4.228 Global distribution of lowermost tropospheric ozone pollution from multispectral synergism of IASI and GOME-2 satellite measurements.

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Abstract:

Tropospheric ozone is the most hazardous gaseous pollutant. Monitoring and understanding the spatiotemporal evolution of ozone pollution is therefore a crucial societal issue. Observation of tropospheric ozone at continental and global scales is only possible by spaceborne remote sensing. However, standard spaceborne observations using single-band approaches using either UV or IR measurements show limited sensitivity to ozone in the atmospheric boundary layer, which is the major concern for air quality.

A new capacity to observe the daily distribution of ozone located at the lowermost troposphere (below 3 km of altitude) is now offered by an innovative multispectral synergism of IASI and GOME-2 measurements at the IR and UV respectively (Cuesta et al., 2013; 2017). This novel method called IASI+GOME2 retrieves ozone at the lowermost troposphere with a low mean bias, a linear correlation of 0.86 and a mean precision of 16% as compared to reference ozonesonde measurements around the world during all seasons. The retrieval sensitivity peaks down to 2 to 2.5 km over land during summer. This multispectral product is available at the IASI spatial resolution (pixels spaced by 25x25 km^2) and for cloud fractions below 30%. IASI+GOME2 retrievals also show a good and currently unique agreement with respect to in situ measurements of ozone at the surface, over East Asia and Europe, for both ozone outbreak events and the seasonal evolution. IASI+GOME2 data is publicly available at the French data centre AERIS/ESPRI (http://cds-espri.ipsl.fr).

The current presentation focuses on the analysis of global observations of lowermost tropospheric ozone from IASI+GOME2. We study the main global hotspots of ozone at the

lowermost troposphere at the tropics and mi-latitudes (e.g. over South and East Asia). We provide a new observational characterisation of the evolution and transport pathways of these ozone hotpots, in link with meteorological and dynamical conditions.