Session 6: Aerosols/Clouds/UV
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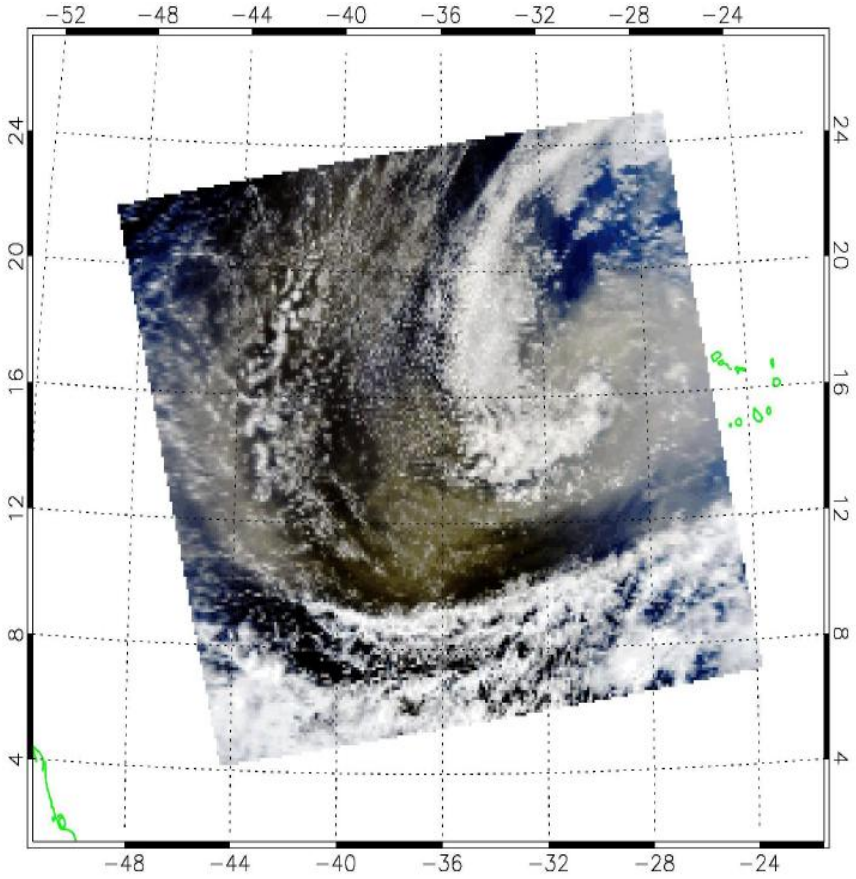
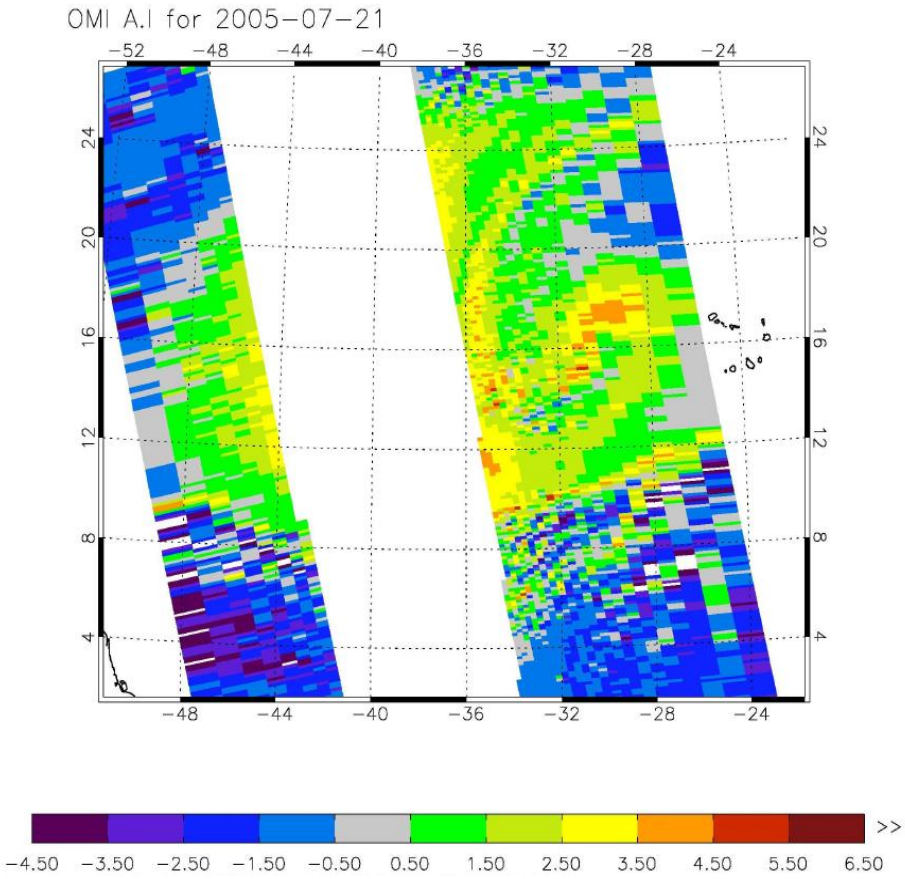


