7.2. Palmer Station

Volume 14 and Volume 15 data from Palmer Station were processed together. This section presents a comparison of data of both volumes with historic data.

The size of the Antarctic "ozone hole" in the austral fall of 2004 was considerably smaller than the average size observed during the last decade. However, stable meteorological conditions that promote the persistence and intensity of the ozone hole replaced the earlier less stable conditions and permitted the gradual growth of the ozone hole into mid-November. The situation was different in 2005 when the third largest ozone on record was observed according to WMO[+]. The ozone hole reached a maximum area of about 27 million square kilometers on September 19, 2005. Ozone levels below 220 DU were observed up to November 11, 2005.

Figure 7.2.1 shows total column ozone measured by satellites at Palmer Station. Total ozone remained below 250 DU up to mid-October in 2004 and 2005, with few exceptions. Dislocation of the hole's center away from the Antarctic peninsula led to ozone columns exceeding 300 DU at the end of October in both years. Total ozone values dropped during the first week of November when the ozone hole moved again toward Palmer Station.

Noontime values of the 298.51 - 303.03 nm integral (Figure 7.2.2) anticorrelate with ozone. For example, high UV levels were observed during the first week of November 2005 when total ozone was below 250 DU. Erythemal irradiance was also comparatively high during this period (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 2005 and 2006 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 years compare well with historic records.

[+] See http://www.wmo.int/web/arep/05/bulletin-8-2005.pdf

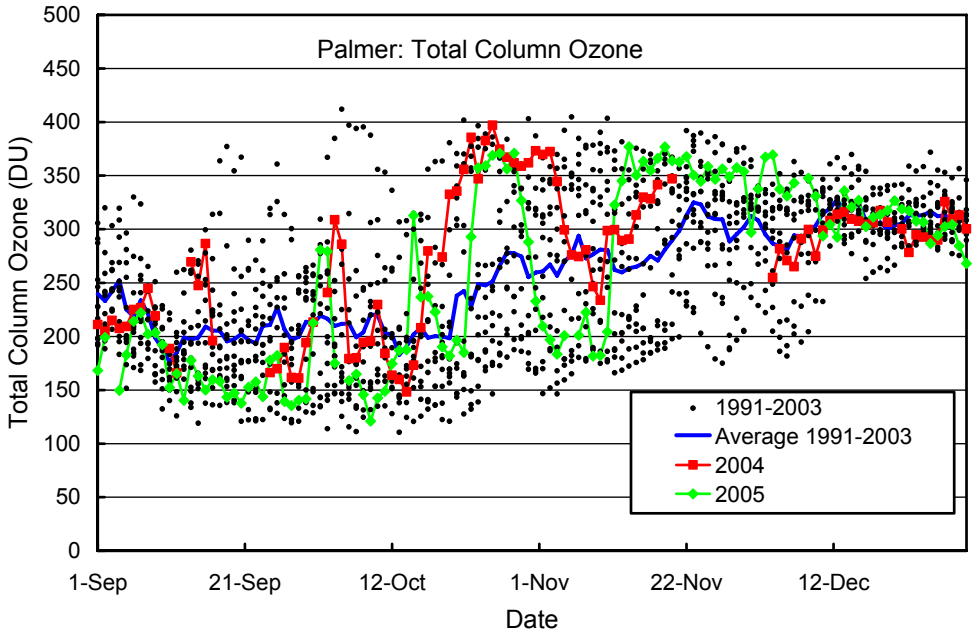

Figure 7.2.1. *Total column ozone in Palmer. OMI measurements from 2004 and 2005 are compared with ozone data from the years 1991-1999 recorded by TOMS /Nimbus-7(1991-1993),TOMS/ Meteor-3 (1993-1994), NOAA/TOVS (1995-1996), and TOMS/Earth Probe (1997-2003) satellites.*

