

7.2. Palmer Station

Figure 7.2.1 shows total column ozone over Palmer Station as measured by TOMS. Ozone values in 1999 are generally within the range of values of previous seasons. Three drops in ozone occurred on 10/17/99, end of November, and beginning of December. All three low-ozone periods had elevated UV levels. For example, noontime values of the 298.51 - 303.03 nm integral change from $1.7 \mu\text{W}/\text{cm}^2$ to $8.1 \mu\text{W}/\text{cm}^2$ between 12/01/99 and 12/03/99 (Figure 7.2.2); erythemally weighted noontime irradiance changes by a factor of 2.1 during the same period (Figure 7.2.3). This change is less pronounced than for the 298.51 - 303.03 nm integral because the erythral weighting function is less sensitive to changes in ozone.

During the same periods, peaks in UV can also be found in daily UV doses, i.e., irradiance integrated over one day. Figure 7.2.4 and Figure 7.2.5 show the annual cycles in DNA-weighted daily dose and erythemally weighted daily dose, respectively. Note that doses observed in 1999 are well within the range of values observed in previous years. Between 10/28/99 and 11/25/99, UV levels tend to be below average. Both figures also show that variability in daily UV doses is much lower between January and March than it is between September and November, the period affected by the ozone hole. UV levels measured during the austral spring have frequently been a factor two to three higher, compared to values measured six months earlier.

In Figure 7.2.6, daily doses in the 400-600 nm range are shown. Since radiation in the visible is not affected by atmospheric ozone concentrations, Volume 9 measurements agree well with measurements from previous years.

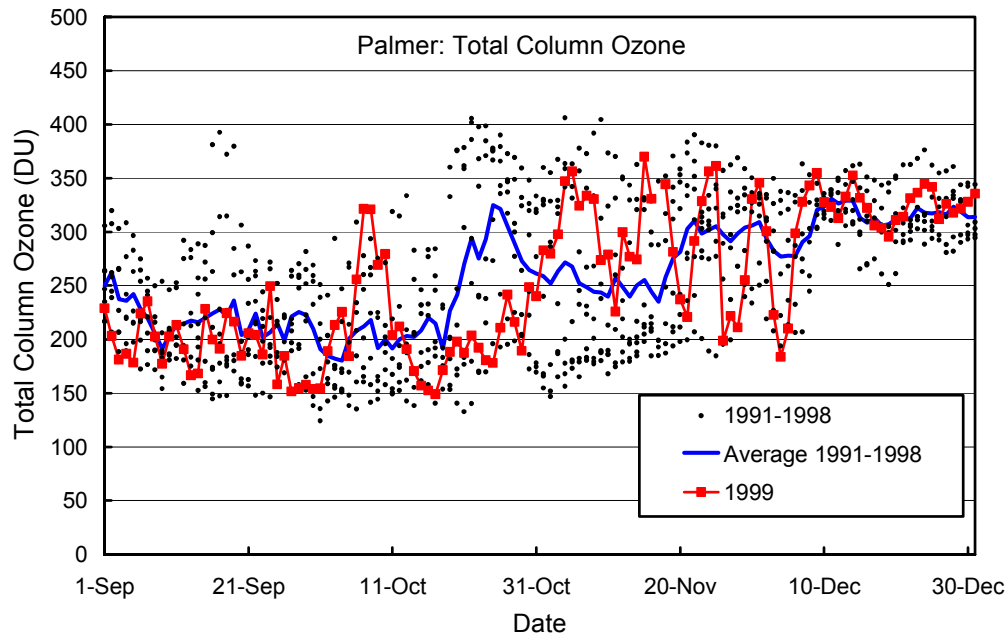


Figure 7.2.1. Total column ozone in Palmer. TOMS/Earth Probe measurements from 1999 are contrasted with ozone data from the years 1991-1998 recorded by TOMS/Nimbus-7(1991-1993), TOMS/Meteor-3 (1993-1994), NOAA/TOVS (1995-1996), and TOMS/Earth Probe (1997-1998) satellites.

