Loading 'Shuttle Radar Topography Mission' maps in L3DT

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This tutorial explains how to import real-world terrain into L3DT, using radar-generated height data produced by the NASA 'Shuttle Radar Topography Mission' (SRTM). In this case, we will be using the 90 metre resolution SRTM data that is provided free of charge by CGIAR, which covers the majority of the Earth's surface. Higher-resolution SRTM or LIDAR data is available elsewhere, but this is outside the scope of this tutorial.

Required L3DT version

Before we proceed further, I should mention that to follow this tutorial you will need L3DT Professional version 2.7 build 6 or later. If you do not have this version, or a later version thereof, please update your copy of L3DT Professional.

Note: L3DT Professional is required because each SRTM v4.1 file is 6001×6001 pixels in size, which is too large to load in L3DT Standard edition.

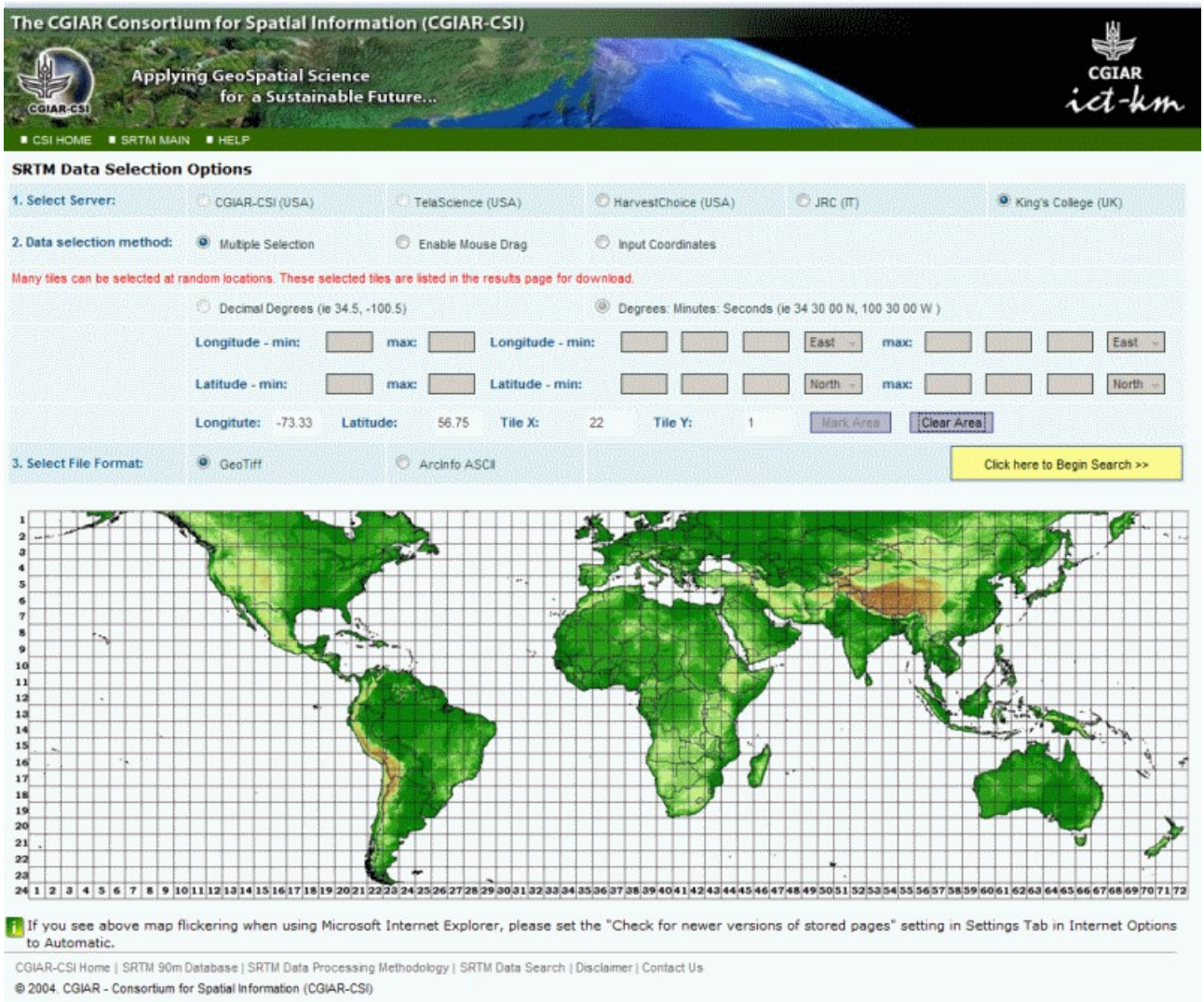
Some acronyms explained

This tutorial uses several acronyms, the meanings of which are listed below:

CGIAR	Consultative Group on International Agricultural Research.
CIAT	International Centre for Tropical Agriculture.
CSI	Consortium for Spatial Information.
SRTM	Shuttle Radar Topography Mission.
GeoTIFF	Georeferenced tagged image file format.

