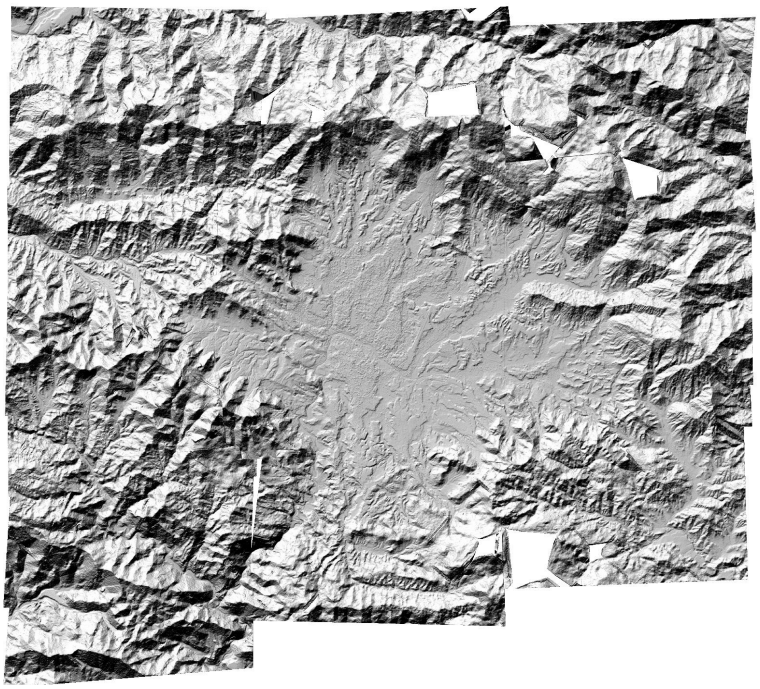
Advice for use of the SETSM 8 meter Posting Elevation Model of Kathmandu, Nepal

MJ Noh and Ian Howat
Byrd Polar and Climate Research Center, The Ohio State University

Claire Porter, Paul Morin, Mike Clementz and Mike Cloutier
Polar Geospatial Center, University of Minnesota

This is a 8m posting DEM produced using the Surface Extraction with TIN-based Search-space Minimization (SETSM) from M.J. Noh and I. Howat at the Ohio State University. The Digital Elevation Models (DEMs) provided here are gridded surface elevation data constructed from overlapping pairs high-resolution (~0.5 m) images acquired by the DigitalGlobe, Inc. Worldview-1 and 2 satellites licensed through the NGA EnhancedView program. The DEMs are built using photogrammetric techniques in which common features are identified in each image and are used to model the relative three dimensional position of the terrain. These DEMs are constructed without ground control and rely on the satellite positioning model (also called the Rational Function Model, or RFM) to locate the surface in space. The accuracy of the DEM is primarily limited by the accuracy of the rational polynomial coefficients, or RPC's, used in the RFM model, and is expected to be several meters in the vertical dimension. Additional errors in the DEM arise from edge effects in the individual DEMs and failure in the matching software due to clouds, shadows, and lack of contrast. Future versions will include filtering of errors and registration to ground control.



A shaded relief image of the extent of the 8m posting elevation model.

Basic Metadata:

Agency = NSF/NASA Byrd Polar & Climate Research Center,- Ohio State University and the Polar Geospatial Center - University of Minnesota.
Vendor = DigitalGlobe Inc., NGA, NSF, NASA
Sensor = Worldview 1 and 2
Acq dates = Feb 6, 2009 / March 29,2009
Licensing = Public/Unrestricted
Projection: Universal Transverse Mercator - UTM Zone 45 North
Horizontal Datum: WGS84
Elevation Units: meters
Elevation is WGS84 and NOT Mean Sea Level
NO GROUND CONTROL USED

Users should include, "*DigitalGlobe imagery was used to produce this digital elevation model*" in any product.

DigitalGlobe Strips Used:

February 6, 2009	1020010006E03500 10200100062AF700
March 29, 2009	10200100060BC900 1020010007E0AC00
June 7, 2010	103001000535D200 10300100058EA900 1030010005C59900

IMPORTANT: The following information is intended to provide general reference and observation regarding the SETSM Digital Elevation Model (DEM) over Kathmandu and is not intended to be a comprehensive accuracy validation of the derived dataset. The accuracy of the aerodrome reference point elevation value stated by Nepal's Civil Aviation Authority is unknown within the scope of this evaluation, but is generally believed to be within 0.5 meters.

Based on the Aeronautical Information Publication (AIP) for Tribhuvan International Airport produced by the Civil Aviation Authority of Nepal, the surveyed airport reference point (ARP) is located at the coordinate position outlined below with an elevation of 1339.54 meters (4394.76 feet). A comparison to the elevation value of the SETSM DEM data reveals the following results:

Tribhuvan International Airport Reference Point (ARP):

27° 41' 49.778" N
85° 21' 28.535" E
Elevation: 1339.54 meters above MSL

SETSM DEM Elevation at Tribhuvan ARP:

27° 41' 49.778" N
85° 21' 28.535" E
Elevation: 1286.741 meters (WGS84 ellipsoid height)
Geoid height = -49.879 (meters)
Orthometric height (height above EGM96 geoid which approximates mean sea level) = 1336.62 (meters)

Observed difference between documented ARP elevation and SETSM DEM at the specified point:

1336.62 - 1339.54 = -2.92 meters

References:

http://e-aip.caanepal.org.np/_uploads/_pdf/36998edb866ae55f4d2e93c455f9f29e.pdf

http://www.caanepal.org.np/publication/AIP%202011%20Amendment/AIP_AMDT_AIP_SUP_2012/AIP%20AMDTA001_2012_For%20Print/VNKT%20AD%202-1%20TO%202-12.pdf

http://www.caanepal.org.np/aerodrome/Document%20for%20verify%20accuracy%20and%20integrity%20of%20Aeronautical%20Data.pdf

http://www.pgc.umn.edu/elevation/stereo

Noh, M.J., I.M. Howat, Automated stereo-photogrammetric DEM generation at high latitudes: Surface Extraction from TIN-Based Search Minimization (SETSM) validation and demonstration over glaciated regions, GIScience and Remote Sensing, doi:10.1080/15481603.2015.1008621

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