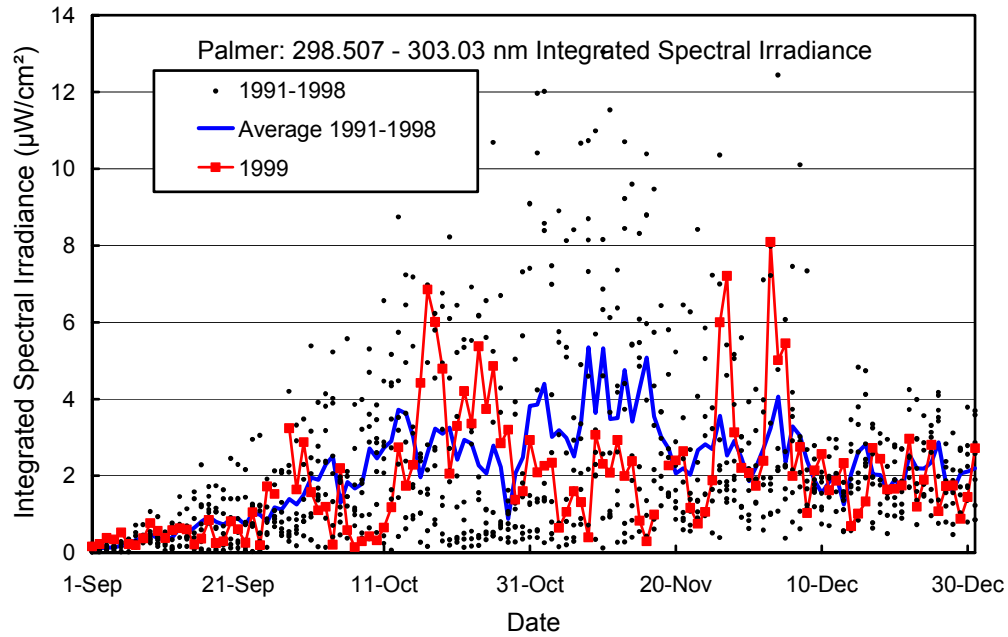


Figure 7.2.2. Noontime integrated spectral UV irradiance (298.51 - 303.03 nm) at Palmer. Measurements from 1999 (squares) are contrasted with individual data points and the average of measurements taken between 1991 and 1998.

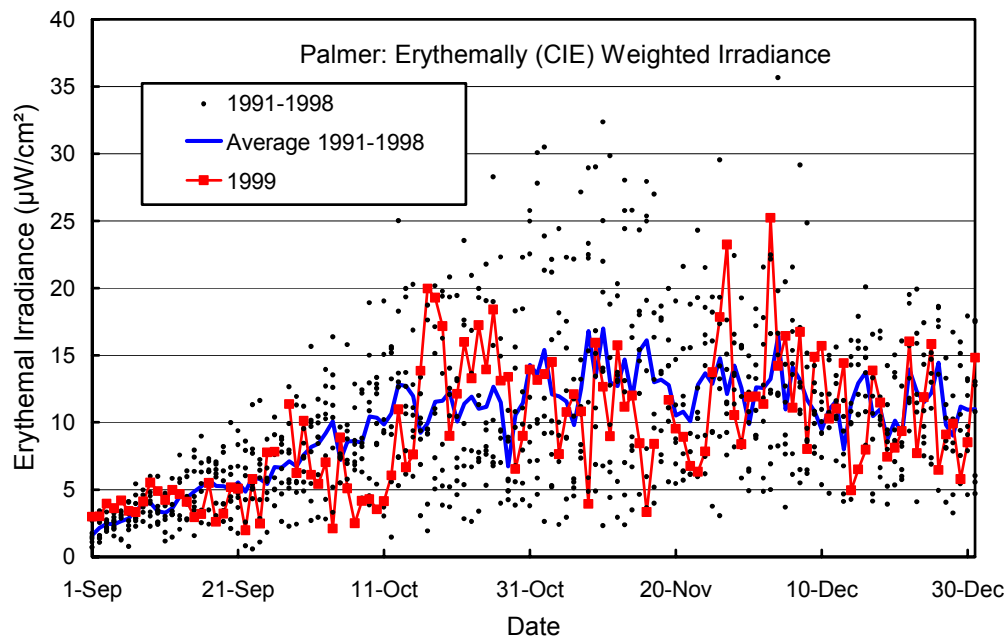


Figure 7.2.3. Erythemally (CIE) weighted irradiance at Palmer. Measurements from 1999 (squares) are contrasted with individual data points and the average of measurements taken between 1991 and 1998.

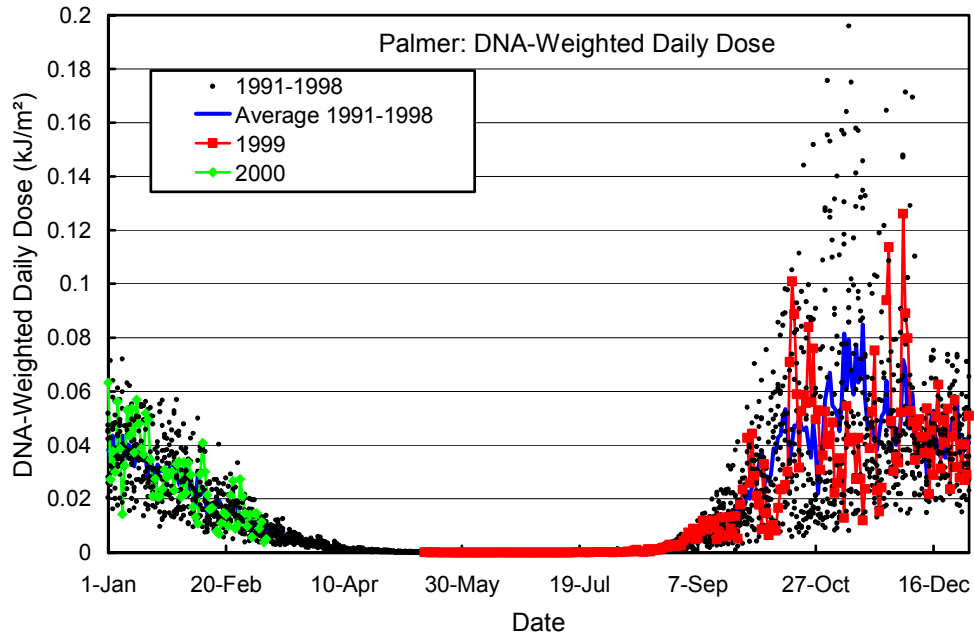


Figure 7.2.4. Daily DNA-weighted dose for Palmer. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998.

