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# Extended and refined Multi Sensor Reanalysis of Total Ozone for the period 1970-2012

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The ozone multi-sensor reanalysis (MSR) is a multi-decadal ozone column data record constructed using all available ozone column satellite datasets, surface Brewer and -Dobson observations and a data assimilation technique with detailed error modelling. The result is a high-resolution time series of 6-hourly global ozone column fields and forecast error fields that may be used for ozone trend analyses as well as detailed case studies.
The ozone MSR is produced in two steps. First, the latest reprocessed versions of all available ozone column satellite datasets are collected, and are corrected for biases as function of solar zenith angle, viewing angle, time (trend), and stratospheric temperature using Brewer/Dobson ground measurements from the World Ozone and Ultraviolet Radiation Data Centre (WOUDC). Subsequently the debiased satellite observations are assimilated within the ozone chemistry and data assimilation model TMDAM driven by meteorological analyses of the European Centre for Medium-Range Weather Forecasts (ECMWF).
The MSR2 (MSR version 2) reanalysis upgrade presented here consists of an ozone record for the 43-year period 1970-2012. The chemistry-transport model and data assimilation system have been adapted to improve the resolution, error modelling and processing speed. BUV satellite observations have been included for the period 1970-1977. The total record is extended with 13 years compared to the first version of the ozone multi sensor reanalysis. The latest total ozone retrievals of 15 satellite instruments are used: BUV-Nimbus4, TOMS-Nimbus7, TOMS-EP, SBUV-7, -9, -11, -14, -16, -17, -18, -19, GOME, SCIAMACHY, OMI and GOME-2. The resolution of the model runs, assimilation and output is increased from 2x3 degree to 1x1 degree. The performance of the MSR2 analysis is studied with the help of observation-minus-forecast (OmF) departures from the data assimilation, by comparisons with the individual station observations and with ozone sondes. The OmF statistics show that the mean bias of the MSR2 analyses is less than 1 percent with respect to debiased satellite observations after 1979.
First results will be shown of a future version of the MSR, in which we will include Dobson station observations of the years before 1979, which will considerably improve the coverage and data quality of our data set.