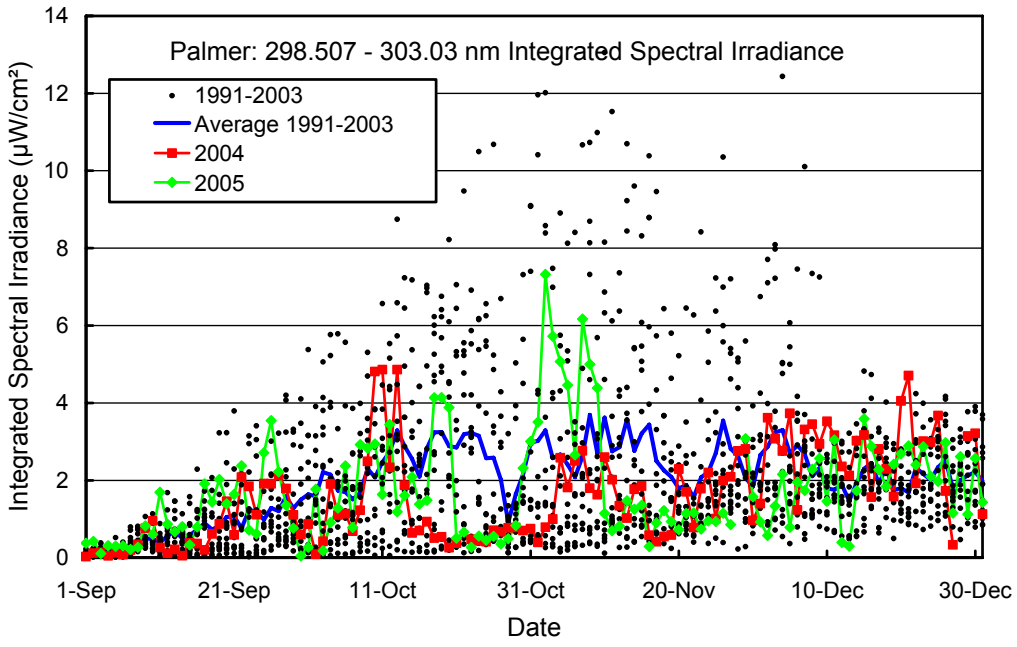

Figure 7.2.2. *Noontime integrated spectral UV irradiance (298.51 - 303.03 nm) at Palmer. Measurements from 2004 and 2005 are compared with individual data points and the average of measurements taken between 1991 and 2003.*

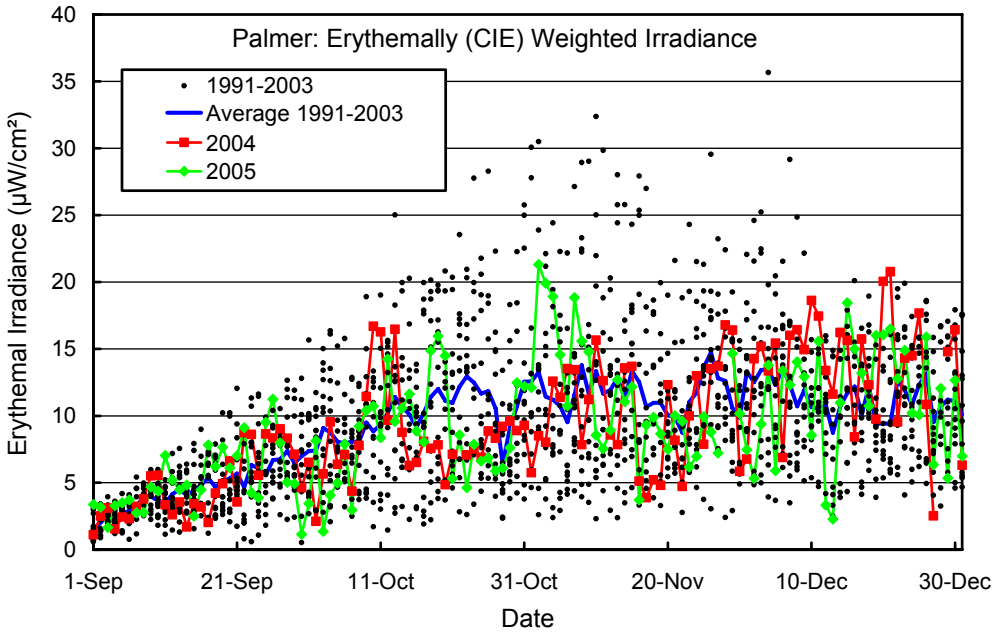

Figure 7.2.3. *Erythemally (CIE) weighted irradiance at Palmer. Measurements from 2004 and 2005 are compared with individual data points and the average of measurements taken between 1991 and 2003.*

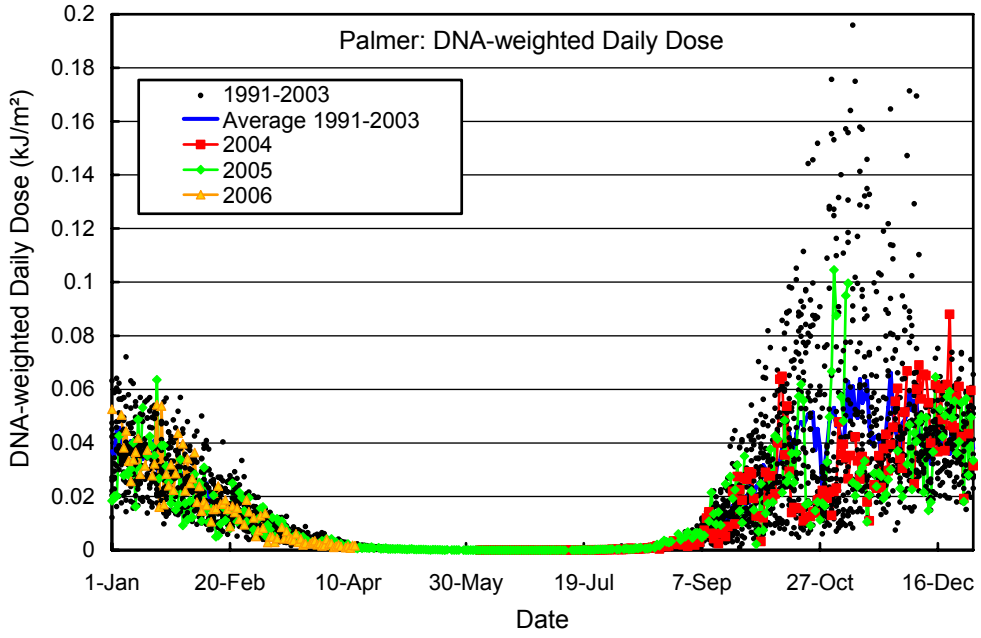

Figure 7.2.4. *Daily DNA-weighted dose for Palmer. Volume 14 and Volume 15 measurements from the years 2004-2006 are compared with individual data points and the average of measurements taken between 1991 and 2003.*

