

DLR SRTM Digital Elevation Models

General Information

This compressed archive contains individual digital elevation models (DEMs) covering a geographic area of 10° by 10°. The filename of the archive specifies the bottom left coordinate of the 10° by 10° tile. The elevation models were generated from X-band synthetic aperture radar (SAR) data acquired during the Shuttle Radar Topography Mission (SRTM) in February of 2000. The corresponding SAR image data are not included in the package. They can, however, be obtained via EOWEB-NG (<http://eoweb.dlr.de:8080/index.html>), the data portal of the German Remote Sensing Data Center at the German Aerospace Center DLR.

In addition to the DEM files, the archive contains the corresponding height error maps (HEM), a browse image map providing an overview of the area covered by the files contained in the archive, a kml file for displaying the browse image of the coverage on Google Earth, and this 'Readme' file.

The Shuttle Radar Topography Mission - SRTM

The Shuttle Radar Topography Mission (SRTM) was conducted jointly between the German Aerospace Center DLR, the Italian Space Agency ASI, and NASA JPL (USA). From February 11 to 22, 2000, two interferometric radar systems onboard the Space Shuttle Endeavor acquired data with the goal of generating a global high resolution digital elevation model. The American system, operating in C-band, was complemented by a higher resolution German-Italian X-band system.

The SRTM DEMs were generated using 'Radar interferometry' or 'InSAR'. Two X-band SAR antennas, one inside the Space Shuttle cargo bay, the other at the end of a 60 m extension pole, simultaneously acquired radar data. During the processing, the phase differences of the two corresponding datasets were compared and converted into elevation values. An introduction to SAR interferometry can be found at http://www.gi.alaska.edu/~rgens/teaching/asf_seminar/intro_insar.pdf.

While the DEMs generated from the American C-band data are available through the USGS, the X-band DEMs can be obtained via DLR.

Similar to the SRTM C-band data, the DLR/ASI X-band DEMs cover the entire globe between 60° northern and southern latitude. However, the coverage of the X-band DEMs is not continuous. The gaps between the individual criss-crossing image strips are a result of the higher precision and therefore the narrow swath width of the X-band system. Information on the precise coverage of the SRTM X-band data can be obtained by visiting the SRTM coverage page at http://www.dlr.de/srtm/level1/data_en.htm or by performing a data search for SRTM DEMs in EOWEB-NG.

The SRTM project page provides additional information on the SRTM X-band mission (http://www.dlr.de/srtm/level1/start_en.htm). Further details on the mission in general, on technology, accuracies, and applications are available in http://www2.jpl.nasa.gov/srtm/SRTM_paper.pdf.

Since December of 2010 the X-Band SRTM DEMs are available at no cost. The data can be obtained via EOWEB-NG (<http://eoweb.dlr.de:8080/index.html>), the data portal of the German Remote Sensing Data Center. A user can perform a traditional search in EOWEB-NG and order up to 100 datasets. Additionally, the SRTM X-band DEMs can be downloaded in bulk from an FTP-Server, accessible via a separate link after logging into EOWEB-NG.

DEM Information

The X-band SRTM DEM data are provided in DTED format. Detailed information on the DTED format can be found in the document 'Product Description of the SRTM DTED-Format' (SRTM/PD-03/11/03) available at <http://www.dlr.de/srtm/docs/SRTM-XSAR-DEM-DTED-1.1.pdf>.

The DEM and HEM data are in geographic (Lat/Long) projection, datum WGS84. The elevation values are also WGS84, as specified in the product description of the SRTM DTED-format.

The DEMs inside the compressed archive are distributed as individual files, i.e. they are not mosaicked into one large DEM file. Each DEM covers an area of 15' by 15'. The filename of the individual DEM file specifies the bottom left coordinate of the corresponding 15' by 15' DEM tile.

One pixel of the DEM files corresponds to approximately 25 m x 25 m on the ground. The elevation values are provided at a resolution of 1 m. The horizontal accuracy of the SRTM X-band DEMs is ± 20 m (abs.) / ± 15 m (rel.), both 90% CE. The vertical accuracy is ± 16 m (abs.) / ± 6 m (rel.), both 90% LE. Precise information on vertical and horizontal accuracies for individual tiles can be found in the accuracy description record (ACC) of the DTED file.

As a result of the processing methodology a few locations within the DEM will have no data values. These voids have not been removed in this particular product. Standard Remote Sensing image processing tools, however, are able to compute and insert the missing values. The DEMs have not been edited with respect to coastlines and water bodies. Therefore, coastlines may not be well defined and water bodies may not be perfectly flat.

Legal Information

The use of the SRTM data is governed by the following usage conditions. By clicking on the button 'Download SRTM data' or by accessing the data via the FTP-link provided, you are accepting these usage conditions.

The SRTM DEM data are intended primarily for scientific purposes. Redistribution of the original SRTM data is not permitted, neither for commercial nor for non-commercial purposes. No further restrictions, except for those contained herein, are being imposed on the usage of the data or derived products.

The SRTM-X band DEMs have been processed to the highest possible standards of accuracy using state-of-the-art technology. However, the data are provided as is. No warranty of any kind, whether explicit or implied is given. Furthermore, as the SRTM data are provided free-of-charge, DLR shall not be liable for any damage arising out of the SRTM data's usage. The user is responsible for observing that no damage is caused to anyone or anything by his use of the SRTM data. By clicking on the button 'Download SRTM data' or by accessing the data via the FTP-link provided, the user therefore agrees to hold the German Aerospace Center (DLR) harmless from and against any and all claims which might arise by himself or any third party out of the SRTM data's usage.

For all products based on the SRTM X-band data, and for all publications including these data or derived products, it is mandatory to use the following copyright information: ©DLR/ASI <year of production>.