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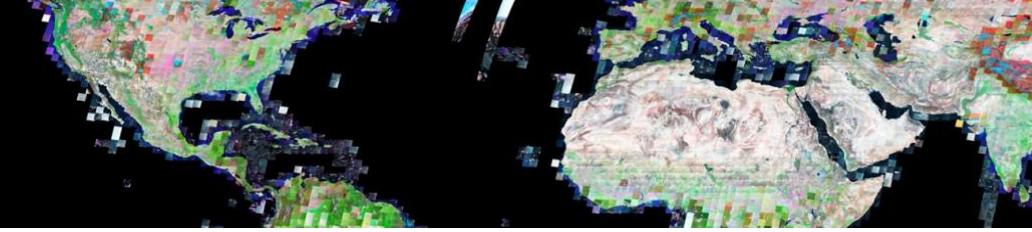

Landsat Update Volume 9 Issue 2, 2015

Important Information: Upcoming Landsat Data Processing Changes

A number of planned changes affecting Landsat data were published in a recent Update (http://landsat.usgs.gov/about_LU_Vol_9_Issue_1.php). Since that time, there have been modifications to the plans initially shared. The originally published information is in *italics* below, and the modifications are noted in the **UPDATE** area of each section.

These changes, planned during Spring 2015, will improve the consistency of Landsat 1–8 data records and enhance data usability. Any questions or concerns about these changes can be directed to Landsat User Services: custserv@usgs.gov.

Changes affecting Landsat 1-7 MSS, TM, and ETM+ data

1. **The addition of a Quality Assessment (QA) Band for Landsat 1-7 products**. *The new QA band will provide information for detecting clouds, cloud shadows, snow/ice, and water in TM and ETM+ products, compatible with the updated Landsat 8 OLI/TIRS QA band. The new QA band for Landsat MSS will only include values for fill, non-cloudy, and cloudy pixels.*
   UPDATE: The QA band has been removed from the upcoming release and will be included in a future release.

2. **New Cloud Cover Assessment (CCA) algorithm to populate the QA band.** *The CFmask (https://code.google.com/p/cfmask/) will be implemented as the primary algorithm for calculation of clouds, cloud shadows, snow/ice, and water in TM and ETM+ products.*
   UPDATE: The CFMask CCA algorithm has been removed from the upcoming release and will be included in a future release.

3. **New information added to the metadata (MTL.txt) file.** *Additions include consistent incorporation of fields describing CCA and fields needed to calculate Top-of-Atmosphere (TOA) reflectance:*
   a. *Cloud Cover Assessment score using the CFmask algorithm* **(removed from this release)**
   b. *Land Cloud Cover Assessment scores* **(removed from this release)**
   c. *Earth-Sun distance at the scene acquisition time*
   d. *Rescaling factors needed to calculate MSS, TM, and ETM+ TOA reflectance*
   e. *Thermal constants needed to calculate TM and ETM+ TOA brightness temperature*
   f. **NEW:** Radiance multiplicative parameters (Field Name RADIANCE_MULT_BAND_x) will be in scientific notation rather than decimal to provide more precision for the conversion from scaled DNs to radiance (e.g., before: RADIANCE_MULT_BAND_1 = 0.779, after: RADIANCE_MULT_BAND_1 = 7.7874E-01).

   The name of the Landsat MSS cloud cover parameter was changed to match the TM, ETM+, and OLI/TIRS naming convention, which may affect existing automated processes. The additional parameters will enable other automated processes.
   UPDATE: a) Cloud Cover Assessment Score and b) Land Cloud Cover Assessment Scores are not included in this release; f) Radiance Multiplicative parameters format will change from decimal to scientific notation.

4. **Landsat 4-5 TM National Land Archive Production System (NLAPS) format data will be processed in Level 1 Product Generation System (LPGS).** *A number of scenes in the archive could not be processed through LPGS due to formatting and calibration differences resulting from NLAPS processing (see http://landsat.usgs.gov/documents/L4-5TM_NLAPS.xlsx). Upcoming system modifications will enable those scenes to process in LPGS, effectively making almost 12,000 "new" scenes available to the user community.*
   UPDATE: Upcoming system modifications will enable those scenes to process in LPGS, but the scenes will not be available until evaluation and calibration analysis are completed.

Changes Affecting Landsat 8 OLI and TIRS data

1. **New Angle Coefficient File added to Level 1 data product.** *Per-pixel solar illumination and sensor view angles will be delivered as an additional file within the Level 1 data product. The solar illumination angle coefficients in the Angle Coefficient File can be used in place of the scene-center solar zenith, in combination with the Scaling and Thermal constants to calculate per-pixel TOA reflectance and brightness temperature.*
   UPDATE: To clarify the above statement: Solar illumination and sensor view angles will not be provided; instead, a file containing parameters needed to calculate the angles and angle bands will be provided, along with a Linux tool to generate angle bands. The solar zenith angle band can be used in combination with rescaling factors from metadata to calculate per-pixel TOA reflectance. Thermal constants are needed to calculate brightness temperature.

2. **New Cloud Cover Assessment (CCA) algorithm to populate the QA band.** *The CFmask (https://code.google.com/p/cfmask/) will be implemented as the primary algorithm for calculation of clouds, cloud shadows, snow/ice, and water. The existing CCA algorithms will remain in the processing flow if the input needed to run CFmask is not available.*
   UPDATE: The Landsat 8 CFmask CCA algorithm has been removed from the upcoming release and will be included in a future release.

3. **Land-Based Cloud Cover.** *Using QA Band information, the percentage of land pixels affected by clouds will be calculated and written to the metadata file (MTL.txt) as a scene-based score.*
   UPDATE: The land mask used to determine land pixels included in the Land CCA score is derived from NOAA's World Vector Shoreline dataset (http://shoreline.noaa.gov/data/datasheets/wvs.html).

LandsatLook

1. **Additional Quality Image for Landsat TM and ETM+.** *The new QA Band in Landsat MSS, TM, and ETM+ data will be added to LandsatLook. The Quality image for TM and ETM+ will be a colored 8-bit .png, as is currently offered for Landsat 8. Landsat MSS Quality images will have fewer categories.*
   UPDATE: The LandsatLook Quality band for Landsat 1–7 scenes has been removed from the upcoming release and will be included in a future release.

2. **New stretch for the Thermal Band image.** *The LandsatLook Thermal Band .jpg is currently stretched with a scene-specific two percent clip. In order to facilitate mosaicking and to permit comparison of images, a constant stretch will be applied to all thermal images.*
   UPDATE: The new stretch was implemented and is applied to all scenes processed as of February 26, 2015.