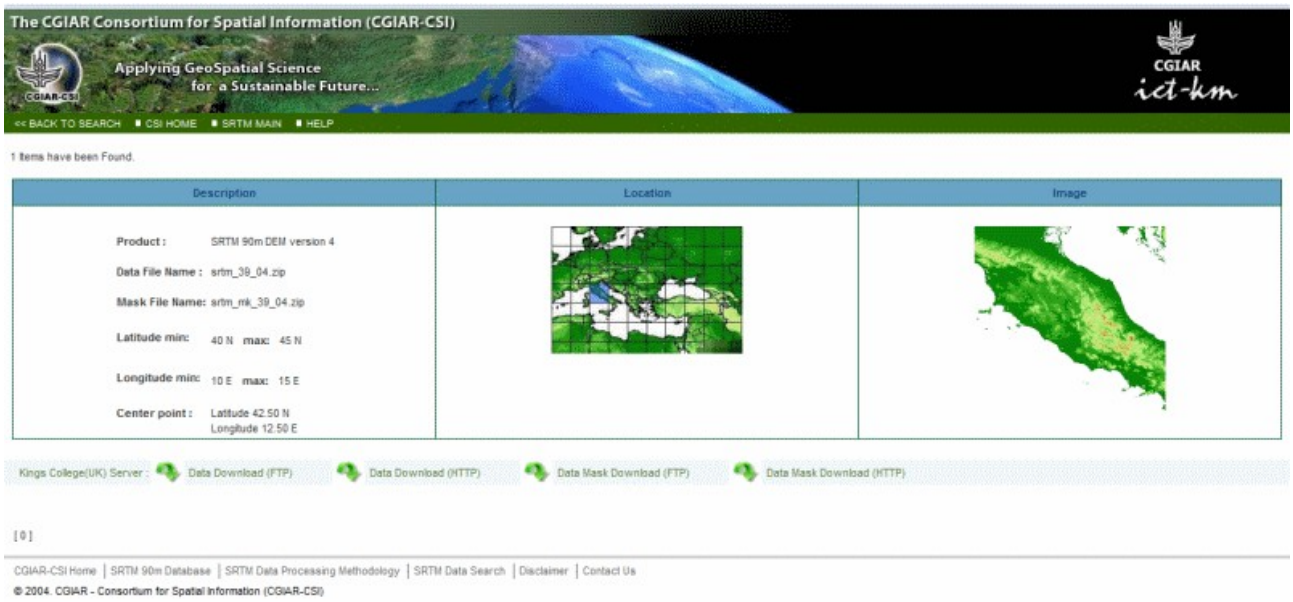
Accessing SRTM data

Thanks to the wonderful people at CIAT-CSI [1], you may download SRTM data for the Earth's surface in a handy GeoTIFF format from the CGIAR-CSI SRTM download page, as shown below.



To select the area you wish to download, you may either left-click on the tiles in the map, or else manually input the latitude/longitude extents for your desired area. Once you have selected your area, press the bright yellow 'Click here to begin search' button to proceed to the results page.

On the results page, shown below, you may select the type of download using either HTTP (see 'Data download (HTTP)' link) or FTP (see 'Data download (FTP)' link). If you don't know what FTP is, use the HTTP option.



Once you have selected your download type, the download should commence. The data is packed into a ZIP archive, with a size of about 20MB per tile.

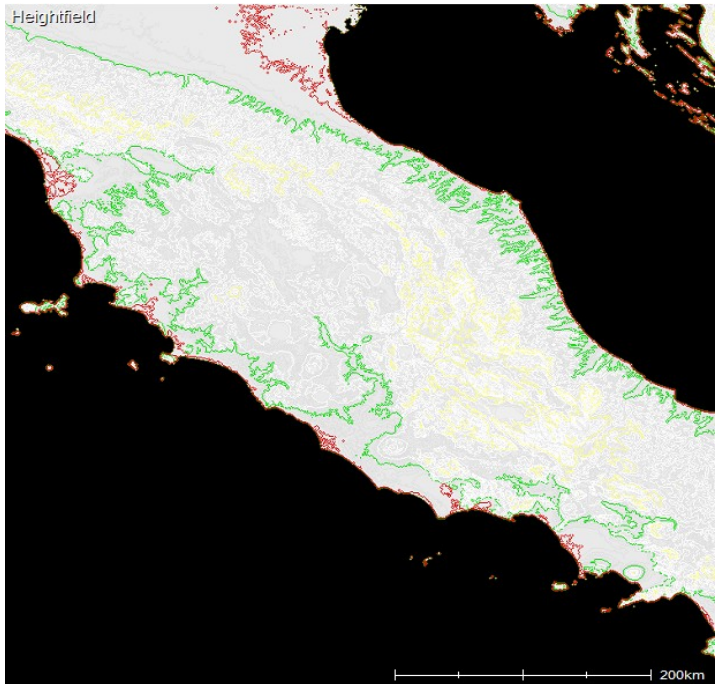
What is in the download archive?

