# An overview of the 2005 Antarctic Polar Vortex

Largely based on the Antarctic Ozone Bulletin No 8/2005

(G. Braathen and contributors)

- The 2005 south polar vortex was close to the average of the last decade in terms of vortex area and temperature conditions.

- However, minimum temperatures inside the vortex were in early September near the coldest recorded since 1979.

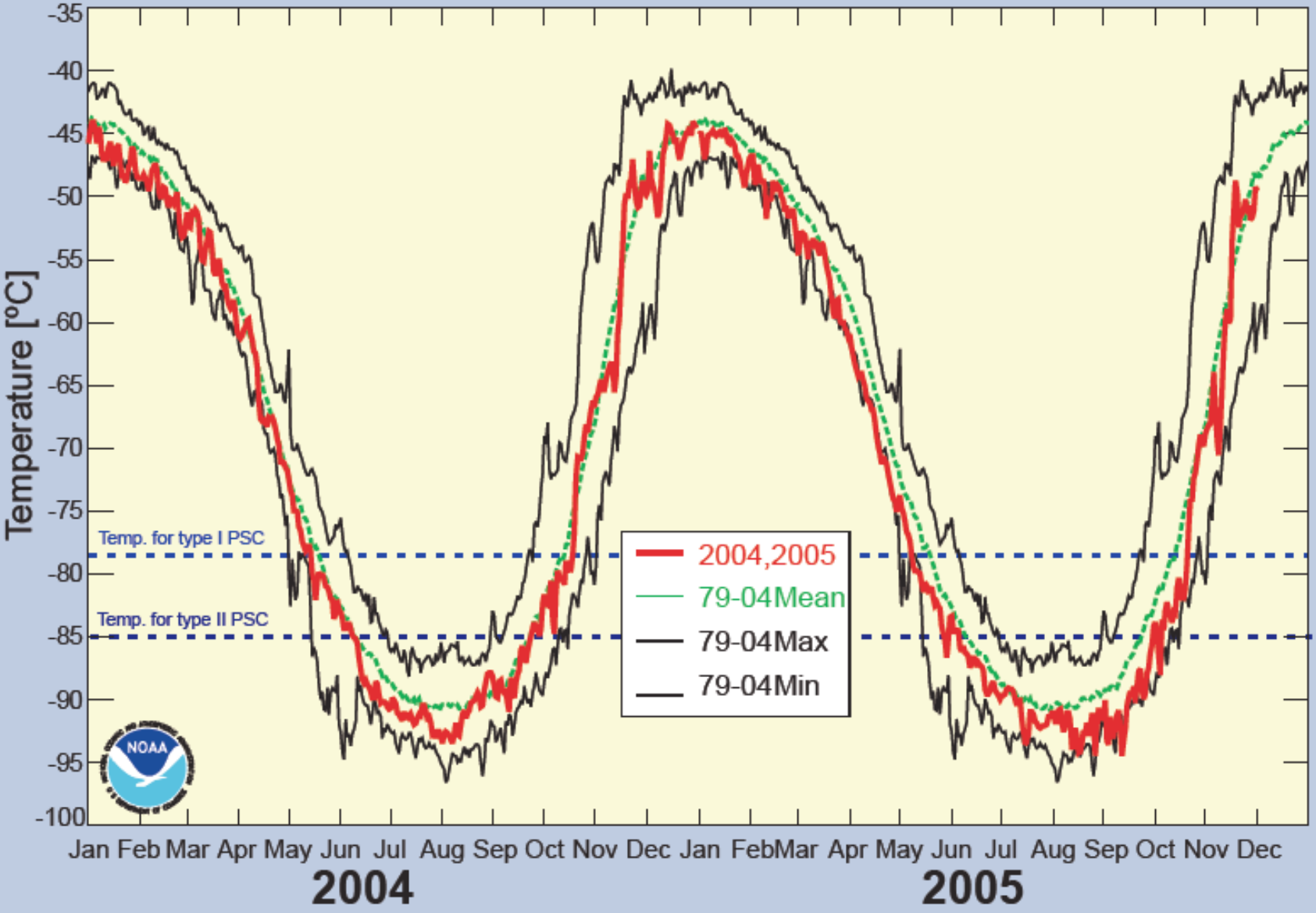
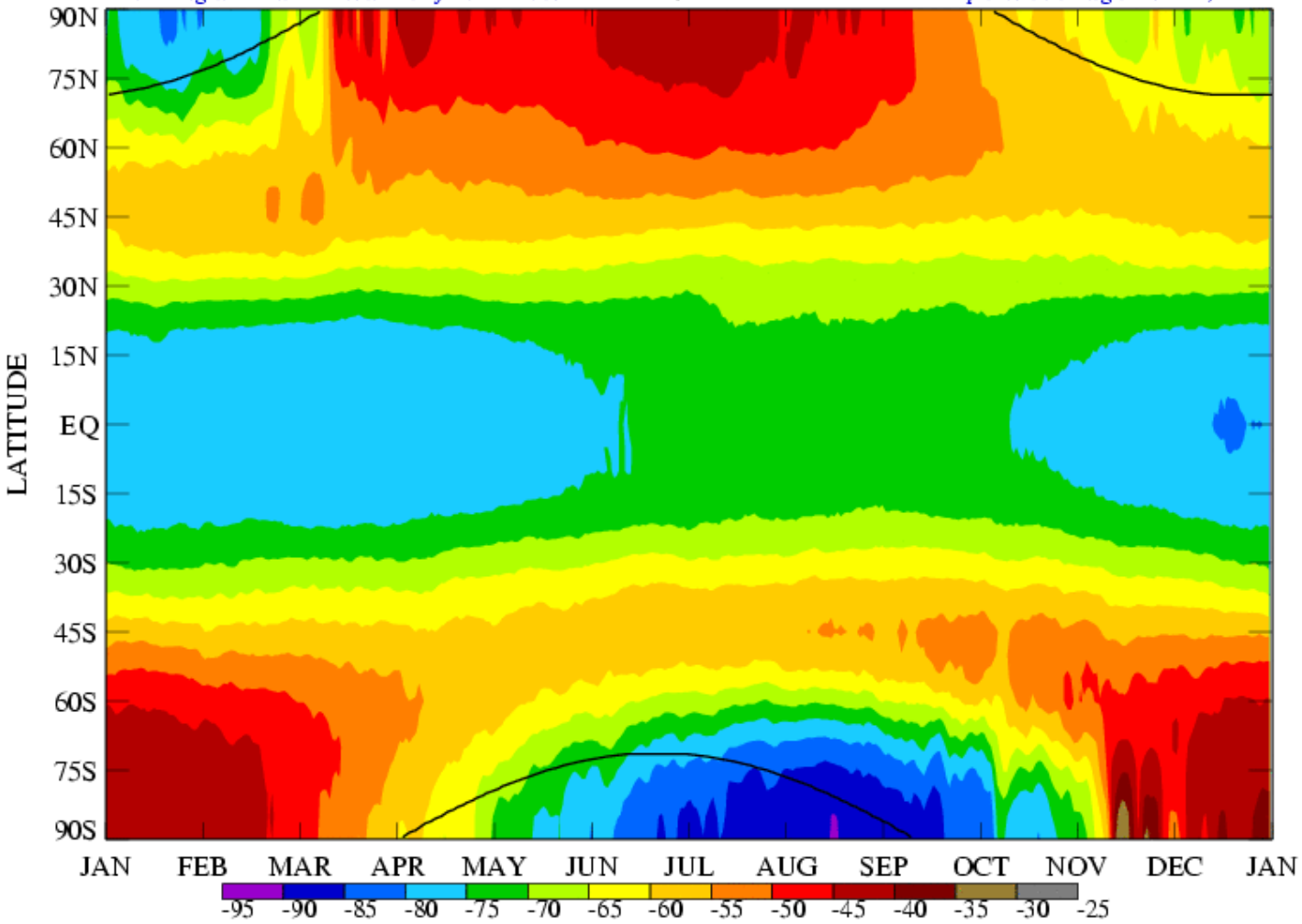



*Figure 1. Time series of NCEP daily minimum temperatures at the 50 hPa isobaric level southward of 65°S. The thick red curve shows 2004 and 2005. The green line shows the average of the 1979-2004 time period. The black curves show the highest and lowest daily minimum temperatures for any year during the 1979-2004 period. The two horizontal blue lines at -78 and -85°C show the temperature thresholds for formation of PSCs of type I and type II, respectively.*

