

Digital Elevation Model (DEM)

Product ID: AST14

Product Level: 2

Absolute Accuracy: ≥ 7 m

Horizontal Resolution: 30 m

Product Size (MB): 35

Lead Invest: Mike Abrams/Roy Welch

Production Mode: on-request

Relative Accuracy: ≥ 10 m

Units: m

Product Description

This data set contains topographic information derived from the along-track, 15 m ASTER optical stereo data acquired in near infrared bands 3N and 3B. It can be created as a Relative DEM (no ground control) or an Absolute DEM (with ground control, which must be supplied by the user). These high spatial resolution DEMs (up to 7 m absolute horizontal and vertical accuracy with appropriate ground control, and up to 10 m relative accuracy without ground control) can be used to derive absolute slope and slope aspect good to 5 degrees over horizontal distances of more than 100 m. ASTER DEMs should meet 1:50,000 to 1:250,000 map accuracy standards.

This is an on-request product which will be generated by the Land Processes DAAC at EROS Data Center at a rate of one 60 km X 60 km stereo pair/day. Based on simulations of instrument operations, mission planning, cloud cover and illumination, an ASTER digital stereo data set with a base/height ratio of 0.6 should be acquired for all of the Earth's land surface below 82 degrees latitude by the end of the 6 year mission. ASTER stereo pairs also can be processed to DEMs by users operating their own software.

Generation of elevation models from stereo photographic data, now a routine adjunct to standard surveying methods, has been developed over the past 60 years based on the principles of photogrammetry. Extensions of these principles to the generation of DEMs from optical, digital stereo satellite data has been implemented over the past two decades. Examples of these satellite stereo systems include SPOT, JERS-1 OPS, and MOMS. Currently, there are large areas of the globe for which no consistent, high-resolution, widely available elevation models exist. ASTER DEMs will help provide much needed coverage over many of these areas.

Algorithm Description

An autocorrelation approach using commercial software at the Land DAAC will produce DEMs from Level 1A or 1B digital stereo pairs.

Applications

Topographic data as well as derived slope and slope aspect are basic to all aspects of land surface research including; cartography, climate modeling, biogeochemistry, biogeography, geophysics, geology, geomorphology and soil science. Digital elevation data are also required for atmospheric and radiometric correction of most satellite observations of the land surface. Digital elevation data are also

used for practical engineering applications such as studies of drainage and runoff, and site suitability studies for urban development, waste containment, and recreation.

Constraints

This product will be produced using off the shelf commercial software. Absolute accuracy depends on availability of investigator-provided ground control points.