

LP-L2-AER-DAILY – Version 2 Data Release Notes

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15 July 2014

The OMPS Limb Profiler (LP) Version 2 daily aerosol product available in the LP-L2-AER-DAILY files was created by the combined ozone and aerosol retrieval algorithm described in *Rault and Loughman* [2013]. The UV ozone retrieval was turned off for this processing, so no ozone values are provided here. Aerosol extinction coefficient profiles are retrieved independently at five measurement wavelengths (nominally 514, 526, 674, 748, 865 nm), using the optimal estimation method [*Rodgers, 1976*]. Note that the actual wavelengths used for each retrieval are based on the information in the Level 1G (L1G) gridded radiance data set. In most cases, the same wavelengths are used for each event, but different values may be used in some situations to address saturated pixels or other issues encountered in the Level 1B (L1B) data. The *a priori* data set for the aerosol retrieval is a set of monthly average and zonal average extinction coefficient profiles derived from SAGE II data, where data between May 1991 and August 1996 were excluded due to contamination from the Mt. Pinatubo eruption.

Version 2 Data Quality Summary

Preliminary evaluation of LP V2 aerosol extinction coefficient data indicates that the quality is good. Comparisons with monthly average CALIPSO data, where the CALIPSO backscatter values have been converted to extinction coefficient using GOMOS/CALIPSO comparisons, show differences on the order of 10% with a variance of approximately 30%. Separate comparisons with GOMOS data during early 2012, when both OMPS LP and GOMOS were operating, give similar results over the Northern Hemisphere. Comparison with OSIRIS aerosol product (Version 5.07) has shown biases of less than 5% and variance of less than 20 % during the duration of the OMPS/LP mission, over latitudes ranging from 20°S to 85°N. OMPS LP aerosol data have proven to be very effective at detecting and characterizing major events, such as the Chelyabinsk bolide in February 2013 [*Gorkavii et al., 2013*] and the Nabro (January-May 2012) and Kelut (February 2014) volcanic eruptions.

The OMPS/LP aerosol extinction product quality degrades at latitudes lower than approximately 20°S, corresponding to single scattering angles larger than 125 degrees, due to intrinsic limitations of the limb scatter measurement technique on a Sun-synchronous platform. In addition, the retrieved extinction spectral dependence is known to be erroneous at lower altitudes (typically below the tropopause level + 5 km) due to the poor sensitivity of limb radiance to aerosol in this altitude range.

Data Coverage. The first OMPS LP measurements were taken on January 10, 2012. LP data for January-March 2012 have numerous gaps due to variations in instrument operations and changes in sample tables. Regular operations began on April 2, 2012. Note that there is very little or no LP data on days when the OMPS Nadir Mapper conducts high-resolution measurements. This sequence occurs approximately one day per week, beginning in April 2012.

Citation Format

Publications that reference these data should include the following citation:

“OMPS LP Version 2 aerosol extinction coefficient data are produced by the LP processing team (DOI 10.5067/suomi-npp/omps-limb/l2-dailyaero/data22)”.

References

Gorkavyi, N., D. F. Rault, P. A. Newman, A. M. da Silva, and A. E. Dudurov (2013), New stratospheric dust belt due to the Chelyabinsk bolide, *Geophys. Res. Lett.*, *40*, 4728-4733, doi:10.1002/grl.50788.

Rault, D. F., and R. P. Loughman (2013), The OMPS Limb Profiler Environmental Data Record Algorithm Theoretical Basis Document and expected performance, *IEEE Trans. Geosci. Rem. Sens.*, *51*, 2505-2527.

Rodgers, C. D. (1976), Retrieval of atmospheric temperature and composition from remote measurements of thermal radiation, *Rev. Geophys.*, *14*, 609-624.