7.2. Palmer Station

Volume 16 and Volume 17 data from Palmer Station were processed together. This section presents a comparison of data of both volumes with historic data.

According to the World Meteorological Organisation[+], the Antarctic “ozone hole” in the austral fall of 2006 was one of the largest and deepest on record. The 21-30 September average area of the ozone hole derived from data of the Ozone Monitoring Instrument (OMI) onboard NASA’s AURA satellite was 27.4 million km^2. This is the largest area on record since satellite measurements began in 1979. In contrast, the size of 2007 ozone hole was only slightly above the 10-year average, both in depth and overall area. The ozone hole area reached a maximum of approximately 25 million km^2 in mid-September, according to OMI. While the 2007 ozone hole was not as deep and large as the ozone hole of 2006, it lasted exceptionally long. Small areas with ozone columns below 230 DU were still present even at the end of December.

Figure 7.2.1 shows total column ozone measured by satellites at Palmer Station. A large day-to-day variability can be observed. Measurements from 2006 and 2007 are generally within the range defined by measurements of previous years. Exceptionally large ozone columns of larger than 400 DU were observed at the end of October 2007. Total ozone dropped again in November.

Noontime values of the 298.51 - 303.03 nm integral (Figure 7.2.2) anticorrelate with ozone. For example, the peak in UV irradiance on 15-November 2006 occurred when total ozone dropped below 200 DU. The daily maximum UV Index was 9.3 on that day (Figure 7.2.3).

Figure 7.2.4 and Figure 7.2.5 show the annual cycles in DNA-weighted daily dose and erythemally weighted daily dose, respectively. Doses observed during the first five months of 2007 and 2008 compare well to historic records. Both figures also demonstrate that variability in daily UV doses is much smaller between January and March than it is between September and November, the period affected by the ozone hole.

Daily doses in the 400-600 nm range are shown in Figure 7.2.6. This data product depends only little on atmospheric ozone concentrations. Measurements from the last three years vary within the range defined by historic records.

[+] See http://www.wmo.ch/pages/prog/arep/gawozobull06_en.html

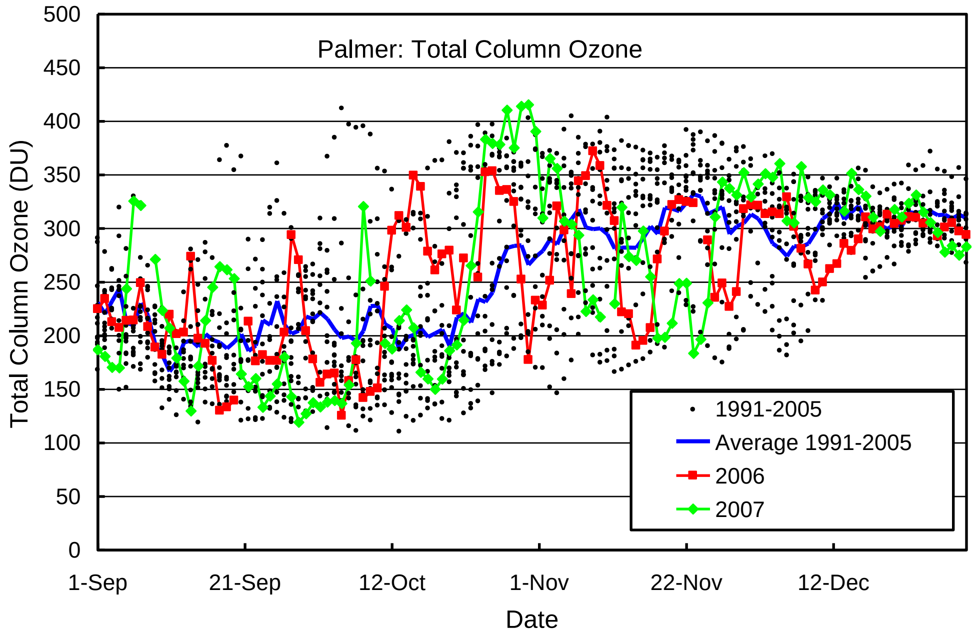

Figure 7.2.1. *Total column ozone in Palmer. OMI measurements from 2006 and 2007 are compared with ozone data from the years 1991-1999 recorded by TOMS /Nimbus-7(1991-1993),TOMS/ Meteor-3 (1993-1994), NOAA/TOVS (1995-1996), TOMS/Earth Probe (1997-2003) satellites, OMI (2004-2005).*

