The Long-term Ozone Trends and Uncertainties in the Stratosphere (LOTUS) SPARC activity: Lessons Learned

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WMO/UNEP assessments on the state of the ozone layer (a.k.a. Ozone Assessments) are released every four years and are of the 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. While the 2014 Ozone Assessment provided estimates of ozone trends that showed statistically significant recovery in the upper stratosphere, another recent activity sponsored by SPARC, IO$_3$C, IGACO-O$_3$, and NDACC (SI2N) provided different results. For the 2018 Ozone Assessment, clear understanding of ozone trends and their significance is still needed, nearly 20 years after the peak of ozone depleting substances in the stratosphere. In order to address discrepancies and issues left pending in previous works, a comprehensive evaluation of all long-term data sets was performed through the SPARC LOTUS (Long-term Ozone Trends and Uncertainties in the Stratosphere) activity. With an eye towards reevaluating stratospheric ozone trends, one of the primary goals of the first phase of LOTUS was to work with the community as a whole and make use of the most up-to-date data sets and models to establish best practices for data handling/merging and trending analyses. Herein we present the methodologies applied for this effort with an emphasis on the important lessons learned.