Ozone Data for Climate Models: A Comparison of Three Datasets and Their Radiative Forcing

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Climate models that do not calculate their own ozone concentrations require an ozone boundary condition data set. In this study, three different ozone data sets are compared: one described by *Randel & Wu* (2007), one described by *Cionni et al.* (2011) (SPARC), and one based on the Binary Database of Profiles (BDBP) (*Hassler et al.*, 2008). All consist of monthly and zonal mean multiple-linear regression fits to vertically resolved ozone observations, resulting in ozone data continuous in space and time (at least 1979 to 2005). The main differences between the data sets arise from the use of different observations, and the inclusion of different basis functions for the regression fits.

The datasets were compared against observations from ozonesondes and satellite ozone measurements, to establish the ability of a given dataset to match concentrations as well as capture interannual variability. The 1979-2005 ozone change was estimated by fitting a piecewise linear trend to the deseasonalized monthly means of specific latitude bands and pressure levels. These changes were then used to calculate the ozone radiative forcing, with the results indicating that the BDBP-based data has the largest radiative forcing.

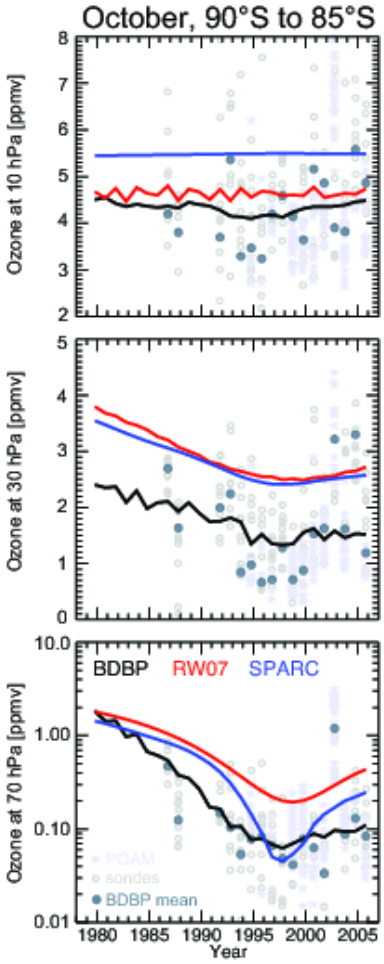

Figure 1. Time series of October mean ozone for the latitude band 90°S to 85°S, derived from the three different data sets, Randel & Wu (red line), SPARC (blue line) and BDBP (black line), for three different pressure levels. Symbols in the plots represent individual measurements on those levels from ozonesondes (gray circles) and Polar Ozone and Aerosol Measurement (light violet stars). Filled gray circles represent the raw monthly means calculated from the BDBP.