Geophysical Research Abstracts
Vol. 13, EGU2011-6150, 2011
EGU General Assembly 2011

Indicators of Antarctic ozone depletion: 1979 to 2010

Greg Bodeker
Bodeker Scientific, Alexandra, New Zealand (greg@bodekerscientific.com, 64 3 4492206)

Two ozone data bases are used to provide a set of indicators describing key attributes of the Antarctic ozone hole for the period 1979 to 2010. The first is a total column ozone data base that combines measurements from multiple satellite-based instruments which are each corrected for offsets and drifts against the ground-based Brewer and Dobson spectrophotometer networks. From this data base a number of metrics are derived including (i) daily measures of the area over Antarctica where ozone levels are below 150 DU, below 220 DU, more than 30% below 1979 to 1981 norms, and more than 50% below 1979 to 1981 norms, (ii) the date of disappearance of 150 DU ozone values, 220 DU ozone values, values 30% below 1979 to 1981 norms, and values 50% below 1979 to 1981 norms, for each year, (iii) daily minimum Antarctic polar cap average ozone, and (iv) daily values of the ozone mass deficit based on a O3<220 DU threshold. The second data base is vertically resolved and provides monthly mean ozone concentrations on 70 altitude/pressure levels approximately 1 km apart extending from the surface to the mesosphere. This data base also combines measurements from multiple satellite-based instruments and measurements from globally distributed ozonesonde sites. A regression based technique is used to fill the data base thereby providing ozone values at all levels, and in 5 degree latitude zones, for the period 1979 to 2010. A number of metrics based on this data base are also presented e.g. October vortex mean partial column ozone values between 14 and 22 km, and the volume of the vortex within which ozone values are less than 10%, 30% and 50% below the 1979-1981 mean. These indices can be used to assess whether the Antarctic ozone hole is responding as expected to the restrictions of emissions of ozone depleting substances imposed by the Montreal Protocol. The suitability of the derived indicators to this task is discussed in the context of their variability and their susceptibility to saturation effects which makes them less responsive to decreasing stratospheric halogen loading.