



GLOBE August 2013: D7 Accessing Landsat Data

Supplemental Notes

Some Landsat Websites

<http://landsat.gsfc.nasa.gov>

<http://ldcm.gsfc.nasa.gov>

<http://landsat.usgs.gov>

<https://www.facebook.com/NASA.Landsat>

<http://glovis.usgs.gov>

Movies

The new “onion skin”

<http://svs.gsfc.nasa.gov/vis/a000000/a004000/a004040/index.html>

Landsat promo

<http://svs.gsfc.nasa.gov/vis/a010000/a010500/a010513/>

Landsat swath

<http://svs.gsfc.nasa.gov/vis/a000000/a003900/a003939/index.html>

Landsat 8 Launch

<http://svs.gsfc.nasa.gov/vis/a010000/a011200/a011289/index.html>

A Handy tool

Landsat Look Viewer – this is great for a quick look at your site prior to doing real processing. Also has measuring tool for doing comparisons with more than one view of a selected area. This could be really useful for teachers as an intro to the imagery.

http://landsat.usgs.gov/LandsatLook_Viewer.php

What's New About Landsat 8 Compared with its Predecessors

Landsat 8 is flying in Landsat 5's previous orbit, so we currently have 8-day repeat coverage (as long as Landsat 7 remains in orbit)

Spectral Bands Viewer shows differences between all the Landsats, plus spectral signatures of several things. Uses Java.


http://landsat.usgs.gov/tools_spectralViewer.php

Comparing Landsats 5 & 7 with Landsat 8 Band Combinations

http://landsat.usgs.gov/L8_band_combos.php

This image that shows the power of the **new Thermal Infrared Sensor (TIRS)**

<http://earthobservatory.nasa.gov/IOTD/view.php?id=81067&src=ve>

Question:  **How does Landsat 8's 12-bit data improve data products?**

(from USGS web site)

Answer: Landsat 8's Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) sensors provide improved signal-to-noise (SNR) radiometric performance quantized over a 12-bit dynamic range.

This translates into 4096 potential grey levels in an image compared with only 256 grey levels in previous 8-bit instruments. Improved signal to noise performance will enable improved characterization of land cover state and condition.

Landsat 8 products are delivered as **16-bit images**.

Landsat 7 and Landsat 8 comparison regarding radiometry

(dynamic range or "bit depth")

<http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=80998>

Dynamic range in photography describes the ratio between the maximum and minimum measurable light intensities (white and black, respectively). In the real world, one never encounters true white or black — only varying degrees of light source intensity and subject reflectivity. – from cambridgeincolour.com

Landsat Processing Details (from USGS website)

Standard Parameters

All* Landsat standard data products are processed using the Level 1 Product Generation System (LPGS) with the following parameters applied:

- **GeoTIFF** output format
- **Cubic Convolution (CC)** resampling method
- **30-meter** (TM, ETM+) and **60-meter** (MSS) **pixel size** (reflective bands)
- **Universal Transverse Mercator (UTM)** map projection (Polar Stereographic projection for Antarctica)
- **World Geodetic System (WGS) 84** datum
- **MAP (North-up)** image orientation

* A very small number of Landsat TM scenes are processed using the National Land Archive Production System (NLAPS). Details about the differences between LPGS and NLAPS can be found at

http://landsat.usgs.gov/products_IP_LPGSvsNLAPS.php.

Levels of Correction

Landsat scenes are processed to **Standard Terrain Correction (Level 1T - precision and terrain correction) if possible**. Some do not have ground-control or elevation data necessary for L1T correction, and in these cases, the best level of correction is applied (**Level 1G-systematic or Level 1Gt-systematic terrain**). See the box below for descriptions of each correction level:

Standard Terrain Correction (Level 1T) - provides systematic radiometric and geometric accuracy by incorporating ground control points while employing a Digital Elevation Model (DEM) for topographic accuracy. Geodetic accuracy of the product depends on the accuracy of the ground control points and the resolution of the DEM used: Ground control points used for Level 1T correction come from the [GLS2000](#) data set. DEM sources include [SRTM](#), [NED](#), [CDED](#), [DTED](#), and [GTOPO 30](#)

Systematic Terrain Correction (Level 1Gt) - provides systematic, radiometric, and geometric accuracy, while employing a Digital Elevation Model (DEM) for topographic accuracy.

Landsat 7 scenes over Antarctica are the only data processed to an L1Gt. The [Ramp V2 DEM](#) is the elevation correction source.

Systematic Correction (Level 1G) - provides systematic radiometric and geometric accuracy, which is derived from data collected by the sensor and spacecraft. Geometric accuracy of the systematically corrected product should be within 250 meters (1 sigma) for low-relief areas at sea level.

Processing Levels of each Path/Row - WRS-1 and WRS-2 - [.xls](#) (12.2 MB)

How to determine the processing level of a downloaded Landsat scene - [FAQ](#)

About the QA Band

<http://landsat.usgs.gov/L8QualityAssessmentBand.php>