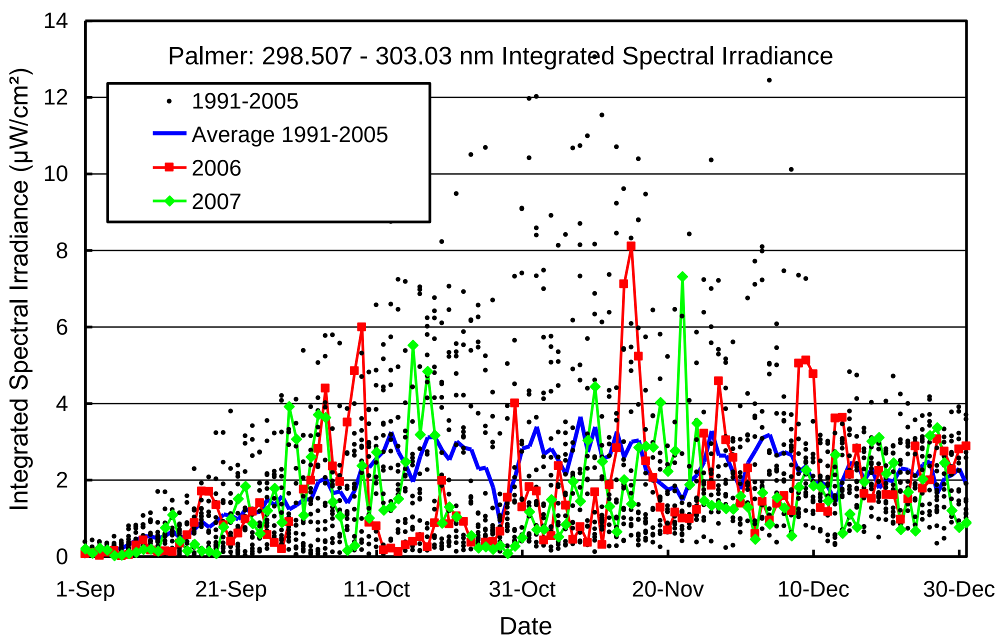

Figure 7.2.2. *Noontime integrated spectral UV irradiance (298.51 - 303.03 nm) at Palmer. Measurements from 2006 and 2007 are compared with individual data points and the average of measurements taken between 1991 and 2005.*

