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An Overview of OCTAV-UTLS (Observed Composition Trends and Variability in the UTLS), a SPARC Activity

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Year-to-year atmospheric composition variability in the upper troposphere / lower stratosphere (UTLS) is influenced by the Brewer Dobson Circulation (BDC), transport across the tropopause (STE), and the position of the subtropical or polar jets. This variability exists on a wide range of temporal and spatial scales, and thus makes detection of trends in observed records difficult. Recent publications show that the causes for the UTLS ozone trends are still not well understood (i.e. Ball et al, 2018, Chipperfield et al, 2018, Wargan et al, 2018). In addition, predictions of the future changes in the surface temperature requires understanding the drivers of the tracer distributions at the tropopause (Riese et al., 2012).
The OCTAV-UTLS (Observed Composition Trends and Variability in the UTLS) is the science research activity, under the SPARC (Stratosphere-troposphere Processes And their Role in Climate) and the WMO (World Meteorological Organization) sponsorship, that aims to reduce the uncertainties in trend estimates by accounting for dynamically induced variability. As a central task for OCTAV-UTLS, we are developing and applying common metrics based on the same reanalysis datasets to compare UTLS data in geophysically-based coordinate systems which includes tropopause and upper tropospheric jet relative coordinates.The dynamical coordinate information contained in the JETPAC (Jet and Tropopause Products for Analysis and Characterization, Manney et al, 2011) database is used to analyze existing UTLS trace gas observations collected by a research aircraft, ground-based, balloon, and satellite platforms. These observations are part of the international and national programmes and networks including the Global Atmosphere Watch (GAW) Programme, Network for the Detection of Atmospheric Composition Change (NDACC), Southern Hemisphere Additional Ozonesondes (SHADOZ), National Oceanic and Atmospheric Administration (NOAA) long-term climate observation networks, regular airborne (e.g. CARIBIC, IAGOS, CONTRAIL) and other campaigns. The OCTAV-UTLS approach provides consistency in analysis across different measurement platforms and accounts for the sampling properties of the different types of observations. This talk will provide an overview of the OCTAV-UTLS activity and examples of analyses of ozone variability measured by different techniques (i.e. satellite, lidar, ozonesonde, aircraft) over the same time period and over different geophysical regions.