The download archive includes four files:

- A TIF file, in GeoTIFF format, which contains the actual height data. Please see the next section for how to load this file in L3DT.
- A Readme.txt file, which you should read at least once (see example).
- A HDR file, which is a text file that describes the GeoTIFF projection, datum, extents, etc. (see example). This file is not used by L3DT, as it reads this data directly from the TIF file.
- A TFW file, which is a text file that lists the tiepoints in the map. This file is not used by L3DT, as it reads this data directly from the TIF file.

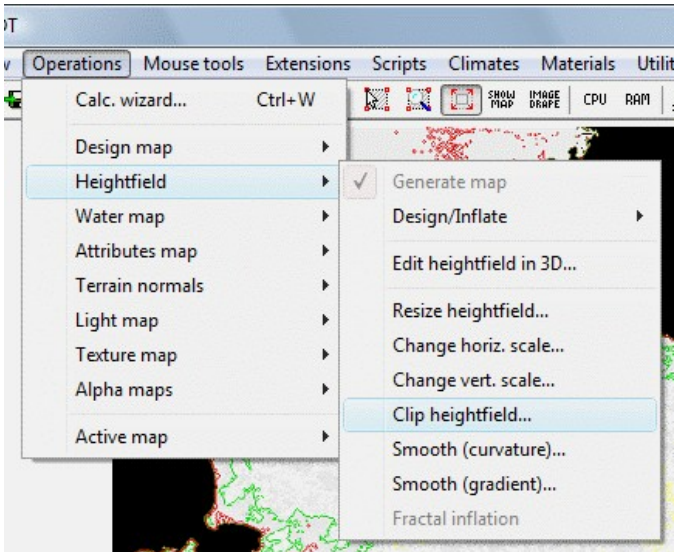
Importing the GeoTIFF

To load the TIF file in L3DT, select the '*File→Import→Heightfield*' menu option, and select the TIF file you want to load. After you click OK, L3DT will import the heightmap and show it in the main window display, like so:



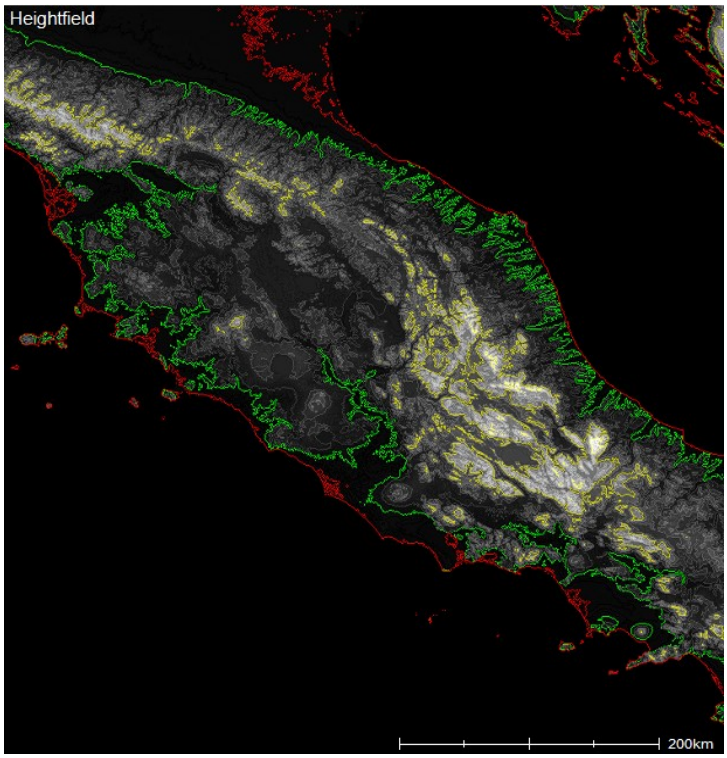
Handling no-data values

Since this data was mapped by radar from orbit, it does not include the land height below water. Thus, the sea-floor is represented in the GeoTIFF using a GDAL 'no data' value of -32768 metres. In L3DT, this will produce an enormous vertical cliff edge at the sea shore about 33km (20mi) high, which may be undesirable. To set an artificial sea floor at a more reasonable depth, select the '*Operations→Heightfield→Clip heightfield*' menu option, shown below.