# ZONAL MEAN TEMPERATURES at 70 mb

*Polar Night Occurs Poleward of Black Lines* *2005* *Updated through Dec 31, 2005*



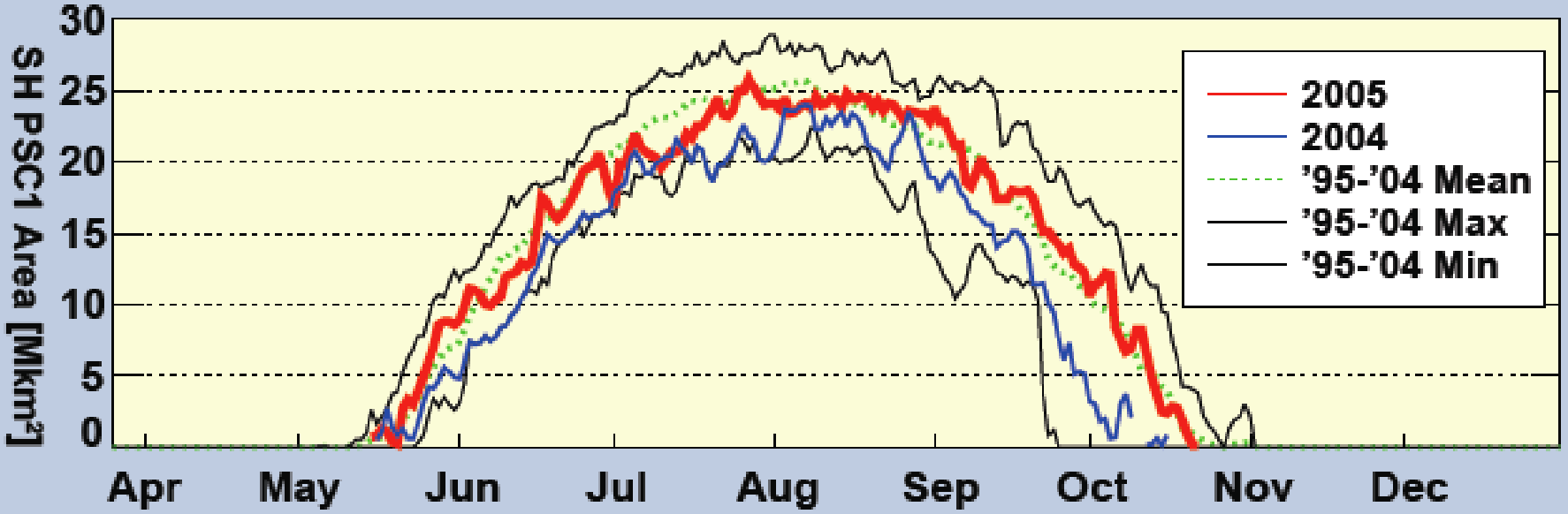
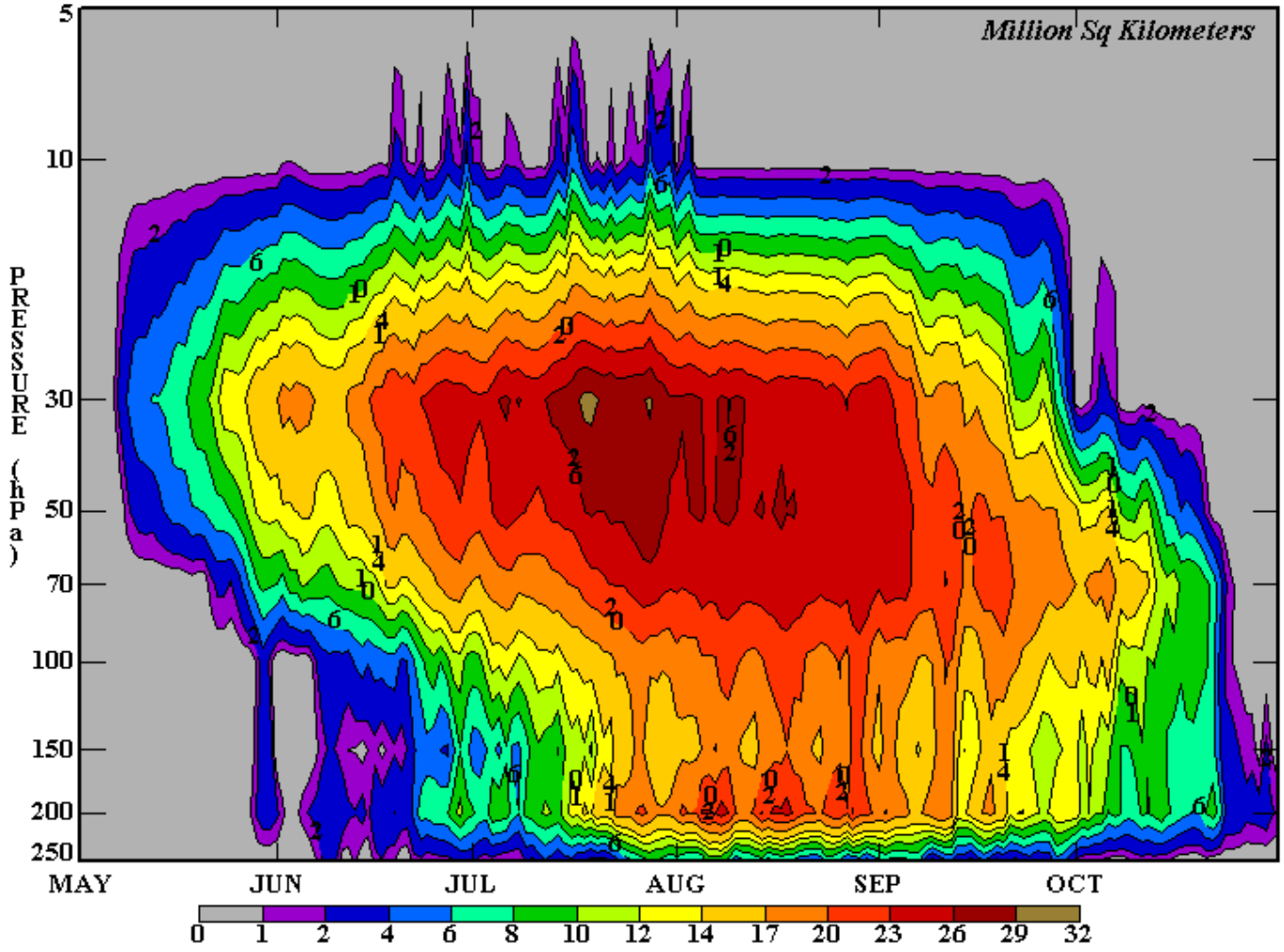



