ASTER IMAGERY
WITH EXAMPLES OVER CHUQUICAMATA, CHILE

An Overview of ASTER

The first Earth Observing System (EOS) satellite called Terra (previously AM-1) was launched on December 18, 1999 from the Vandenberg Air Force Base in California. Terra will fly in a sun-synchronous polar orbit, crossing the equator in the morning at 10:30. ASTER is one of the five state-of-the-art instrument sensor systems on-board Terra with a unique combination of wide spectral coverage and high spatial resolution in the visible near-infrared through shortwave infrared to the thermal infrared regions. It was built by a consortium of Japanese government, industry, and research groups. ASTER data is expected to contribute to a wide array of global change-related application areas including vegetation and ecosystem dynamics, hazard monitoring, geology and soils, land surface climatology, hydrology, and land cover change.

What makes ASTER unique?

- The Visible Near Infra-Red (VNIR) telescope's backward viewing band for high-resolution along-track stereoscopic observation.
- Multispectral thermal infrared data of high spatial resolution (8 to 12 µ window region, globally).
- Highest spatial resolution surface spectral reflectance, temperature, and emissivity data within the Terra instrument suite.

ASTER Sensor Systems

Sub-system	Band No.	Spectral Range (µm)	Spatial Resolution	bits
VNIR	1 2 3N 3B	0.52 – 0.60 0.63 – 0.69 0.78 – 0.86 0.78 – 0.86	15m	8bits
SWIR	4 5 6 7 8 9	1.600 – 1.700 2.145 – 2.185 2.185 – 2.225 2.235 – 2.285 2.295 – 2.365 2.360 – 2.430	30m	8bits
TIR	10 11 12 13 14	8.125 – 8.475 8.475 – 8.825 8.925 – 9.275 10.25 – 10.95 10.95 – 11.65	90m	12bits

Characteristics of ASTER

Swath Width	60 Kms
Total Cross-Track Coverage	± 116 to ± 318 Kms
Stereo Base-to-Height Ratio	0.6 (along-track)

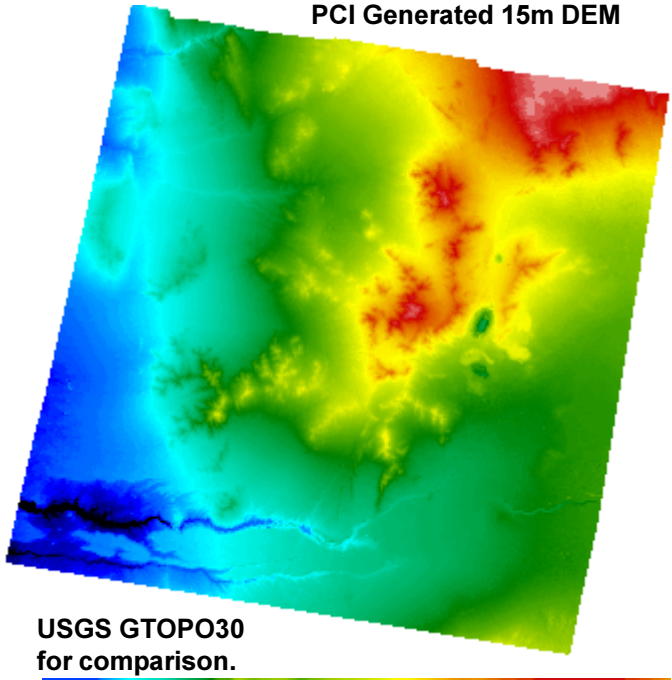
Availability of ASTER

The ASTER PROGRAMME is a scientific mission from which data was not expected to be available. Limited data has however been released and it is a matter of carrying out a search on the EOS DATA Gateway to see what is available. Data is currently free although it has to be ordered and downloaded from an FTP site (file size about 120Mb) and is in HDF format which is difficult to read. GEOIMAGE is currently carrying out test of DEM generation and is compiling pricing for various services it can provide including downloading data, conversion to common formats, DEM generation, orthorectification of the image data, etc.

GEOIMAGE is trialling the PCI Orthoengine suite of Software to produce DEMs from the ASTER data.

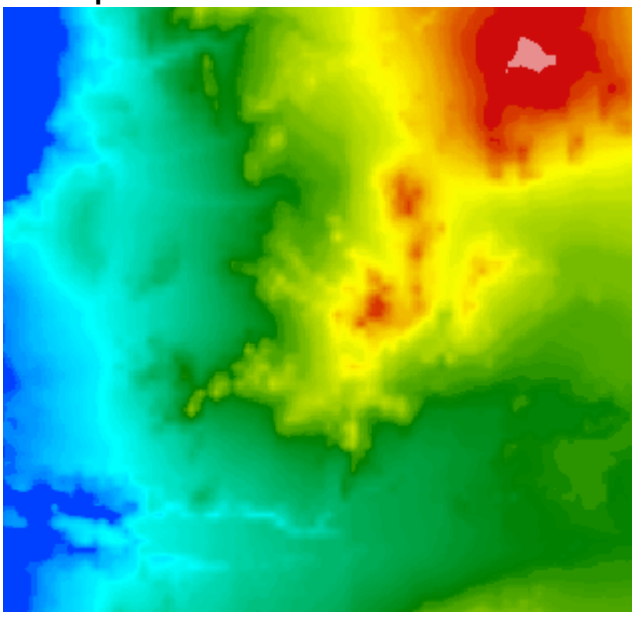
The Chuquicamata Aster data shown on these pages was collected pm 10th November 2000.

