Introduction

Ozone Monitoring Instrument (OMI) aboard NASA's Aura mission measures ozone column and profile, aerosols, clouds, surface UV irradiance, and the trace gases including NO2, SO2, HCHO, BrO, and OCO using UltraViolet-electromagnetic spectrum (280 - 400 nm) with a daily global coverage and a pixel spatial resolution of 13 km x 24 km at nadir, and it's been one of the key instruments to study the Earth's atmospheric composition and chemistry. The second Modern-Era Retrospective analysis for Research and Applications (MERRA-2) is NASA's atmospheric reanalysis using an upgraded version of Goddard Earth Observing System Model, version 5 (GEOS-5) data assimilation system. Compared to its predecessor MERRA, MERRA-2 is enhanced with more aspects of the Earth system among which is aerosol assimilation.

When comparing between satellite pixel measurements and modeled grid data, how to properly bundle counterpart is critical considering their spatial and temporal variations. The comparison between satellite and modeled data by simply using Level 3 (L3) products may result biases due to lack of detailed temporal information. It has been proposed to inter-compare or implement satellite-derived physical quantity (i.e., Level 2 (L2) Swath type) directly with to model measurements with higher temporal and spatial resolution as possible. However, this has posed a challenge in the community to handle. Rather than directly measuring with higher temporal and spatial resolution as possible. However, it cannot be used to validate modeled parameters.

The right figure in figure 1 shows the global map of the total column amount of ozone cointeining all the candidates with their spatial and temporal signatures collected from OMI L2G data. Each candidate in OMI L2G grid cells are distinguished by specific signatures including line number, orbit number, scene number, geolocation and time stamp. Comparing OMI L2G products with MERRA-2 hourly simulations as

Advantages of OMI L2G Product

- 24 UTC hours of OMI level-2 data (excluding register mode) in one file
- Global coverage
- Grid format
- All data are from "good" scenes.

Disadvantages of OMI L2G Product

- OMI L2G products are not commonly gridded data.
- What is Ncandidate?

- Care of variables of OMI L2G products all have a third dimension of Ncandidate in addition to the dimensions of longitude-grid and latitude-grid, which might cause confusing to some users. Figure 1 show OMI2G total ozone column amount (DU) of single level candidates versus all-level candidates. Because the single in candidate grid cell of OMI L2G products are sequenced according to their optical paths, choose a single level candidates could not able to represent the true globally spatial distribution of the interest atmospheric composition, thus should be not be used to validate modeled parameters.

- The right figure in figure 1 shows the global map of the total column amount of ozone considering all the candidates with their spatial and temporal signatures collected from OMI L2G data. Each candidate in OMI L2G grid cells are distinguished by specific signatures including line number, orbit number, scene number, geolocation and time stamp. Comparing OMI L2G products with MERRA-2 hourly simulations as

Use Case

In January 23 of 2007, several significant aerosol episodes were observed by space-based satellite instruments including OMI.

- Smoke that blew off the west coast of northern Africa over the Canary Islands.
- In central Africa, seasonal agricultural burning is common in this time of the year. Smoke spread westward to the Gulf of Guinea.
- In Victoria, Australia, bush and vegetation had been burned in Great Dividing Range Mountains since December of 2016 due to extremely dry, windy and hot weather.
- In south America, north of Conception, Chile, a number of agricultural fires caused small smoke plumes. However, the cause of the last fires near the coast that produced extensive thick smoke plumes could not be identified.

Summary

In order to optimally utilize Aura OMI daily L2G aerosol products that have a global coverage, an algorithm has been developed to create hourly OMI gridded data products from L2G data. The hourly AOT product will be able to compare to MERRA-2 hourly aerosol simulations directly, thus to emphasize the benefit of 2G products.

The preliminary comparisons to MERRA-2 total extinction and absorption optical thickness are mainly in capability demonstration not in quantity match. However, the results do confirm that OMAERU multi-wavelength algorithm overestimates thick aerosol loading.

Acknowledgment:
The authors acknowledge the OMI Aerosol Science Teams for the Science Algorithms and the NASA/GMAO MERRA-2 for aerosol data and the GES DISC for CDO regidize tools.