Resampled** to a pixel size of 90 meters.



- Select in the ILWIS Main menu: **File > Create > Coordinate System...**
- Select or type in the Create Coordinate System window:
 - **Coordinate System Projection**
 - Type the **Coordinate system name**
 - If done: **OK**
- Select in the Coordinate System Projection window:
 - Tab Projection: select: **UTM**, if done **OK**
 - Tab Ellipsoid: select: **WGS 84**, if done: **OK**
 - Tab Datum: select: **WGS 1984**, if done: **OK**

You can find a list with UTM zone zones by searching ILWIS Help. Search for: **Projections: UTM zones**
- If done: **OK**

Create a **GeoReference** from the study area, using **UTM** coordinate system



- Select in the ILWIS Main menu: **File > Create > GeoReference..**
- Select or type in the Create GeoReference window:
 - **GeoRef Corners**
 - Type the **GeoReference name**

- Select **Coordinate System** (the one you created)
- Type the **Pixel size**: 90 (meters)
- Type the **Min X,Y** and **Max X,Y** coordinates in UTM of the study area

Finally the dataset has to be **Resampled** to the **GeoReference**, with a pixel size of 92 meters.



- Select in the ILWIS Main menu: **Operations > Image processing > Resample**.
- Select or type in the Resample Map window:
 - **Raster Map**: select the downloaded SRTM file in Lat / Long
 - Resampling Method: **Bicubic**
 - Type the name of the **Output Raster Map**
 - **GeoReference**: select the one you created before
 - If done: **OK**
- Display the newly created SRTM file. Check the **Properties**.

E. Creation of a colour composite hill shade

A special colour hill shade script for elevation data has been developed by Koert. Sijmons, ITC.



- Select in the ILWIS Main menu: **Operations > DEM Hydro-Processing > DEM Visualization**
- Select in the DEM Visualization window the SRTM data; type the **Output File name**. If done: **OK**
A script is used to create the colour-hill shade. This can take some time.
- Study the color hill-shade map. Zoom in and out if you like.

Short explanation of the calculations by the script:

- First three shadow maps are created using the shadow filters ShadowW (West), Shadow (North-West) and ShadowN (North).
- The three shadow maps are stretched using linear stretching.
- The color composite that is created from these stretched shadow maps is a 24-bit color composite.
- Finally, temporary raster maps are removed and the output color composite is displayed.