

A21B-2171: Generating Land Surface Reflectance for the New Generation of Geostationary Satellite Sensors with the MAIAC Algorithm



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 *New Orleans Ernest N. Morial Convention Center - Poster Hall D-F*

The latest generation of geostationary satellite sensors, including the GOES-16/ABI and the Himawari 8/AHI, provide exciting capability to monitor land surface at very high temporal resolutions (5-15 minute intervals) and with spatial and spectral characteristics that mimic the Earth Observing System flagship MODIS. However, geostationary data feature changing sun angles at constant view geometry, which is almost reciprocal to sun-synchronous observations. Such a challenge needs to be carefully addressed before one can exploit the full potential of the new sources of data. Here we take on this challenge with Multi-Angle Implementation of Atmospheric Correction (MAIAC) algorithm, recently developed for accurate and globally robust applications like the MODIS Collection 6 re-processing. MAIAC first grids the top-of-atmosphere measurements to a fixed grid so that the spectral and physical signatures of each grid cell are stacked ("remembered") over time and used to dramatically improve cloud/shadow/snow detection, which is by far the dominant error source in the remote sensing. It also exploits the changing sun-view geometry of the geostationary sensor to characterize surface BRDF with augmented angular resolution for accurate aerosol retrievals and atmospheric correction. The high temporal resolutions of the geostationary data indeed make the BRDF retrieval much simpler and more robust as compared with sun-synchronous sensors such as MODIS. As a prototype test for the geostationary-data processing pipeline on NASA Earth Exchange (GEONEX), we apply MAIAC to process 18 months of data from Himawari 8/AHI over Australia. We generate a suite of test results, including the input TOA reflectance and the output cloud mask, aerosol optical depth (AOD), and the atmospherically-corrected surface reflectance for a variety of geographic locations, terrain, and land cover types. Comparison with MODIS data indicates a general agreement between the retrieved surface reflectance products. Furthermore, the geostationary results satisfactorily capture the movement of clouds and variations in atmospheric dust/aerosol concentrations, suggesting that high quality land surface and vegetation datasets from the advanced geostationary sensors can help complement and improve the corresponding EOS products.

Authors

Weile Wang *

CSUMB & NASA/AMES

Yujie Wang

NASA Goddard Space Flight Center

Hirofumi Hashimoto

Shuang Li

NASA Ames Research Center

Hideaki Takenaka

JAXA Japan Aerospace Exploration Agency

Atsushi Higuchi

Chiba University

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