

Seamless Shuttle Radar Topography Mission (SRTM) "Finished" 3 Arc Second (~90 meter)

Description

The Shuttle Radar Topography Mission (SRTM) is a joint project between NASA and NGA (National Geospatial-Intelligence Agency) to map the world in three dimensions. SRTM utilized dual Spaceborne Imaging Radar (SIR-C) and dual X-band Synthetic Aperture Radar (X-SAR) configured as a baseline interferometer, acquiring two images at the same time. These images, when combined, can produce a single 3-D image. Flown aboard the NASA Space Shuttle Endeavour February 11-22, 2000, SRTM successfully collected data over 80% of the Earth's land surface, for all area between 60 degrees N and 56 degrees S latitude.

SRTM data is being used to generate a digital topographic map of the Earth's land surface with data points spaced every 3 arc second for Global coverage of latitude and longitude (approximately 90 meters). The SRTM "finished" data meet the absolute horizontal and vertical accuracies of 20 meters (circular error at 90% confidence) and 16 meters (linear error at 90% confidence), respectively, as specified for the mission. The vertical accuracy is actually significantly better than the 16 meters. It is closer to +/- 10 meters.

Data Processing

SRTM data were processed from raw radar echoes into digital elevation models at the Jet Propulsion Laboratory (JPL) in Pasadena, CA. These original data files had samples spaced ("posted") at intervals of 1 arc-second of latitude and longitude (about 30 meters at the equator). These data were then edited by the National Geospatial-Intelligence Agency (NGA, formerly the National Imagery and Mapping Agency), and distributed as part of their DTED® product set. (<http://edcsns17.cr.usgs.gov/srtm/index.html>)

The editing, also referred to as finishing, consisted of delineating and flattening water bodies, better defining coastlines, removing "spikes" and "wells", and filling small voids. This "finished" set is publicly available at two postings: 1 arc-second for the United States and its territories and possessions, and 3 arc-seconds for regions between 60 degrees N and 56 degrees S latitude.

The method NGA used to produce 3 arc-second data from the 1 arc-second set is "subsampling", namely selecting the center value from the set of nine centered on a particular posting location. This is the method that has been used to produce the 3 arc-second edited data that are available through the Seamless Data Distribution System. Note that in the course of creating the DTED®1 by "subsampling" the DTED®2 it is possible that residual voids smaller than 16 contiguous pixels may reside in the final DTED®1. It is also possible that some water bodies that are contained by higher elevations in the original DTED®2 may not be completely contained in the finished DTED® 1.

Research - Grade:

NASAs Jet Propulsion Laboratory is distributing a "research-grade" SRTM data set produced in a slightly different manner. The initial release consists of 1 arc-second data for the U.S. in its original unedited form, as well as 3 arc-second data produced by averaging the nine values centered on each posting. This averaging, as opposed to subsampling, reduces the high frequency "noise" that is characteristic of elevation data collected using radar interferometry and is the method preferred by the research community. Obtain the "research-grade" SRTM data at <http://www2.jpl.nasa.gov/srtm/>.

Specifications

Seamless Shuttle Radar Topography Mission (SRTM) "Finished" 3 Arc Second (~90m resolution)	
Resolution	3 arc second (approx. 90m)
Projection	Geographic
Horizontal Datum	WGS84
Vertical Datum	WGS84/EGM96 geoid
Vertical Units	Meters

Format Information

ArcGrid is an Arc/Info proprietary format. Some other software packages can read the ArcGrid format. Customers who specify ArcGrid will be delivered a workspace. The workspace is not tarred or gzipped.

BIL is a non-proprietary format made by running the GRIDIMAGE command in Arc. The data is a simple binary raster format (signed integer data). There is an accompanying ASCII header file that provides file size information (number of rows and columns). The data are stored in row major order (all the data for row 1, followed by all the data for row 2, etc.).

GridFloat is a non-proprietary format made by running the GRIDFLOAT command in Arc. The 32-bit (4 byte) is a simple binary raster format (floating point data). There is an accompanying ASCII header file that provides file size information (number of rows and columns). The data are stored in row major order (all the data for row 1, followed by all the data for row 2, etc.). More information about binary floating point is at:

- <http://grouper.ieee.org/groups/754/>
- <http://www.math.grin.edu/~stone/courses/fundamentals/IEEE-reals.html>
- <http://www.psc.edu/general/software/packages/ieee/ieee.html>

TIFF for SRTM 3 Arc Second is a 32 bit floating point grid format. More information on the 32 bit floating point TIFF is at:

- <http://partners.adobe.com/asn/developer/graphics/graphics.html>