Cloud Optical Products (06_L2) Processing Updates

Updated 18 September 2014

Update: Cloud Optical Thickness Overflow

Problem production information

Platform: Aqua Product Generation Executive (PGE): PGE06 v6.0.72 or v6.0.73 Data Archive Time Period: 7/2002-12/2012

Correction production information

Platform: Aqua Product Generation Executive (PGE): PGE06 v6.0.75 Data Archive Time Period: 1/2013-present Beginning Production Date: 4/21/2014 (day 2014111)

Problem type: minor

The intended maximum reported value for a successful Cloud Optical Thickness (COT) retrieval was increased from 100 in Collection 5 to 150 in Collection 6 (C6). However the new C6 COT datasets Cloud_Optical_Thickness_16 and Cloud_Optical_Thickness_37 were inadvertently not limited to 150. Therefore, for a small number of very bright clouds (typically at low sun angles), these two COT datasets can exceed 150 or become negative due to an integer overflow (beyond a value of 327.67). Users are advised that if they encounter a COT value in these datasets that is either greater than 150, or less than zero but not a fill value, then they should set the value to 150.

This minor COT dataset issue has been remedied for Aqua forward processing starting on the production date given above. Since the problem was found before Terra reprocessing began, no Terra re-/forward-processing was impacted.

□ Updates: Multiple (ASL, Sfc. Albedo, SDS attributes, sensor column exclusion, LUT initialization)

Problem production information

Platform: Aqua Product Generation Executive (PGE): PGE06 v6.0.73 or v6.0.75 Data Archive Time Period: 1/2013-present

Correction production information

Platform: Aqua Product Generation Executive (PGE): PGE06 v6.0.80

Data Archive Time Period: 1/2013-present Beginning Production Date: 09/16/2014 (2014 259)

The following changes entered Aqua forward processing starting on a production date given above. Terra was not impacted as re-/forward-processing had not begun as of this date.

1. Alternate Solution Logic (ASL) algorithm

Problem type: minor

Instances occur when the retrieved cloud optical thickness is ≥ 150 (maximum allowed value) and the shortwave infrared (SWIR) or mid-wave infrared (MWIR) channel reflectance is within the valid look-up table (LUT) solution space for cloud effective radii (CER) retrievals. For such pixels, the previous ASL CER solution interpolation routine occasionally defaulted to the closest LUT grid point CER integer value instead of interpolating between the two adjacent LUT grid points. This update now provides interpolated CER.

This minor issue generally only occurs at high latitudes and large solar zenith angles.

2. Surface spectral albedo dataset issues

2a. Surface spectral albedo dataset updated through 2013

Problem type: minor

The MOD06 ancillary land/snow albedo dataset is an 8-day cadence (16-day average) gap-filled dataset derived from the Collection 5 MOD43 product. With a recent update of the ancillary dataset through 2013, MODAPS is reprocessing all 2013 MOD06 cloud optical property datasets for C6 Aqua. In addition, forward processing (2014 and onward) will use the albedo dataset from the corresponding 2013 time period. This is expected to have a minor impact.

2b. Permanent snow/ice spectral albedos for 2012

Problem type: minor except in permanent land ice regions (i.e., Antarctica, Greenland).

There was a mistake in the reading of the ancillary dataset for the initial Aqua C6 2012 reprocessing, whereby permanent snow/ice spectral albedos were defaulting to the heritage fixed values used in Collection 5. This was found to have occasionally significant impacts on cloud optical thickness retrievals in Antarctica for a daily aggregation (Jan. 2, 2013) using a test version of the Atmosphere Team Level-3 product. This 2012 data has not been reprocessed at this time.

3. New Scattering Parameter SDS attribute

Problem type: no consequence

Attributes have been added to the 2-dimensional scattering property SDSs to provide the MODIS channels and cloud effective radii corresponding to the rows and columns of the datasets. The affected SDSs and their dimensions follow.

Water LUT scattering parameter SDSs, 7 (channels) x 18 (effective radii): *Asymmetry_Parameter_Liq Single_Scatter_Albedo_Liq*, *Extinction_Efficiency_Liq*

Ice LUT scattering parameter SDSs, 7 (channels) x 12 (radii): *Asymmetry_Parameter_Ice Single_Scatter_Albedo_Ice Extinction_Efficiency_Ice*

4. Fix for non-processed cross-track pixel position 1354

Problem type: no consequence

Neither the first column of 1km data in the scan direction (pixel position 1) or the last column (pixel position 1354) is processed by the optical retrieval algorithm. However, a fix had to be made for the last column of data that was occasionally showing spurious cloud phase retrievals in the absence of valid retrievals. This issue was due to differences in the way initializations were being handled between 32 and 64-bit machines. As there are no valid retrievals along that line to begin with, the problem should not have been of any consequence for users.

5. LUT initializations

Problem type: no consequence

Inconsistencies were observed between MOD06 retrievals run under different operating system environments, an issue caused by a failure to explicitly initialize certain LUT arrays. This initialization failure was determined not to affect the operational production environment, but does impact the algorithm testing environments. This issue has been remedied, but is of no consequence to the Terra and Aqua data product archives.