2007 Antarctic Ozone Hole off to a Robust Start Over South Pole

11 September, 2007

Global Monitoring Division - **ESRL-GMD**
This story entered on 11th Sep, 2007 04:57:42 PM PST

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NOAA Earth System Research Laboratory balloon-borne ozonesonde measurements from the South Pole show that the seasonal ozone hole has begun with September soundings following a similar trajectory to those of the past 15 years toward large ozone losses by the end of the month. In late July, stratospheric air temperatures of -95 C were some of the coldest measured over the past 20 years and have remained colder than normal in the 20-24 km altitude layer, providing excellent conditions for the formation of polar stratospheric clouds, the precursors to reactive chlorine photochemistry and catalytic ozone destruction. Despite the early indications of larger ozone depletion this year at South Pole, it is difficult to predict if near record minimums will be observed as they were in 2006 when total column ozone dropped to 93 DU on October 9. September will be the most critical month for the stratospheric ozone destruction as sunlight spreads over the entire continent and ozone destruction increases to a rate of 3-4 DU per day over South Pole.

Background: Balloonborne ozonesonde measurements have been conducted by NOAA/ESRL from the South Pole Amundsen-Scott station since 1986 to track the development and recession of the annual austral springtime Antarctic Ozone Hole. Balloon profiles have shown the primary ozone depletion region occurs within the altitude range of 14 to 24 km. Ground based Dobson spectrophotometer measurements began in 1963 using direct sun and moon light to measure total column ozone. (To see the August 28 lunar eclipse at South Pole go to the web site listed below). The year to year variability in Antarctic ozone depletion is in response to colder than normal recent Antarctic stratospheric temperatures and a persistent polar vortex. The cold, stable conditions produce vast areas where polar stratospheric clouds form and process the chlorine and bromine species into active forms that destroy ozone beginning at polar sunrise.

Significance: Ozone plays an important role by shielding humans and other life from harmful ultraviolet light from the sun. Emissions of chemicals, such as chlorofluorocarbons (CFSs), over the last decades have led to depletion of the stratospheric ozone layer. Although ozone destroying halocarbons are decreasing in the atmosphere in response to controls put into effect by the Montréal Protocol, there are still sufficient concentrations of these compounds available to completely remove ozone in a large portion of the Antarctic stratosphere.

More information: http://www.esrl.noaa.gov/gmd/dv/spo_oz/

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