PCI Generated 15m DEM



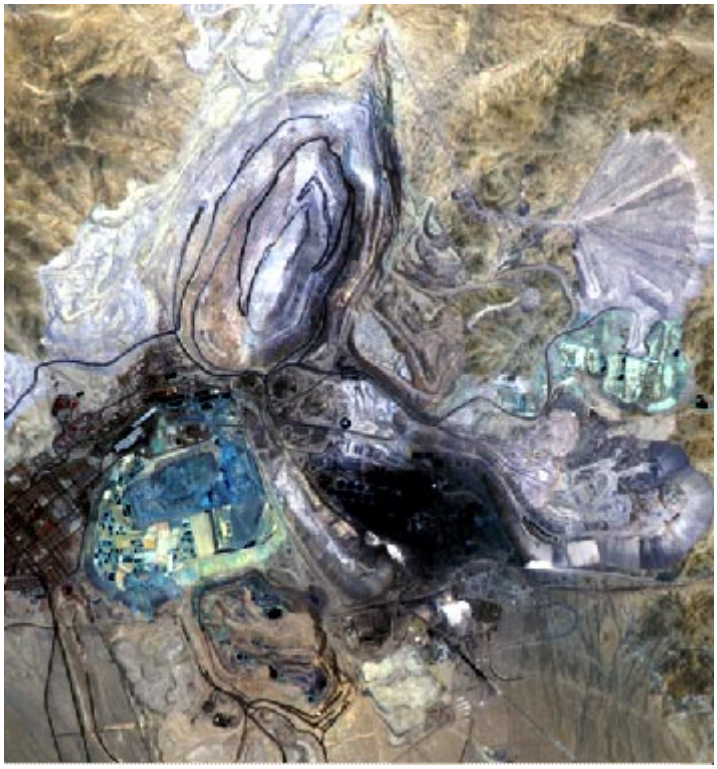
Chuquicamata Image.
VNIR orthorectified.

USGS GTOPO30
for comparison.



CHUQUICAMATA ASTER DATA

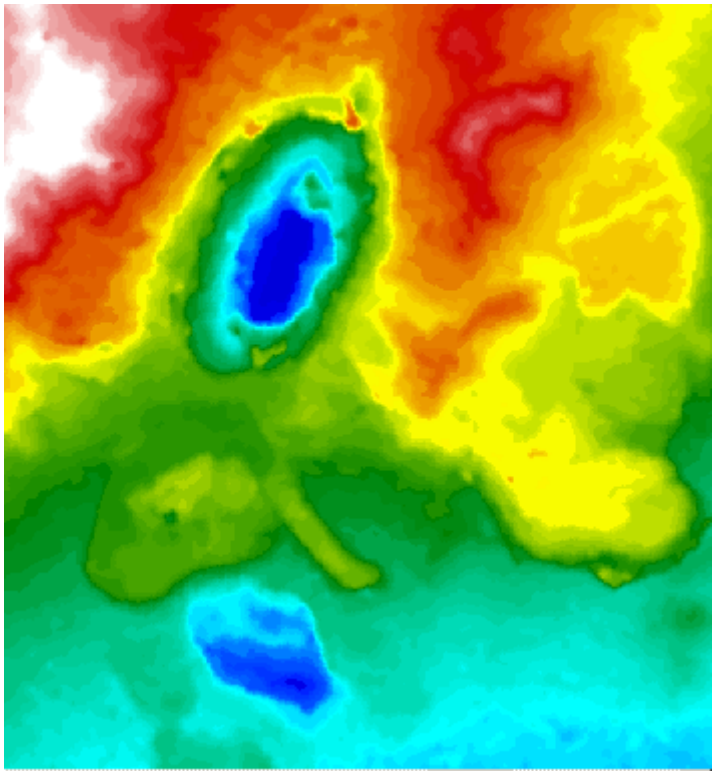
This Aster data was collected on 11th Nov 2000 and the Thematic Mapper scene on 23rd April 2000. All enhancements are at approximately 1:100 000 scale.



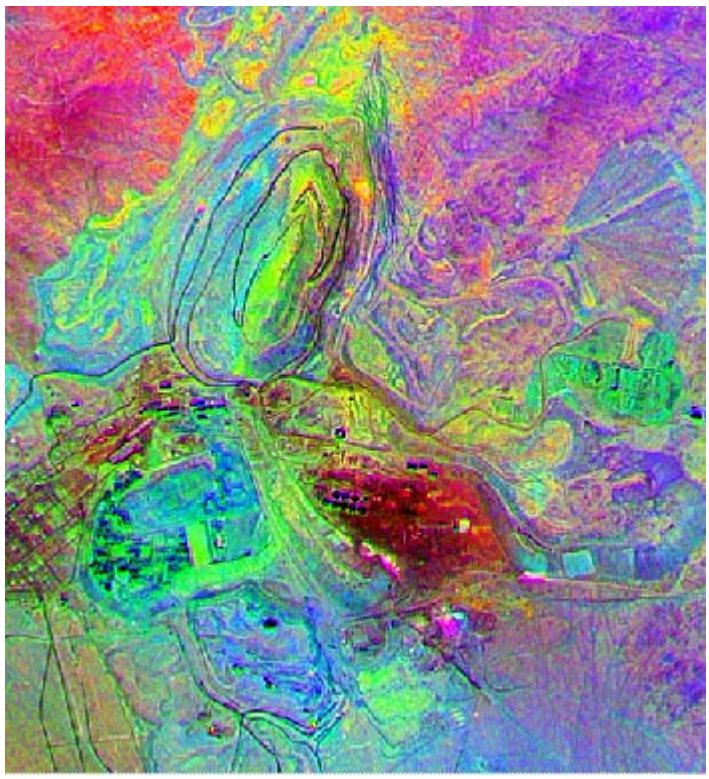
Aster VNIR in false colour infrared

LANDSAT ETM+ 147 sharped with pan.

DEM generated from the Aster data.



Aster SWIR 975 Decor sharpened with Band2.



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