MODIS RGB Image



OMI Near UV Aerosol Index

Thanks, Omar!

Summary

All of the aerosol products presented are scientifically attractive, but they are at more of an exploratory level than are current operational products. They are beginning to exploit the spectroscopic information available from GOME, SCIAMACHY, MIPAS, and OMI, and the synergies among instruments. Some useful information is emerging but difficulties remain, particularly in distinguishing among aerosol types.

The studies related to clouds are very appealing for their scientific development. The treatment of clouds is very important for the products themselves as well as for retrieval of other constituents; this can impact the definitions of cloud products. In addition, there are important questions and controversies concerning cloud cover related to IPCC reviews. This has a potential major impact on our understanding of climate change. There may be implications for cloud information derived from the Ring effect due to solar activity, at least during periods of high activity.

The new algorithms add important information about PSCs, cirrus clouds, UV radiation at the surface, and solar irradiance.

Recommendations and Comments

- ESA should fund studies that further explore synergies among instruments to improve constituent retrievals.

- Level 1 data needs more support in archiving and access. Data distribution in general is too diverse. ESA should also assist in providing access to new data products.

- There should be stronger connections and correlation between the satellite measurement and modeling communities and also between the satellite measurement and meteorological communities.

- For cloud and aerosol studies, new methods should be developed in order to exploit the specific strength (spectral information) and minimize the major weakness (large ground pixels) of the spectrometer instruments, rather than following the radiometer-based techniques of the imagers too directly.

- It was emphasized that cloud retrieval algorithm developers should bear in mind what the products are to be used for (*e.g.*, correction to the fitting of gases); more attention needs to be paid to error analysis and full error budgets.

- It was suggested that in the future clouds, aerosols, and gases might be analyzed simultaneously. A counter argument was made: The analysts are not yet in a position to do this properly.

Recommendations and Comments, Cont'd

- Efforts are needed to produce algorithms that are robust at high latitudes.

- Many of the analysis methods now used, and the new ones presented here, rely on accurate radiometric calibration. The issue of in-flight calibration should be kept open, and the development of new methods encouraged.

- For future instruments, funding should be available for synergy studies in the planning stage.

- The value of O_2 measurements for clouds was made even more obvious in this meeting: New instruments should include either the O_2 *A* band or the O_2 *B* band.

- The status of the spectroscopic and other databases should remain under review. As examples, absorption in the O_2-O_2 collision complex, and its temperature dependence, may require further measurements; the O_2 *B* band parameters (particularly widths) are not as well known as the *A* band parameters. The climatology of surface albedos needs improvement.

- There should be support in the future for reanalysis of cloud and aerosol (and other) properties as knowledge and algorithms improve, and as measurements become important for their climatological content.