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Ozonesonde climatology for Model Evaluation of the Troposphere and Lower Stratosphere

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We present an ozone climatology based on ozone soundings for the last 15 years to be used by the community for model evaluation and comparisons to other observations, e.g., satellite observations. Ozone profiles for 42 stations around the globe have been compiled, averaged for the years 1995-2009. The profiles are provided as a function of pressure altitude from the surface up to 10 hPa, as well as referenced to the thermal tropopause. In addition to single stations, we provide regional averages by combining stations with similar ozone characteristics. The interannual variability and time evolution of different regions and seasons is discussed, including years before 1995.

To check for consistency with independent observations, ozone timelines near the surface are compared to available surface observations in the high northern latitudes, western Europe, the US and Japan. In addition, MOZAIC aircraft observations are compared to ozone profiles. The new climatology gives further insights on the seasonality of ozone in different regions of the atmosphere. We apply the new climatology to two sets of model results that are part of two model intercomparison activities, the Task Force on Hemispheric Transport of Air Pollution (TF HTAP) for the troposphere and the Chemistry-Climate Model Validation Activity (CCMVal2), which has focused on the stratosphere including the UTLS. In addition, we compare the time evolution of ozone for different regions and altitudes with offline model results from the NCAR Community Earth System Model (CESM).