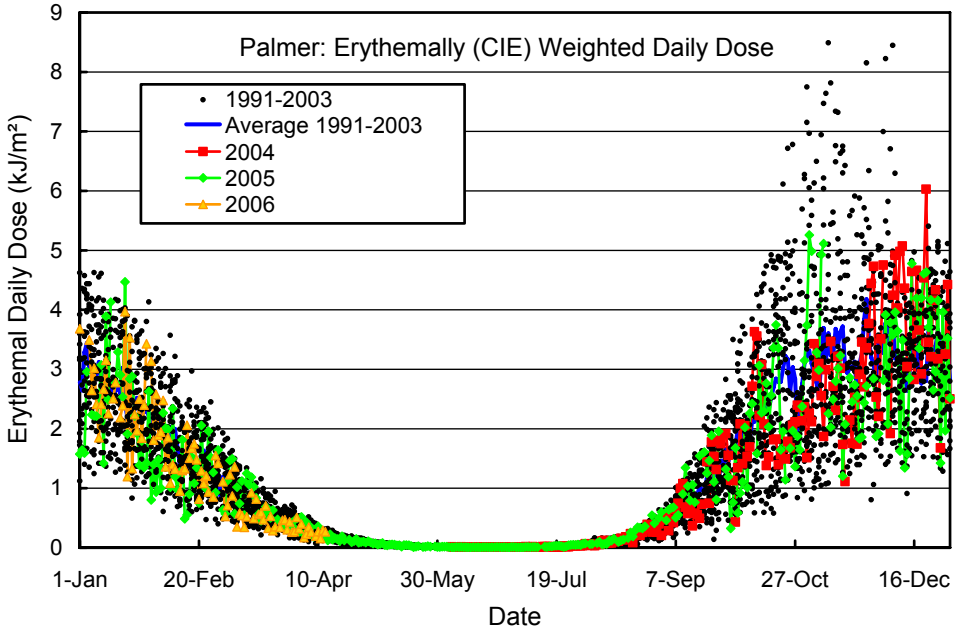

Figure 7.2.5. *Daily erythemal dose for Palmer. Volume 14 and Volume 15 measurements from the years 2004-2006 are compared with individual data points and the average of measurements taken between 1991 and 2003.*

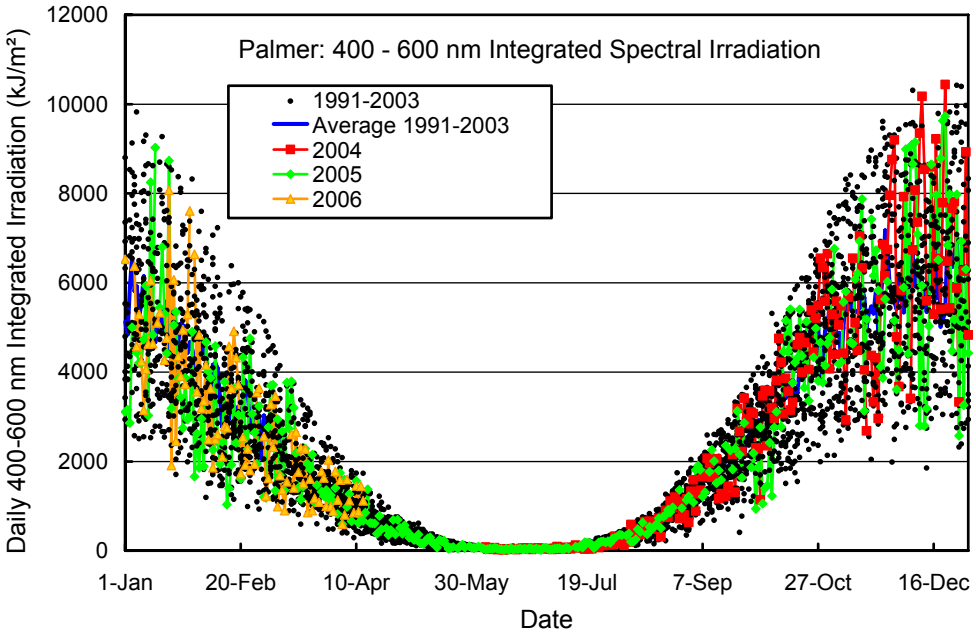

Figure 7.2.6. *Daily irradiation of the 400-600 nm band for Palmer. Volume 14 and Volume 15 measurements from the years 2004-2006 are compared with individual data points and the average of measurements taken between 1991 and 2003.*