*Figure 2. The area at the 70 hPa level (approx. 17 km) where temperatures are lower than the threshold for existence of polar stratospheric clouds of type I (NAT). The red curve represents 2005 and the blue curve 2004. The green dashed line shows the average for the 1995-2004 time period. The black curves give the daily minimum and maximum for any year during the 1995-2004 time period. It can be seen from this plot that the amount of type I PSCs in 2005 was very close to the 1995-2004 average and significantly smaller than maximum areas obtained during the last decade.*

# Southern Hemisphere Area Where Temperature LE Tnat

*2005*



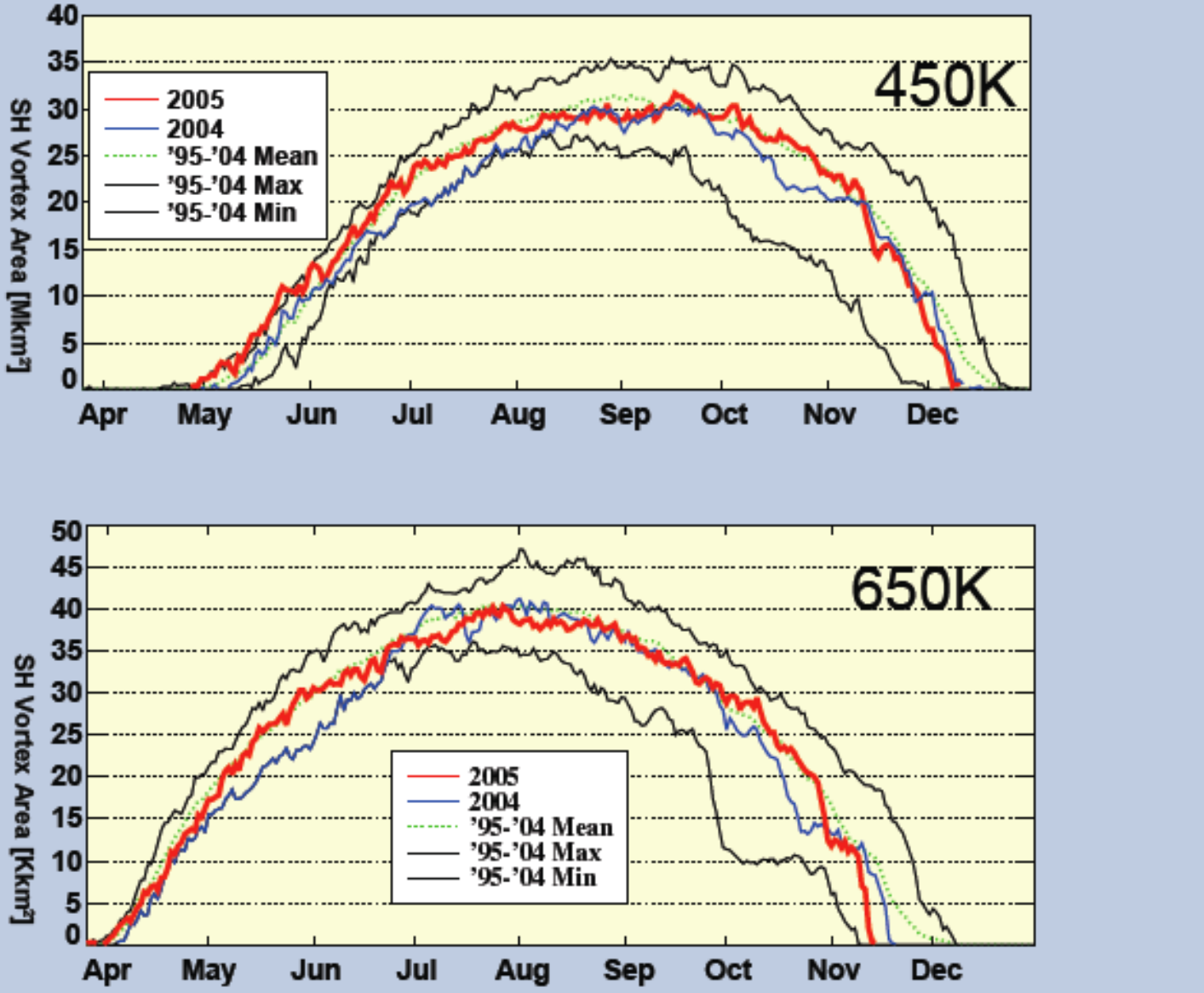



*Figure 3. Time series of the area of the south polar vortex from April-December 2005. Data are from NOAA's Climate Prediction Center. The upper panel shows the vortex area at the 450K isentropic surface and the lower panel shows the vortex area at the 650K surface. The red curve represents 2005 and the blue curve 2004. The green dashed line gives the 1995-2004 average, whereas the black curves represent daily minima and maxima for any year during the 1995-2004 time period.*

- The area where total ozone was less than 220 DU (ozone hole area) was larger than ever before, at that time of the year, during the first two weeks of August.
- During the last two weeks of August and the first three weeks of September the ozone hole area continued to increase at a pace close to the average of the last 10 years.

