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Technical Note: A new global database of trace gases and aerosols from multiple sources of high vertical resolution measurements

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Abstract. A new database of trace gases and aerosols with global coverage, derived from high vertical resolution profile measurements, has been assembled as a collection of binary data files; hereafter referred to as the "Binary DataBase of Profiles" (BDBP). Version 1.0 of the BDBP, described here, includes measurements from different satellite- (HALOE, POAM II and III, SAGE I and II) and ground-based measurement systems (ozonesondes). In addition to the primary product of ozone, secondary measurements of other trace gases, aerosol extinction, and temperature are included. All data are subjected to very strict quality control and for every measurement a percentage error on the measurement is included. To facilitate analyses, each measurement is added to 3 different instances (3 different grids) of the database where measurements are indexed by: (1) geographic latitude, longitude, altitude (in 1 km steps) and time, (2) geographic latitude, longitude, pressure (at levels ~1 km apart) and time, (3) equivalent latitude, potential temperature (8 levels from 300 K to 650 K) and time.

In contrast to existing zonal mean databases, by including a wider range of measurement sources (both satellite and ozonesondes), the BDBP is sufficiently dense to permit calculation of changes in ozone by latitude, longitude and altitude. In addition, by including other trace gases such as water vapour, this database can be used for comprehensive radiative transfer calculations. By providing the original measurements rather than derived monthly means, the BDBP is applicable to a wider range of applications than databases containing only monthly mean data. Monthly mean zonal mean ozone concentrations calculated from the BDBP are compared with the database of Randel and Wu, which has been used in many earlier analyses. As opposed to that database which is generated from regression model fits, the BDBP uses the original (quality controlled) measurements with no smoothing applied in any way and as a result displays higher natural variability.

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