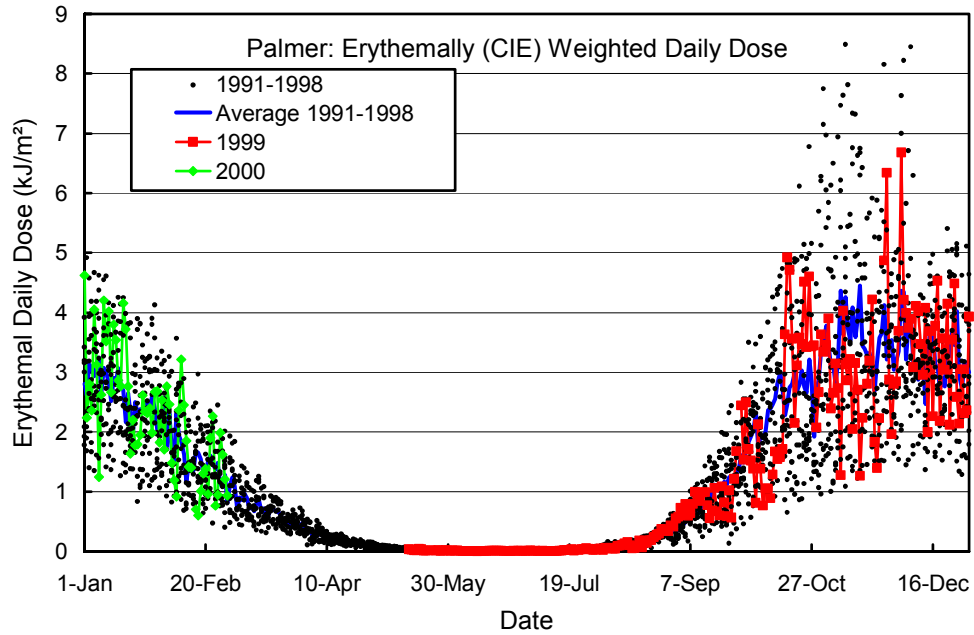


Figure 7.2.5. Daily erythemal dose for Palmer. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998.

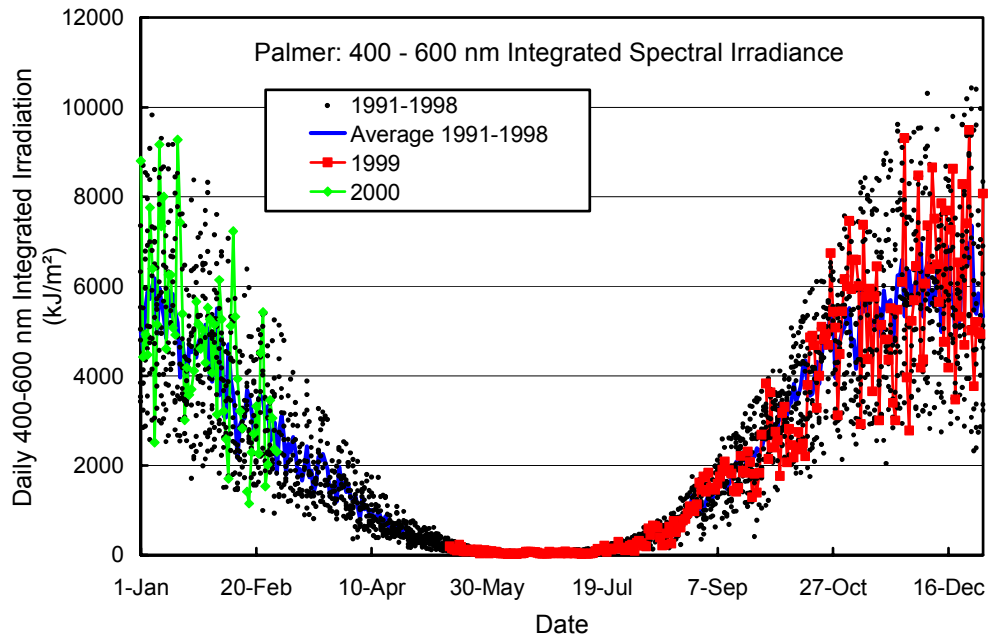


Figure 7.2.6. Daily irradiation of the 400-600 nm band for Palmer. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998.