

Ozone Profiles Measured at South Pole Station During the 2002 Ozone Hole

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The 2002 summary of total column ozone measured by NOAA CMDL ozonesondes at South Pole station indicates a highly perturbed stratosphere beginning near the middle of September. The ozonesonde profiles during that time showed a rapid change in ozone above 15-km altitude. From September 1 to September 19, total column ozone dropped from 263 Dobson Units (DU) to 166 DU, which represents a typical chemical destruction process during the development of the Antarctic ozone hole. The minimum usually occurs at the end of September and by simple extrapolation would have reached approximately 110 DU, slightly above the 100-DU minimum observed in 2001. However, by September 25, 2002, total ozone was up to 378 DU, far above the average for that time period (Figure 1). The increase also coincided with a stratospheric temperature increase in the 20- to 24-km layer of over 50°, rising from -80°C to over -30°C. NOAA and NASA satellite observations showed that the Antarctic polar vortex split in two at the time we were observing the large increases in stratospheric ozone and temperature; both vortices were displaced away from South Pole station. One of the vortices appeared to regain its position over South Pole in early October, and a minimum total ozone of 152 DU was observed on October 21 before increasing rapidly again to more than 300 DU on October 27, 2002. Since ozonesonde observation began at South Pole in 1986, only 1988 is comparable to 2002 when an early breakup of the polar vortex resulted in a minimum total ozone of 190 DU measured on October 10, 1988.

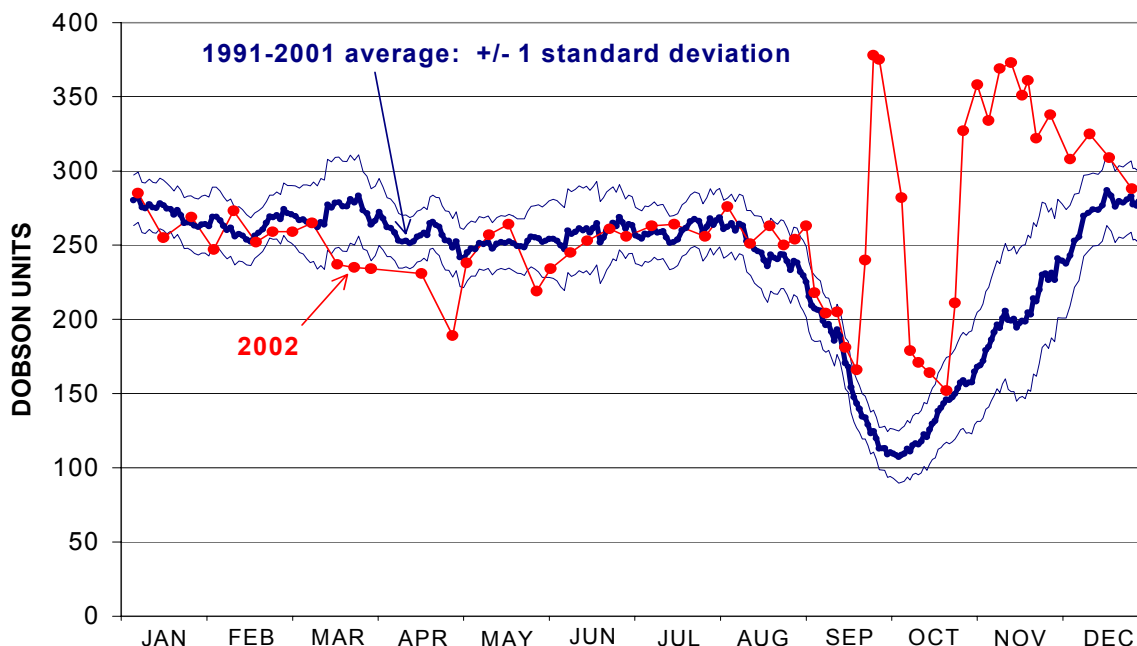


Figure 1. Total column ozone measured by ozonesondes at South Pole, Antarctica, during 2002 compared with the 1991-2001 average.