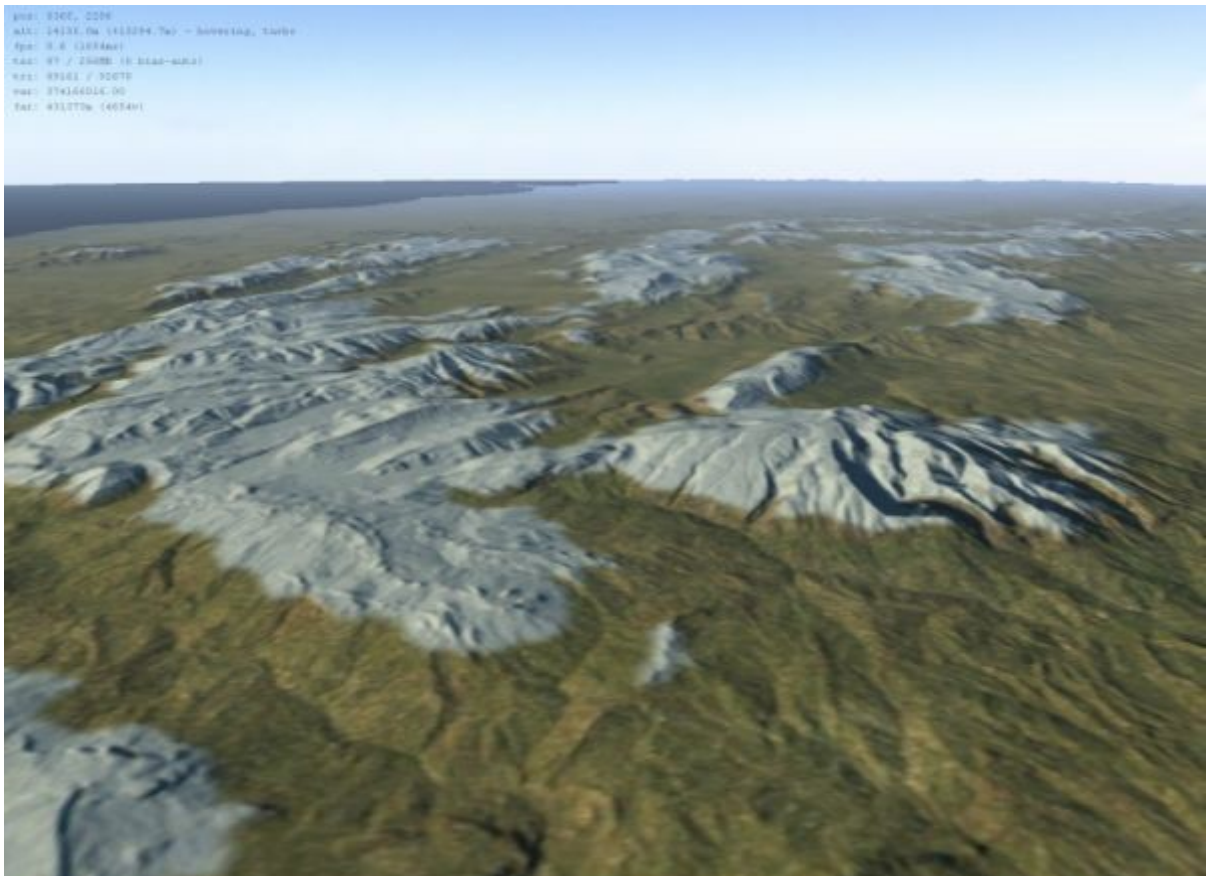
In the ‘Clip heightfield’ window, set the controls to clip all terrain below -100m to a value of -100 (as shown below). This ensures that the no data regions (i.e. sea floor) are set to a reasonable number.

After you click OK, L3DT will clip the no data regions to the set altitude, and refresh the heightfield display accordingly.



You may now proceed to flood the water map, generate the attributes map, texture map, etc. These operations are explained in the L3DT userguide, and so won’t be repeated here.

When done, the map may look like this:



I hope this has helped.

Cheerio,

Aaron.

Footnotes

[1] Jarvis A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled seamless SRTM data V4, International Centre for Tropical Agriculture (CIAT), available from http://srtm.csi.cgiar.org.