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OMPS LP aerosol observations of Kelut and Calbuco volcanic eruptions

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The Ozone Mapping and Profiler Suite (OMPS) on board Suomi National Polar-orbiting Partnership (S-NPP) was launched on October 28, 2011. It consist of three instruments: Nadir Mapper (NM), Nadir Profiler (NP) and Limb Profiler (LP). The OMPS LP instrument is designed to provide high vertical resolution ozone and aerosol profiles from measurements of the scattered solar radiation in the 290-1000 nm spectral range. It collected its first Earth limb measurement in January 10, 2012, and continues to provide daily global measurements of ozone and aerosol profiles from the cloud top up to 60 km and 40 km respectively.

Although the instrument was designed primarily for vertical ozone profiles measurement, it has a high sensitivity to stratospheric aerosols, cirrus cloud in the upper troposphere, as well as stratospheric (PSC) and mesospheric (PMC) clouds. The relatively high vertical and spatial sampling allow detection and tracking periodic events when aerosol particles are injected into the stratosphere, such as volcanic eruptions or meteor explosions. The current aerosol retrieval algorithm is based on Chahine's non-linear relaxation method, using single wavelength at 675 nm.

In this presentation, we will provide early assessment of OMPS LP aerosol extinction profile measurements by comparing it to OSIRIS and CALIPSO measurements. Initial comparison of OMPS aerosol extinction shows agreement with OSIRIS measurements to within 20%. In addition, results showing latitudinal, and temporal variability of stratospheric aerosol extinction and optical depth for both instruments will also be presented.

We will also present OMPS LP aerosol observations of the dispersal of volcanic aerosols at various altitudes in the stratosphere following the volcanic eruptions of Kelut and Calbuco in 2014 and 2015 respectively. OMPS LP measurements shows that by September, aerosol from the eruption of Calbuco in southern Chile already reached the lower altitudes of the polar vortex. This is significant since the ozone hole in 2015 was amongst the largest of the decade. Stratospheric aerosols particles play an important role in the chemical and dynamic processes related to ozone destruction.