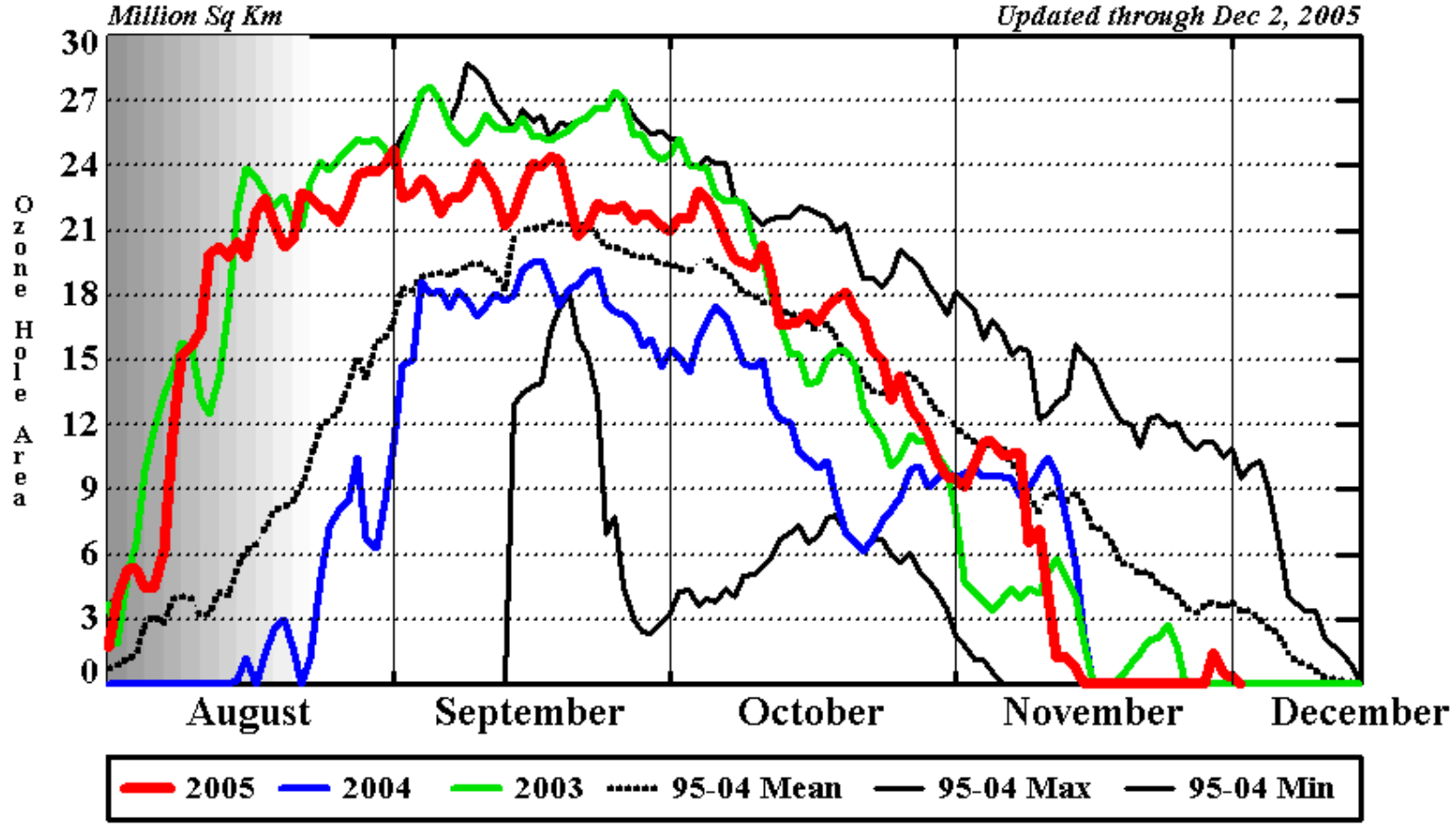
- The ozone hole reached a maximum area of about 27 Mkm2 on 19 September. Comparing with total ozone data of the last decade, the 2005 ozone hole ranks as the third largest on record.

- During the last week of September and through October the ozone hole area declined at about the same rate as most of the previous ten years, but in mid-November it dropped from14 to 3 Mkm2 in one week.

