

South Pole Ozonesonde and Dobson Spectrophotometer Measurements in 2012

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Total column ozone at the South Pole dropped from 279 Dobson Units (DU) in August to 136 DU on October 5, 2012 (Figure 1), the 4th highest minimum measured in the 27-year ozonesonde record from South Pole Station, well above the average minimum of 116 ± 18 DUs. However, the September loss rate of 3.4 DU/day within the 12-20 kilometer altitude layer shows a typical ozone hole development. By October 8, ozone began increasing above 20 km, a good indication that the vortex was weakening much earlier than previous years. The October 16 ozonesonde profile showed near record high amounts of ozone for mid-October. This also shows in the yearly benchmark measurement for the Dobson spectrophotometer (average Oct 15-31 total column) which was significantly higher than the last two decades. Satellite ozone maps showed the vortex breaking apart by November 8.

NOAA Earth System Research Laboratory has measured total column ozone since 1962 and began measuring vertical profiles in 1986 using balloon-borne electrochemical concentration cell ozonesondes. Balloons are launched weekly, then increase to 2-3 per week during September and October. Typically, the lowest amount of stratospheric ozone over South Pole is observed between September 26 and October 11, and may fluctuate each year depending on the position and stability of the polar vortex and stratospheric temperatures. The 12-20 km ozone loss rate during September 1-26 is a useful indicator of the severity of the yearly ozone hole by chemical ozone loss, before the polar vortex weakens and higher mid-latitude ozone is drawn in to the ozone depleted vortex.

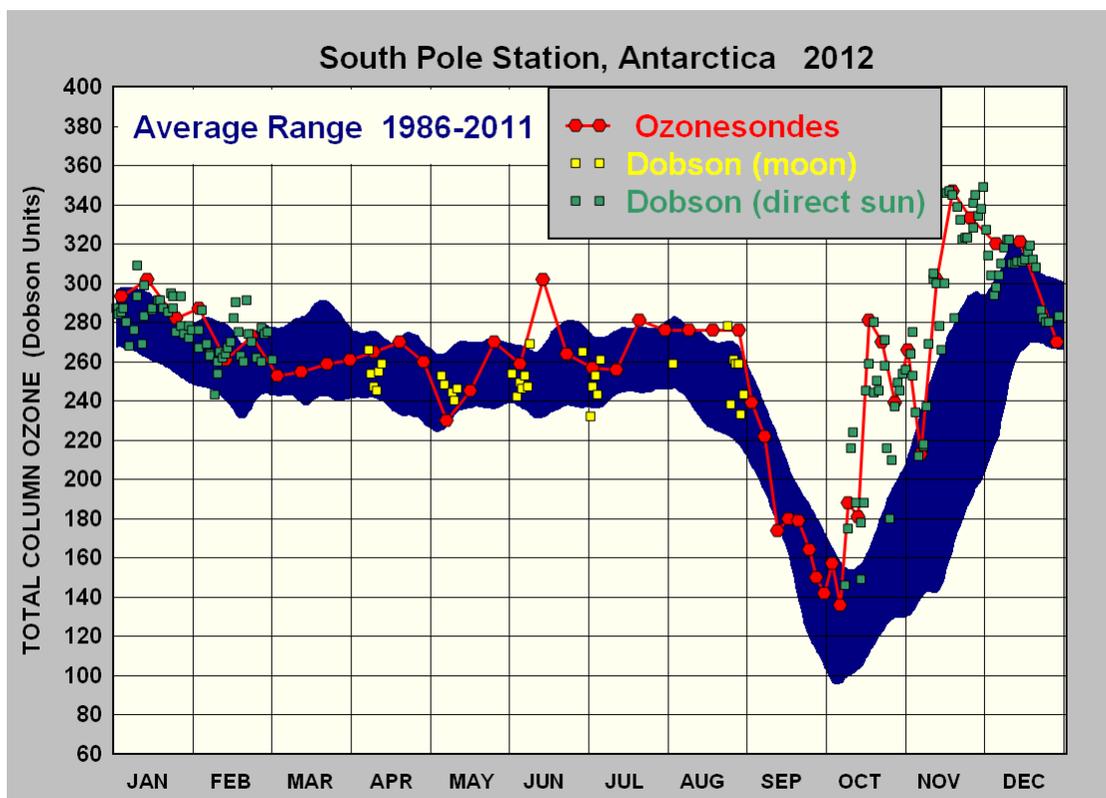


Figure 1. South Pole Station total column ozone (DU) from the Dobson spectrophotometer and ozonesondes in 2012 compared to the average 1986-2011 range.