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Improvement of GOMOS ozone retrievals in the UTLS and beyond using AerGOM

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The simultaneous retrieval of aerosol and trace gases from satellite instruments may cause problems due to the sensitivity of multiple species in the same spectral range. It is especially the case with the Global Ozone Monitoring by Occultation of Stars (GOMOS) mission. The use of stellar occultation implies a reduced signal-to-noise ratio which makes even more difficult the distinction between the contributions of the different species. As a consequence, the operational ozone retrieval shows a poorer quality in the upper-troposphere and lower stratosphere (UTLS) and more particularly is strongly biased with regards to ground-based and satellite observations.

In the framework of EXPANSION, an ESA Living Planet Fellowship project, we explore the performance of a new retrieval algorithm (AerGOM) for the observation of ozone and other species (NO_2, NO_3, aerosols) from the upper troposphere to the mesosphere using the Global Ozone Monitoring by Occultation of Stars (GOMOS) instrument. AerGOM was developed to improve the aerosol retrieval from GOMOS, and more particularly the retrieved spectral behaviour. An important aspect of the EXPANSION project is to improve the ozone retrieval by using this refined treatment of the aerosols compared with the GOMOS operational retrieval algorithm (IPF), which should especially enhance ozone observations in the UTLS which are known to be strongly biased with regards to ground-based and other satellite observations. More generally, EXPANSION aspires to obtain good quality vertical trace gas profiles while keeping or improving the quality of aerosol extinction data.

This poster will show some of the results obtained so far in the EXPANSION project, more specifically how various retrieval parameters affect the trace gas inversion, along with comparisons of AerGOM's results with other datasets such as GOMOS-IPF, satellite and ground-based observations for ozone, NO_2 and NO_3. These comparisons allow us to evaluate the quality of the gas profiles and determine whether AerGOM results lead to a fully consistent, global retrieval of all GOMOS species, or if a better approach is to use a combination of specialized retrieval algorithms.