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Retrievals of Atmospheric Carbonyl Sulfide from IASI

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Carbonyl sulfide (OCS) is the most abundant sulfur containing gas in the atmosphere and is an important source of stratospheric aerosol. Furthermore, it has been shown that OCS can be used as a proxy for photosynthesis, which is a powerful tool in quantifying global gross primary production. While considerable improvements have been made in our understanding of the location and magnitude of OCS fluxes over the past few decades, recent studies highlight the need for a new satellite dataset to help reduce the uncertainties in current estimations. The Infrared Atmospheric Sounding Interferometer (IASI) instruments on-board the MetOp satellites offer over 14 years of nadir viewing radiance measurements with excellent spatial coverage. Given that there are currently three IASI instruments in operation, there is the potential for a significantly larger OCS dataset than is currently available elsewhere. Retrievals of OCS from these IASI radiances have been made using an adapted version of the University of Leicester IASI Retrieval Scheme (ULIRS). OCS total column amounts are calculated from profiles retrieved on a 31-layer equidistant pressure grid, using an optimal estimation approach for microwindows in the range 2000 – 2100 cm^{-1} wavenumbers. Sensitivity of the measurements peak in the mid-troposphere, between 5 – 10 km.

The outlook of this work is to produce a long-term OCS satellite observational data set that provides fresh insight to the spatial distribution and trend of atmospheric OCS. Here, we present subsets of data in the form of case studies for different geographic regions and time periods.