



## The Sun rises over a frozen plateau; South Pole, Antarctica, Sept. 22, 2008

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### Global Monitoring Division - ESRL-GMD

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NOAA/ESRL South Pole Baseline Atmospheric Research Observatory personnel, Amy Cox and Johan Booth, will soon see the sun return to the polar plateau after 6 months of darkness. NOAA and other staff wintering over at the U.S. Amundsen-Scott South Pole Station will officially "see" the center of the sun cross the horizon at the autumnal equinox time of 10:44 EDT (15:44 GMT) on September 22, 2007. Storms and atmospheric conditions at the geographic South Pole can greatly alter when, and if, the first glimpse of the sun is seen on the horizon. Assuming clear skies and basic atmospheric refraction (the bending of light rays as they penetrate through the Earth's atmosphere), the sun can be seen as much as two days earlier than the equinox. Similarly, the appearance of the "green flash," an atmospheric dispersion effect on colors of sunlight (see [http://en.wikipedia.org/wiki/Green\\_flash](http://en.wikipedia.org/wiki/Green_flash)), is common at sunrise yet unpredictable. Once the sun has risen above the horizon at South Pole it will continually stay visible until the vernal equinox on March 20, 2009 when it will then set once again for 6 months. Surface air temperatures as cold as -75C (-100 F) are typical into September and the coldest temperatures of the year are often recorded just prior to the sun's return. The welcome sunlight will warm the polar air at South Pole and when the surface temperature reaches -50C (-58F) the ski-equipped Hercules LC-130 aircraft can begin summer resupply flights from McMurdo station (on the Antarctic coast). The geographic South Pole is located at 2850 meters (9,350 ft.) above sea level on solid ice two miles thick. ESRL staff members each spend a full twelve months stationed at the South Pole observatory and sunrise signals the end of their tour is nearing. Only a few short weeks until the station opens for the austral summer season (~October 23rd) and two new ESRL staff members arrive Pole to relieve the current crew. To view the South Pole sunrise, please go the live NOAA/ESRL web camera at:

<http://www.esrl.noaa.gov/gmd/obop/spo/livcamera.html>

Background: NOAA/ESRL and its predecessor organizations have conducted a wide range of baseline atmospheric measurements at the South Pole since the International Geophysical Year (IGY), 1957. The

longest atmospheric carbon dioxide greenhouse gas record on earth (started in IGY) has been collected at the South Pole and pre-dates the better known Mauna Loa carbon dioxide curve by several months. In addition to the greenhouse gas measurements, in the last twelve months the winter-over crew have released ~70 ozonesondes on high altitude balloons (up to ~110,000 feet) to study the stratospheric ozone layer and to document the onset and severity of the annual Antarctic "Ozone Hole." The weekly NOAA ozonesonde data record dates back to 1986 as a continuous record.

Significance: Continuous long term records of atmospheric parameters measured at the South Pole, where the mantra is "the deanest air on earth", have documented a wide range of changes in the composition, chemistry, and radiative balance of the atmosphere over the Antarctic continent since the inception of the measurements. Many of these changes are related to mankind's combustion of fossil fuels and the release of industrial and household chemicals into the atmosphere.

**More information:** <http://www.esrl.noaa.gov/gmd/obop/spo/livecamera.html>

**Contact information**

**Name:** Brian Vasel

**Tel:** (303) 497-6823

**[Brian.Vasel@noaa.gov](mailto:Brian.Vasel@noaa.gov)**

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