LP-L1-ANC – Version 2 Data Release Notes

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Retrievals of ozone and aerosol extinction coefficient profiles from OMPS Limb Profiler (LP) measurements require background atmosphere temperature and pressure profiles. The profiles used in the Version 2 retrievals are created by interpolation from NASA Global Modeling and Assimilation Office (GMAO) GEOS-5 Forward Processing for Instrument Teams (FP-IT) Np gridded data, which are provided on 42 pressure levels up to 0.1 hPa, at 0.5° latitude x 0.625° longitude horizontal resolution, and at 3 hours temporal interval. The closest geographic location is identified, and the nearest measurements are then linearly interpolated in time to generate profiles appropriate for the measurement time and tangent point location of each OMPS LP event. In order to supply pressure and temperature profiles up to 80 km for the forward model calculation, the GMAO temperature profile is extrapolated from 0.1 hPa to this altitude using a constant lapse rate of -1.5 K/km, and the corresponding pressure values are generated assuming hydrostatic equilibrium. The interpolated pressure and temperature profiles are then used to create a corresponding neutral density profile that is used to convert retrieved ozone density profiles into ozone mixing ratio profiles. An interpolated ozone density profile is also created from GMAO data for each event. The tropopause height and temperature provided in the ancillary data file are derived from the GMAO temperature data, using the method of *Reichler et al.* [2003]. The vorticity value is the kinematic vertical pressure velocity estimated by finite-volume dynamics, and is provided for continuity with the Version 1 ancillary data product. A single ancillary data file is created for each OMPS LP orbit.

Changes from Version 1 to Version 2

Some changes have been implemented for the LP Version 2 ancillary data product from the Version 1 product. These changes are summarized below.

- The product name has been changed from LP_ANC_EV_GRID to LP-L1-ANC.
- The input pressure and temperature data are now taken from the GMAO FP-IT product, rather than from the NCEP product.
- The temperature profile above the highest level of input data is now extrapolated up to 80 km with a constant lapse rate, rather than being held constant at higher altitudes.

Version 2 Data Quality Summary

GMAO pressure and temperature profile data are generally very consistent with MLS measured profiles when interpolated to the same time of day and geographic location. Comparisons were performed for four cardinal days in 2013 (March 21, June 21, September 21, December 21) over the latitude range 60°S to 60°N and the altitude range 10 km to 60 km. Pressure differences are generally less than ±2%, with some larger differences in December. Temperature differences are generally less than ±5 K, with small pockets of larger differences on each day.

Reference

Reichler, T., M. Dameris, and R. Sausen (2003), Determining the tropopause height from gridded data, *Geophys. Res. Lett.*, *30*, 2042-2045.