

## **SPARC Data Initiative - Climatology comparisons in the upper troposphere / lower stratosphere**

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This poster contribution is part of the SPARC Data Initiative poster cluster, which presents atmospheric composition climatologies from the upper troposphere to the middle mesosphere from a multi-national suite of space-based instruments. The main objective of the initiative is to write a SPARC report on a comprehensive comparison of vertically resolved climatologies of chemical tracers, age of air, and aerosols from all available satellite measurements. Here we present an intercomparison of O<sub>3</sub> and CO measurements in the upper troposphere / lower stratosphere (UTLS) region (~300-70 hPa). One of the great challenges in intercomparing satellite data is accounting for differences in vertical resolution, and this is particularly difficult in the UTLS region, where there are strong vertical gradients as well as a great deal of small-scale vertical structure. A detailed analysis of the UTLS region is beyond the scope of this report, but one way to overcome the issues of vertical resolution is to provide a consistent basis for comparison by smoothing all of the measurements with the observational operator of the instrument with the coarsest vertical resolution. This allows for identification of biases in the large scale vertical and horizontal distribution as well as in temporal variability. The Tropospheric Emission Spectrometer (TES) instrument is the only instrument in this Initiative with a focus on tropospheric composition. It is a nadir-viewing instrument with ~6-7 km vertical resolution and its O<sub>3</sub> and CO measurements are well-characterized with respect to in situ observations in the UTLS region. We process the measurements from the more highly vertically resolved instruments with the TES averaging kernels and assess the differences in large-scale structure and variability between the different instruments.