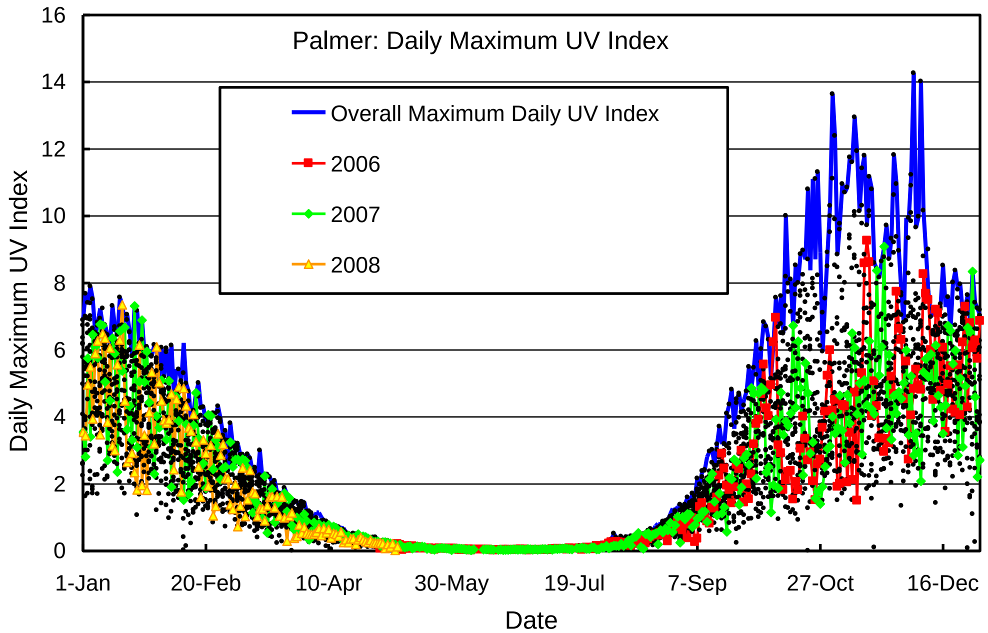

Figure 7.2.3. *The daily maximum UV Indices at Palmer Station measured between 2006 and 2008 are compared with UV Indices measured between 1991 and 2005. The overall maximum daily UV Indices are also highlighted.*

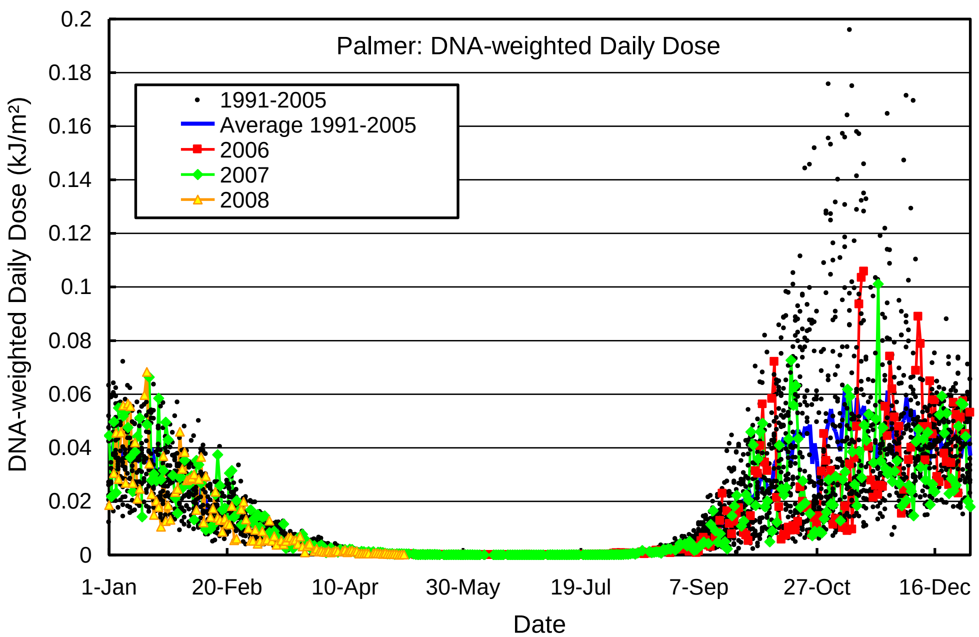

Figure 7.2.4. *Daily DNA-weighted dose for Palmer. Volume 16 and Volume 17 measurements from the years 2006-2008 are compared with individual data points and the average of measurements taken between 1991 and 2005.*

