**Enhanced tropospheric ozone over Arabian sea during pre-monsoon: the importance of SCIAMACHY LNM tropospheric data improvement**

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**Abstract**

To investigate sources, transport mechanisms of tropospheric ozone in a global view, limb nadir matching (LNM) technique applied with SCIAMACHY instrument is used to retrieve tropospheric ozone. With the fact that 90% ozone is located in the stratosphere and only about 10% can be observed in the troposphere, the usage of satellite data requires highly qualified nadir and limb data. The tropospheric ozone monthly data is well improved with the benefit of the new (V3.0) limb ozone profile information. The limb nadir matching technique is also refined to increase the quality of the tropospheric ozone. The improved LNM tropospheric ozone results are now more suitable to observe the regional ozone behaviours.

This study focuses on the remarkable enhancement of the tropospheric ozone over Arabian Sea (AS) during the pre-monsoon season. Satellite data (SCIAMACHY LNM, OMI/MLS and TES) showed a strong and clear ozone seasonality over AS. With the help of MACC reanalysis data, our results showed that 3/4 of the enhanced ozone is contributed at 0-8 km height. The main source of the ozone enhancement is believed to be a long range transport, together with a suitable meteorological condition for air mass accumulation. The source regions are detailed discussed with the help of MOZART-4. Local chemistry plays different roles over different altitudes. However we believe the contribution to the tropospheric ozone enhancement from the chemistry is low. The contribution of the STE is unclear.

In addition, the interannual variation of the pre-monsoon tropospheric ozone enhancement over AS is discussed. The anomalies in 2005 and 2010 could be due to the dynamical variation of ozone caused by the El Niño events.