National Remote Sensing Centre
Indian Space Research Organisation
Dept. of Space, Govt. of India, Balanagar, Hyderabad - 500 037

nrsc
Shadnagar (Earth Station)
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NRSC/DPA/Feb 2024

2.5m Carto DSM Products

Updated 2.5m DSM using Cartosat-1 stereo data

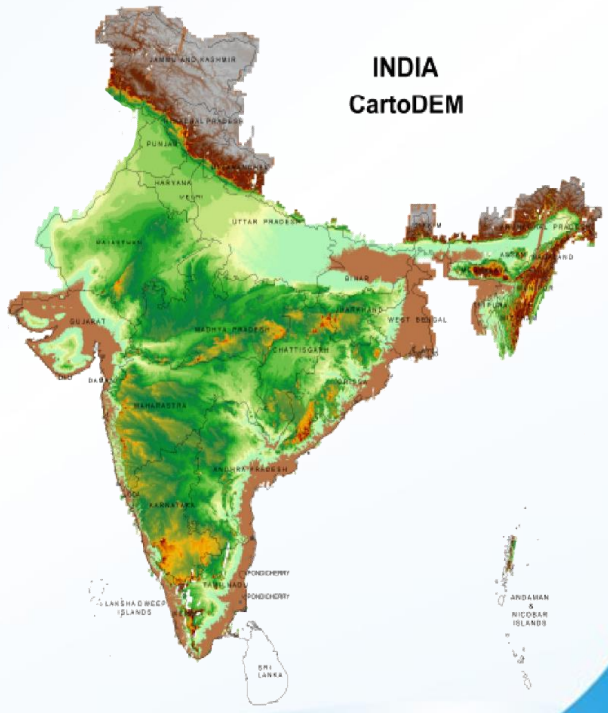
The Cartosat-1 Digital Elevation Model (CartoDEM) is a surface model of elevation and covers land surfaces of India developed by ISRO. Realised using Cartosat-1 data, which is the first stereo mission @2.5m resolution launched on 5th May 2005. It has Panchromatic stereo cameras having an along track stereoscopic capability using its near-nadir viewing and forward viewing telescopes to acquire stereo image data with a base-to-height ratio of 0.62. The spatial resolution is 2.5m in the horizontal plane. Each camera has a pixel array of size 12000 giving a swath of about 27km.

Generation of seamless 1-Deg x 1-Deg DEM and Ortho tiles by Bundle Block Adjustment was carried out using Cartosat -1 Stereo RAD ortho kit products covering the required area (36 to 60 scenes). From The 1-Deg x 1-Deg DEM and ortho tiles 7.5' X 7.5' tiles covering the area ~ 13.5 km x 13.5 km were generated with DEM spacing of 1/12 arc-sec, and ortho-image of resolution 1/12 arc-sec. CartoDEM has an accuracy of 8m at LE90 and 15m at CE90 for ortho data.

Quantitative, qualitative evaluation and From terrain category analysis, it was observed that, more spatial details were present in 2.5m DEM than 10m for a particular slope and aspect. Visual comparison of derivatives like slope, aspect also confirms that 2.5m DEM has more details. Comparative Evaluation of Cartosat DEM and Tandem-X DEM for Hydrological and Hydrodynamic Modelling Applications was carried out and found that CartoDEM 2.5m is much better than 10m DEM in all respects and has more details than Tandem-X 5m DEM.

Specifications:

Tile size : 7.5' x 7.5' DEM & Ortho tiles
Projection : Geographic (Latitude, Longitude)
Datum (Horizontal & Vertical) : WGS-84
DEM Cell size : 1/12 arc-sec (~2.5m at equator)
Ortho image : 1/12 arc-sec(~2.5m at equator)
Planimetric / Horizontal accuracy : 15m (CE90)
Elevation / vertical accuracy : 8m (LE90)
Elevation unit : Meter
Image Format : Geo-Tiff
Data type of DEM : Signed short (2 bytes)
Data type of Ortho : Unsigned short (2 bytes)
DEM Value for no data : -32768
Ortho Value for no data : 0



Web links:

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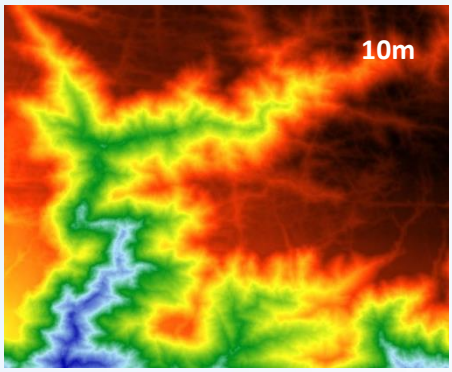
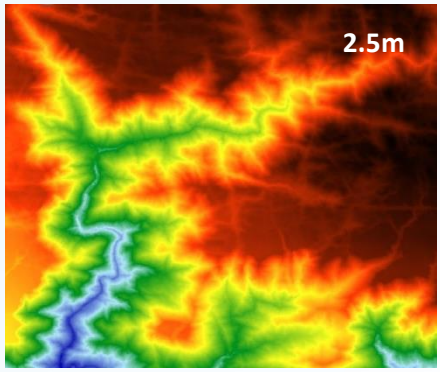
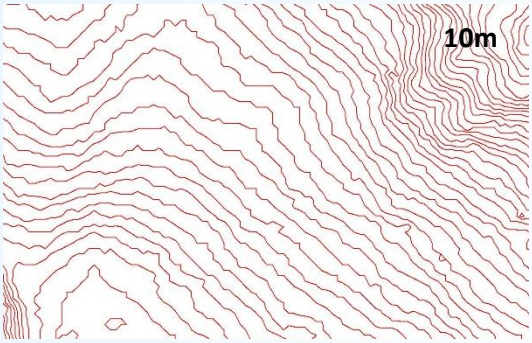
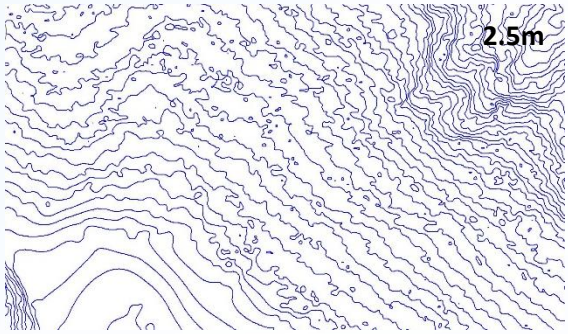
Shillong Area





Tirumala Area





Disclaimer

- For areas with slope greater than 20 Deg, LE 90 specifications may vary.
- Presence of DEM distortions like, sinks and spikes in hill shadows, snow areas and homogenous plain areas (observed at isolated places).
- Presence of Horizontal and Vertical line distortions in Hill shadows (observed at isolated places)
- Hydrological conditioning is not carried out.
- Data Gaps due to non availability of cloud free Cartosat -1 stereo data (approx. 1%)

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