# 2005 Southern Hemisphere Ozone Hole Area

*NOAA SBUV/2*

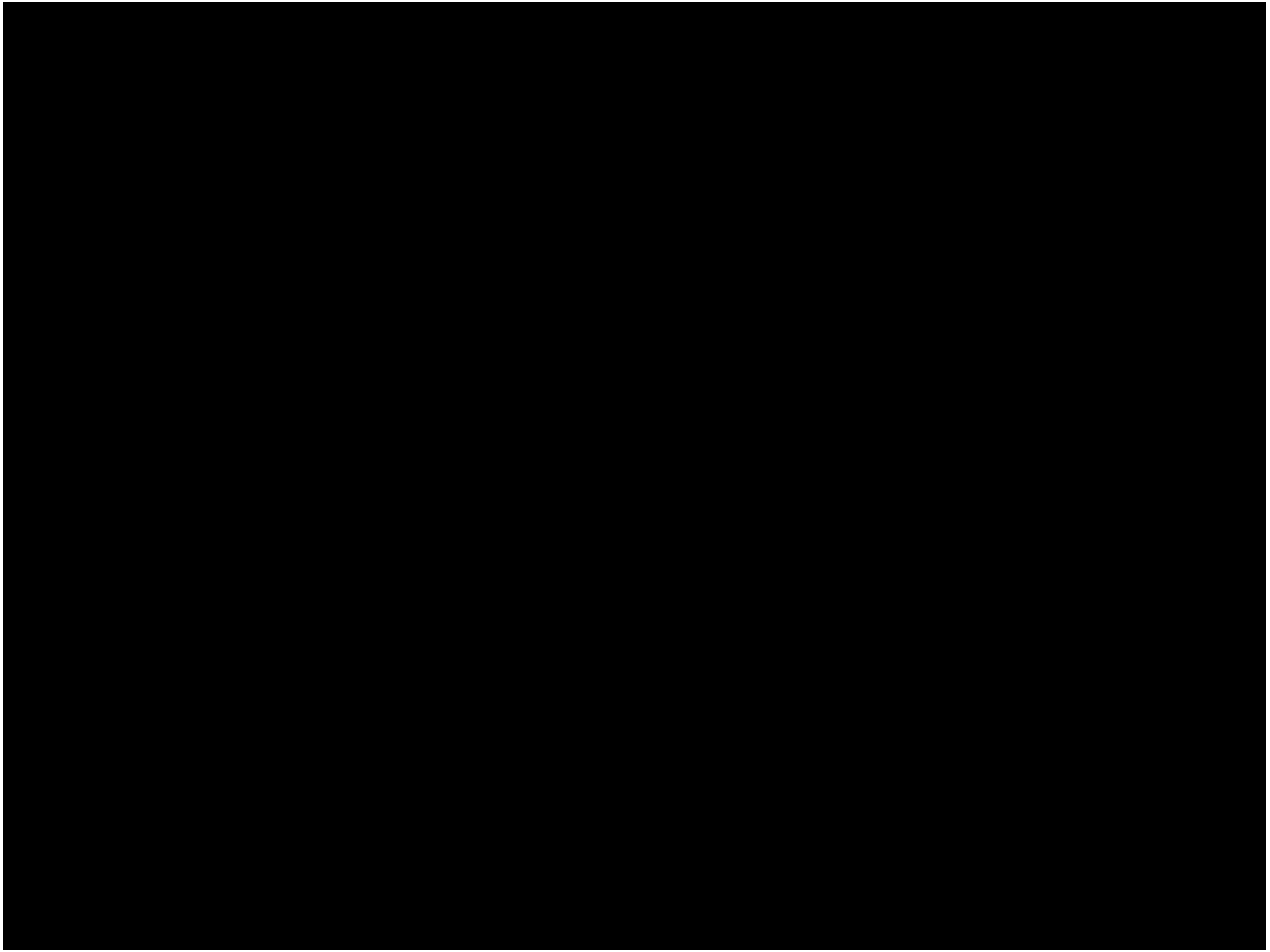
*Current Year Compared Against Past 10 Years*