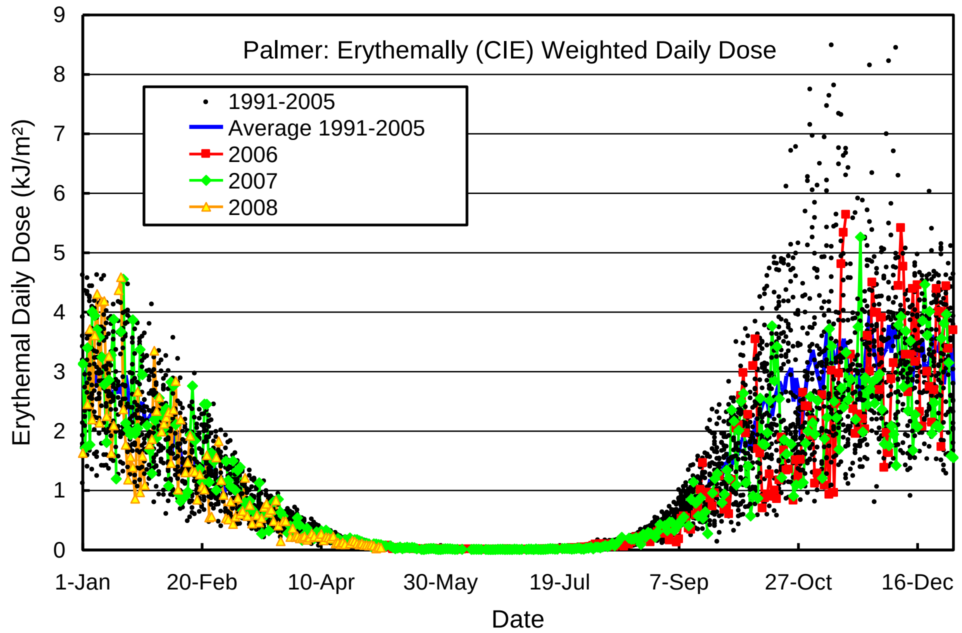

Figure 7.2.5. *Daily erythemal dose for Palmer. Volume 16 and Volume 17 measurements from the years 2006-2008 are compared with individual data points and the average of measurements taken between 1991 and 2005.*

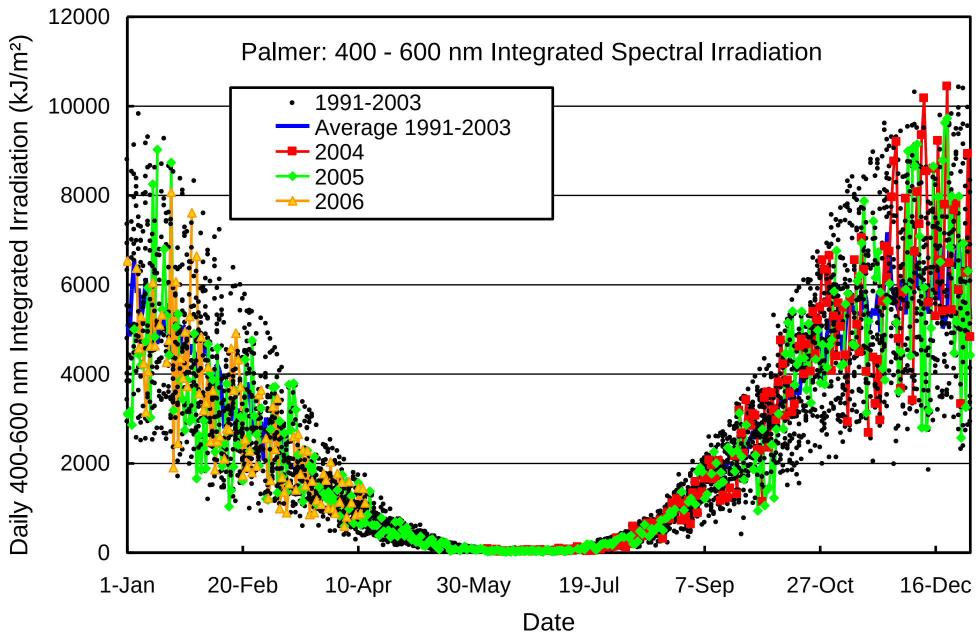

Figure 7.2.6. *Daily irradiation of the 400-600 nm band for Palmer. Volume 16 and Volume 17 measurements from the years 2006-2008 are compared with individual data points and the average of measurements taken between 1991 and 2005.*