

## Overview of the Long-term Ozone Trends and Uncertainties in the Stratosphere (LOTUS) SPARC Activity

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World Meteorological Organization United Nations Environment Programme (WMO/UNEP) Assessments on the state of the ozone layer (aka Ozone Assessments) require an accurate evaluation of both total ozone and ozone profile long-term trends. These trend results are of utmost importance in order to evaluate the success of the Montreal Protocol with regards to the recovery of the ozone layer and the effect of climate change on this recovery, in the main regions of the stratosphere (polar, mid-latitudes, tropics). A previous activity sponsored by SPARC, IO<sub>3</sub>C, IGACO-O<sub>3</sub> and NDACC (SI2N) successfully provided estimates of ozone profile decreasing trend in the period 1979 - 1997 and sign change of the trend in the period 1998 – 2012, from a variety of long term records, however results on the significance of the trends in the latter period were different from those published in the WMO 2014 Ozone Assessment report. For the WMO/UNEP 2018 Ozone Assessment, a clearer understanding of ozone trends and their significance as a function of altitude and latitude is needed, nearly 20 years after the peak of ozone depleting substances in the stratosphere. In recent years, new merged satellite data sets and long awaited homogenized ozonesonde data series have been produced. There is thus a strong interest in the scientific community to understand limitations in determining significance of ozone recovery. In order to address the issues left pending after the end of SI2N, a comprehensive evaluation of all long term data sets available together with their relative drifts is needed. Evaluation of error propagation in ozone trend calculation is also required. This presentation will provide an overview of the LOTUS project goals and highlights of the emerging results.



**Figure 1.** LOTUS activity for SPARC.