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Spatial and temporal variability of stratospheric HNO3 and O3 from IASI global measurements

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Nitric acid (HNO3) plays a crucial role in the stratospheric ozone cycles but its spatial distribution was until recently only accessible from limb satellite measurements, with medium coverage and sampling. IASI provides since 2007 HNO3 concentration distributions with unprecedented spatial and temporal sampling, which have not yet been exploited.

In this presentation, we will first briefly review the characteristics of the HNO3 profiles retrieved from IASI and we will show results from a validation exercise, in which the HNO3 profiles and total columns from IASI are compared with those retrieved from ground-based measurements at several sites.

We will then show and discuss the spatial distributions of HNO3 IASI total and stratospheric columns and assess the seasonal and inter-annual variability of HNO3 using the 8 years of IASI observations available. Preliminary results from a simple multivariable regression model applied to these time series will be shown to support the analysis and to identify the principal processes driving the variability of stratospheric HNO3. In this discussion focus will be given onto the polar regions, where the relation of HNO3 to ozone will be investigated in greater details, thanks to collocated O3 data retrieved from IASI measurements as well.

With these results, the potential of using IASI for studying stratospheric chemistry will be more generally highlighted.