Landsat Update

Landsat 8 Data Processing Changes

New production code was released April 23, 2015 to enhance the usability of Landsat 8 products. Some of the planned changes were postponed in favor of coordinating new features in Landsat 8 with similar changes in Landsats 4-7 TM and ETM+ scheduled for the fall/winter of 2015. Other features expected to impact users have also been added since the last Landsat Update. The originally published information is in *italics* below, and modifications are noted in the **UPDATE** area of each section below.

Any questions or concerns about these changes can be directed to Landsat User Services: custserv@usgs.gov.

Changes Affecting Landsat 8 OLI and TIRS data

1. **New Angle Coefficient File added to Level 1 data product** (01/28/2015). *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 (02/27/2015): *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.*

   UPDATE (04/23/2015): The release of angle coefficient files and accompanying tool with Landsat 8 products has been postponed. A coordinated release of the files and tool is planned for Landsats 4-7 TM and ETM+ and Landsat 8 later this year.

2. **New Cloud Cover Assessment (CCA) algorithm to populate the QA band** (01/28/2015). *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 (02/27/2015): *The Landsat 8 CFmask CCA algorithm has been removed from the upcoming release and will be included in a future release.*

   UPDATE (04/23/2015): The Landsat 8 CFmask CCA algorithm release has been postponed. A coordinated release of the new algorithm is planned for Landsats 4-7 TM and ETM+ and Landsat 8 later this year.

3. **Land-Based Cloud Cover** (01/28/2015). *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 (02/27/2015): *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).*

   UPDATE (04/23/2015): The new metadata field describing the percentage of cloud-covered land pixels now appears in the MTL as "CLOUD_COVER_LAND."

4. **UPDATE Reprocessing zero-fill TIRS data** (04/23/2015): The new release enables reprocessing for TIRS data acquired between December 19, 2014 and March 13, 2015, replacing the products that previously contained zero-fill TIRS bands. More reprocessing information is available in the April 16, 2015 Landsat Mission Headline, "Landsat 8 Thermal Data Reprocessing Update."

5. **UPDATE SCENE_CENTER_TIME format change** (04/23/2015): The SCENE_CENTER_TIME parameter in the MTL is now expressed in quotes, i.e., SCENE_CENTER_TIME = "18:29:23.3098165Z."

6. **UPDATE CCA score for night scenes** (04/23/2015): Previous calculations of cloud cover for scenes with sun elevation angles less than or equal to zero (night) have been removed from processing. The CCA score now set to "-1" for all night scenes.

7. **UPDATE No thermal constants in OLI-only scenes** (04/23/2015): Functionality has been implemented to ensure that irrelevant thermal constants are not included in the MTL files when a scene does not contain TIRS data.

8. **UPDATE Precision of TIRS K_1 and K_2 constants** (04/23/2015): The TIRS band-specific thermal conversion constants K_1 and K_2 in the MTL files are reported to 4 decimal places instead of 2 in this release.

9. **UPDATE Improved GCP accuracy** (04/23/2015): Ground Control Point (GCP) handling has been enhanced to improve the location accuracy of Level 1T Standard Terrain Correction products at high latitudes.

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