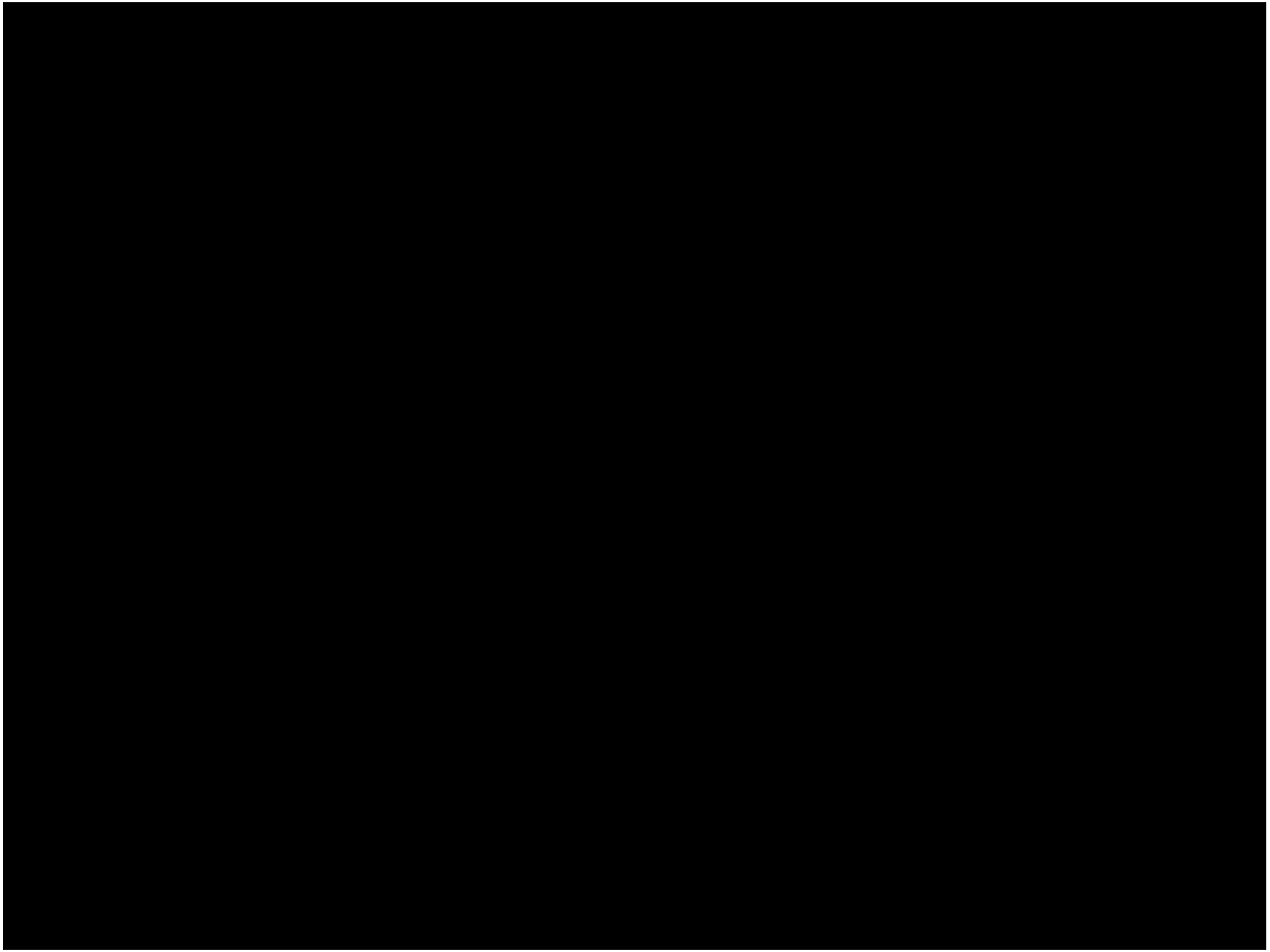


- Some stations have observed total ozone columns that are close to the all-time low for those stations.

- There have also been episodes of unusually large total ozone columns at some stations.

- This variability in ozone observations demonstrates the importance of dynamical processes, in particular the position of the polar vortex relative to the measurement site.





- The 2005 ozone hole strengthens the tendency towards the Antarctic ozone hole reaching its peak earlier in the season and also breaking down earlier than during the 1990s.

- All the ozone holes from year 2000 until now, with the exception of 2001, have declined more rapidly in the mid-October to mid-November period than during the years from 1996 to 1999.

- This change in the temporal evolution of the ozone hole over the course of the winter/spring season points to changes in the meteorological conditions.
- In particular, the large decrease in the ozone hole area from 2003 to 2004 and the large increase again from 2004 to 2005 cannot be explained by changes in the stratospheric halogen loading, but are due to interannual dynamical variability.