Version 7 of the OSIRIS Ozone Data Product: Algorithm Upgrades to the Radiative Transfer Model, Instrument Point Spread Function, and Satellite Pointing Solution

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The longevity of the Odin mission (15 years) and quality measurements of the OSIRIS instrument has made the ozone data product a useful and popular data set. Three major upgrades to our current processing chain will be implemented in our next round of data processing (version 7). They are algorithm upgrades to the radiative transfer model (the forward model in the retrieval), increased accuracy in modelling the instrument point spread function of the OSIRIS optics, and accounting for the shift in altitude of the retrieved profile due to drift in the satellite attitude solution.

Significant upgrades to the radiative transfer model include improvements in calculating the diffuse field, which particularly affects modelling shorter wavelengths at high instrument solar zenith angles. Also, the input air density and temperatures will be migrated to ECMWF ERA-Interim. An improved time-dependent characterization of the instrument point spread function of the OSIRIS optics will be applied to the next round of processing which will diminish biases in the data due to seasonal environmental changes of the satellite bus.

Additionally, improved a posteriori knowledge of the shift in altitude of the tangent point of the instrument allows for the application of a correction. It is believed that the errors in tangent point altitude registration arise due to a time-dependent misalignment between the OSIRIS instrument and the satellite bus which reports the attitude.