MODIS Atmosphere Level-2 Cloud Optical and Microphysical Products Collection 005 Updates. Part 2 of 2

New Products, Updated Products and Ancillary Updates

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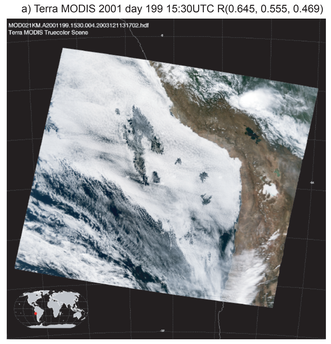
Introduction

The MODIS cloud optical and microphysical properties algorithm will have undergone a number of major changes between collection 4 and collection 5 processing streams.

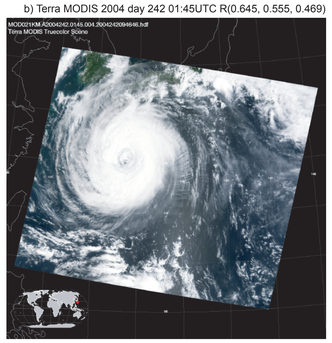
In this poster we will discuss and illustrate new products that have been added, products that were updated and updates to ancillary data sources,(e.g., external lookup tables used by the algorithm).

We will illustrate these updates using two data granules from Terra MODIS. The first one is 2001 day 199, 15:30 UTC: marine stratocumulus off the coast of Peru. The second granule is 2004 day 242, 01:45 UTC: typhoon Chaba making landfall in Southern Japan. The images of these data granules are shown below.

a) Terra MODIS 2001 day 199 15:30UTC R(0.645, 0.555, 0.469)



b) Terra MODIS 2004 day 242 01:45UTC R(0.645, 0.555, 0.469)



New and Updated for Collection 5

Several completely new products (SDSs) will be included in collection 5:

1. Pixel-level retrieval uncertainty for τ, r_e, and water path. This SDS provides an combined uncertainty estimate from the following sources: instrument calibration, surface albedo uncertainty, and the uncertainty in above-cloud precipitable water (currently derived from NCEP GDAS) used for atmospheric corrections.

2. A new multi-layer cloud map is now included as an aid in analysis of retrieval results. The multi-layer cloud map identifies areas in a granule where clouds of different phases and/or altitude overlap and therefore produce a highly suspect retrieval. Multi-layer detection for thick upper level cloud scenes are not possible.

The following portion of the MOD06 product, used by the cloud optical and microphysical properties algorithm, was updated:

3. Cloud top pressure product updated for collection 5 reprocessing stream.

The following new or updated ancillary data sources will be present:

4. New 16-day averaged surface albedo maps as described in Moody et al. (2005)

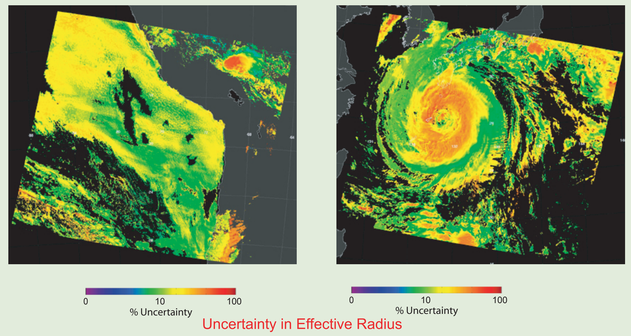
5. TOVS 1 degree daily ozone product is now being used to correct the 0.65 µm reflectance for above-cloud ozone absorption

6. A new band-averaged water vapor transmittance table has been implemented. The new transmittance lookup table was generated using the 13,000 profiles in the ECMWF database for a more realistic representation of atmospheric conditions and aggregation uncertainty.

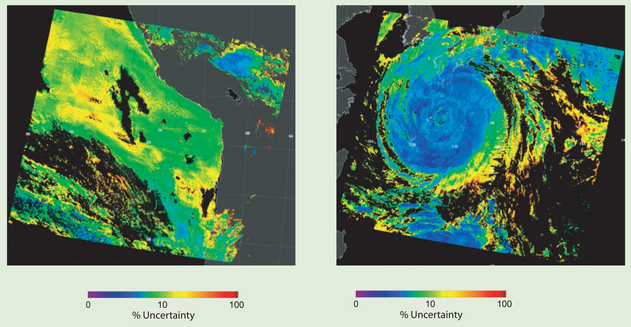
This poster concludes the description of updates to the MODIS cloud optical properties algorithm, began in the preceding poster: *MODIS Atmosphere Level-2 Cloud Optical and Microphysical Properties Part 1.*

