Stratospheric Ozone at South Pole Begins to show Signs of Improvement in the Yearly Ozone Hole

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Slight improvement in the severity of the September to mid-October ozone hole over South Pole Station, Antarctica is shown in the balloon-borne ozonesonde averaged data in Figure 1. The total column ozone average in the recent 5-year period 2012-2016 shows a slight upward shift by mid-September compared to the 1991-2011 average, but remains below the early 1986-1990 average total column line. This early period represents the first 5 years of ozonesonde measurements at South Pole, during a time when equivalent effective stratospheric chlorine was increasing rapidly. The NOAA Ozone Depleting Gas Index (ODGI) peaked over Antarctica by 2002. The steady decline in the ODGI should mean less severe ozone holes are expected each year. However, substantial natural year-to-year variability in the Antarctic polar vortex and total column ozone caused by variability in dynamical conditions are observed at South Pole and make it difficult to detect a definite trend towards full recovery. The Dobson spectrophotometer 1964-1981 median shown in Figure 1, before stratospheric ozone depletion was observed, provides a glimpse of what full recovery should look like when total column ozone remains above 220 Dobson units (DU) into October.

Ozonesonde profiles showed one other slight improvement. The September depletion rate in the 14-21 km layer dropped to 3 Dobson Units (DU) per day falling below the 1991-2011 range of 3.0 – 4.0 DU/day.
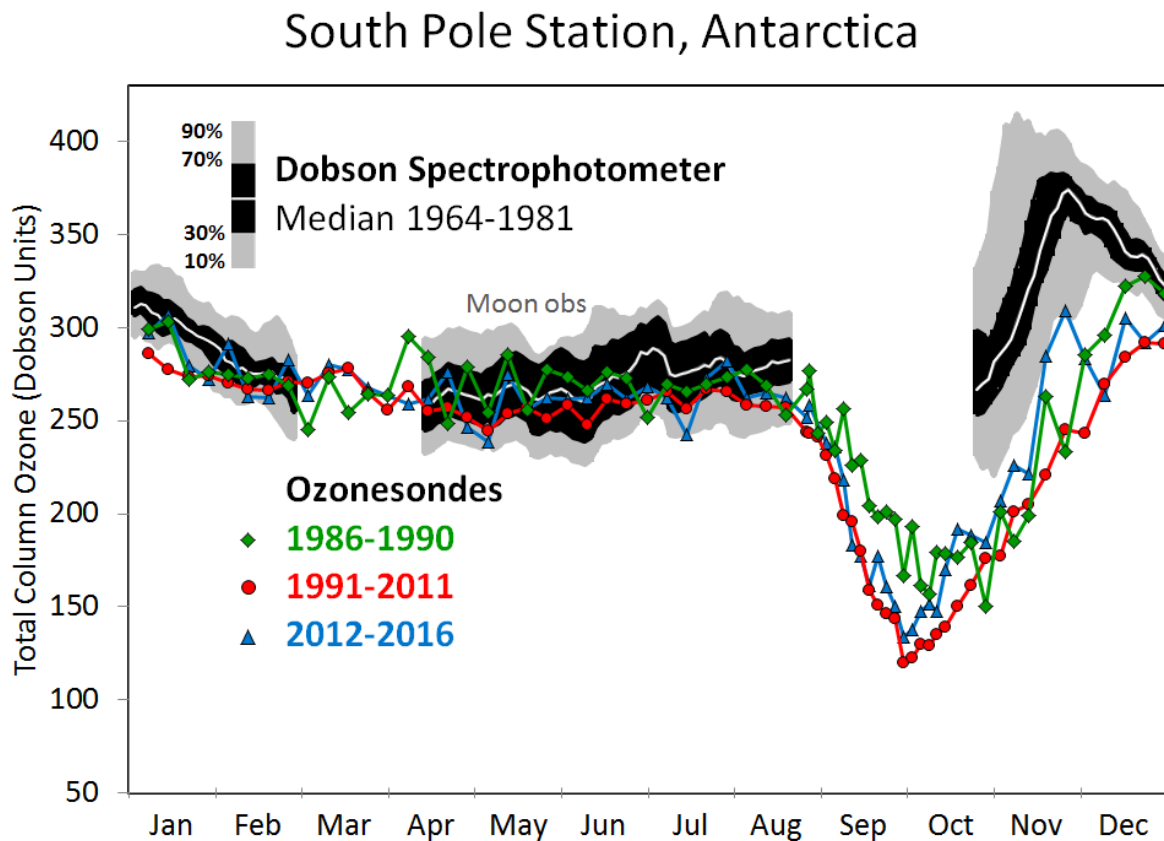

Figure 1. South Pole Station total column ozone averages from Dobson and ozonesonde measurements.