New Product: Pixel-Level Retrieval Uncertainty

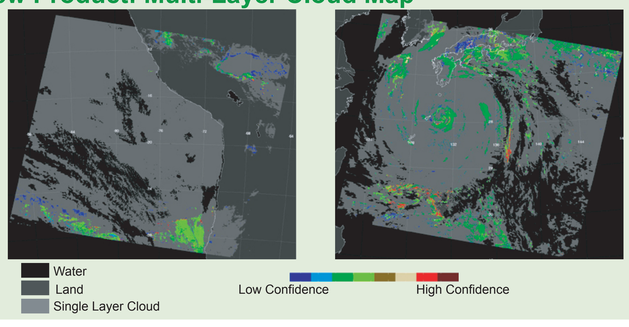
Uncertainty in Optical Depth



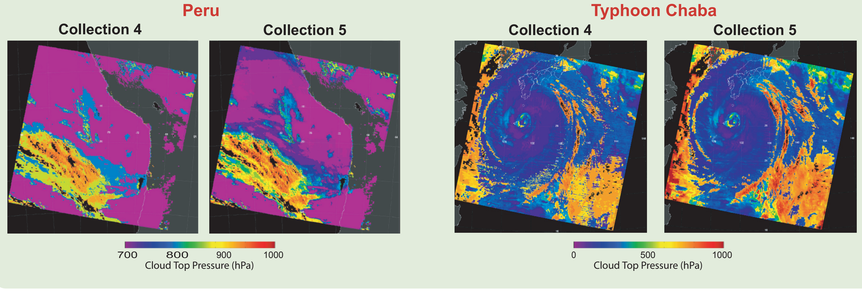
Uncertainty in Effective Radius



New Product: Multi-Layer Cloud Map

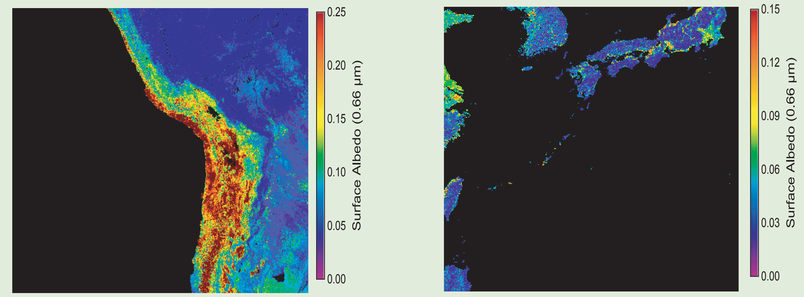


Updated Product: Cloud Top Pressure



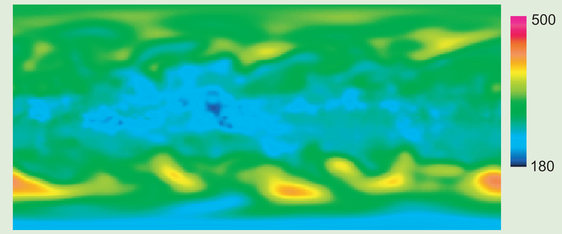
New and Updated Ancillary Sources

16-day Averaged Surface Albedo Product used to eliminate the contribution of ground to measured reflectance



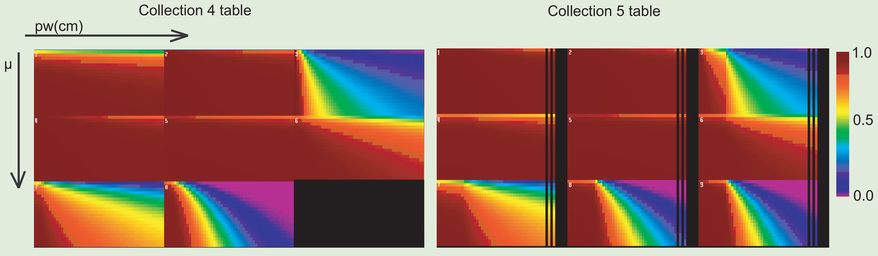
These images show the approximate area of granules being examined

TOVS Daily Total Ozone Product used to correct the measured reflectance in 0.65 µm band for presence of above cloud ozone



This image is an example of the TOVS Daily Total Ozone Product column ozone in Dobson units

Water VaporTransmittance Lookup Table used to correct the measured reflectance for water vapor absorption



These images illustrate the differences between the new and the old transmittance tables. 11µm band had been added and random MODTRAN ozone profiles had been removed from 0.65µm band transmittance. The new table had been re-gridded to give finer resolution between 0.0 and 0.2 cm of precipitable water. The new table was generated using the ECMWF 13,000 profile database.

Conclusion and References

This poster summarizes major additions and ancillary changes for the Collection 5 processing stream, including the new pixel-level uncertainty and multi-layer cloud map products, updated cloud top pressure and finally the new and updated ancillary sources used during retrievals.

1. Moody, E. G., M. D. King, S. Platnick, C. B. Schaaf, and F. Gao, 2005: *Spatially complete global spectral surface albedos: Value-added datasets derived from Terra MODIS land products.* IEEE Transactions on Geoscience and Remote Sensing, Vol. 43, 144-158.

2. http://modis-atmos.gsfc.nasa.gov/products_C005update.html

3. http://modis-atmos.gsfc.nasa.gov/_docs/QA_Plan_2005_06.pdf