7.4. Ushuaia, Argentina

Figure 7.4.1 shows total column ozone over Ushuaia as measured by TOMS. Ozone values in 1999 are generally within the range of values of previous seasons. There are two exceptions: on 11/21/99 and 12/05/99 ozone values fall below historic minima. UV irradiances at both days consequently show distinct spikes. For example, noontime values of the 298.51 - 303.03 nm integral change by a factor of 7.5 between 11/19/99 and 11/21/99 (Figure 7.4.2). During the same period, erythemally weighted irradiance changes by a factor of 3.6 (Figure 7.4.3). This change is less pronounced than the one for the 298.51 - 303.03 nm integral because the erythemal weighting function is less sensitive to changes in ozone.

The two peaks that can be found in noon-time irradiance are also present in DNA-weighted daily dose (Figure 7.4.4) and erythemally weighted daily dose (Figure 7.4.5). In fact, the DNA-dose of 0.1172 kJ/m^2 measured on 12/05/99 is the highest value on record. On this day the center of the ozone hole was displaced toward South America and the Atlantic Ocean. The ozone hole quickly dissolved after this day. Doses during the remainder of December are therefore within the long-term average.

Since Ushuaia has the lowest latitude from all austral sites it is least influenced by the ozone hole. UV levels between January and March are therefore usually comparable to those between September and November. However, low-ozone episodes, as those observed on 11/21/99 and 12/05/99, occur every year when ozone depleted airmasses move over Ushuaia. This may cause large changes in UV from one day to the next, which may have a significant impact on both citizens of Ushuaia and native wildlife.

In Figure 7.4.6, 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. Note that there is a large day-to-day variability, caused by rapid changes in cloudiness.

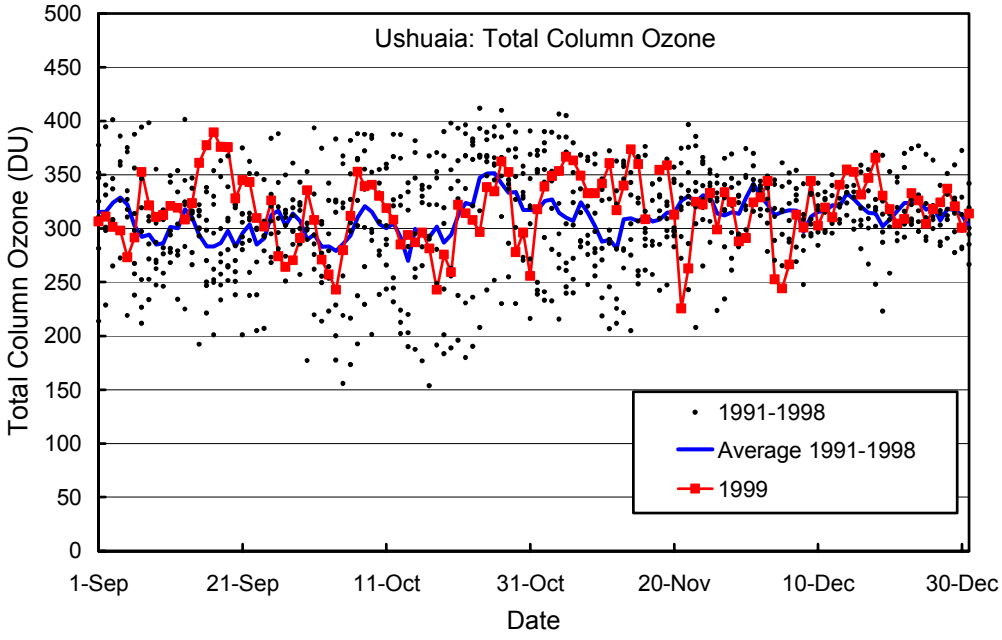

Figure 7.4.1. *Total column ozone in Ushuaia. TOMS/Earth Probe measurements from 1999 are contrasted with ozone data from the years 1991-1998 recorded by TOMS /Nimbus-7(1991-1993),TOMS/ Meteor-3 (1993-1994), NOAA/TOVS (1995-1996), and TOMS/Earth Probe (1997-1998) satellites.*

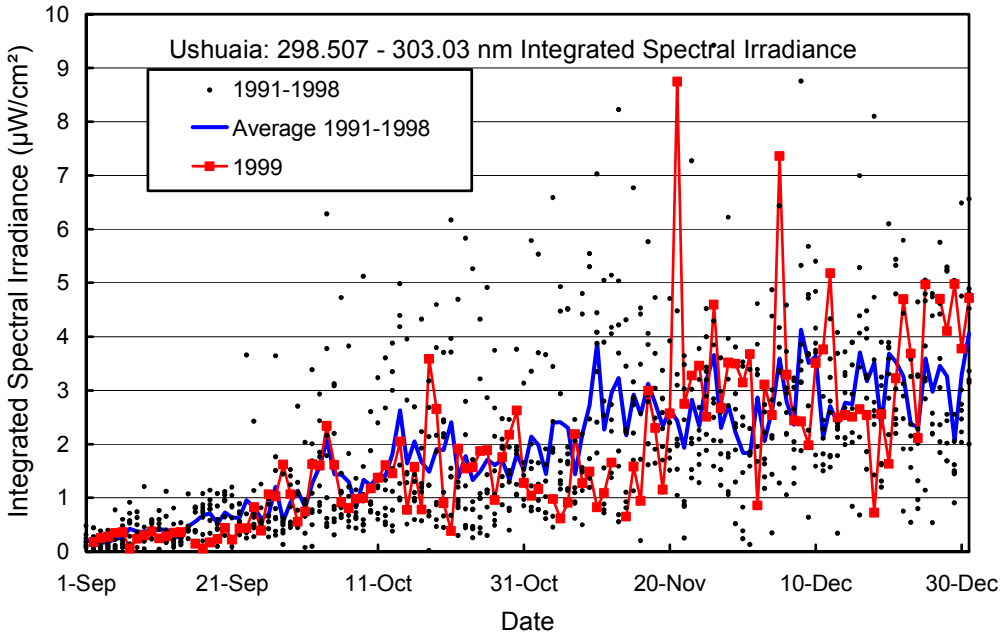

Figure 7.4.2. *Noontime integrated spectral UV irradiance (298.51 - 303.03 nm) at Ushuaia. Measurements from 1999 (squares) are contrasted with individual data points and the average of measurements taken between 1991 and 1998.*

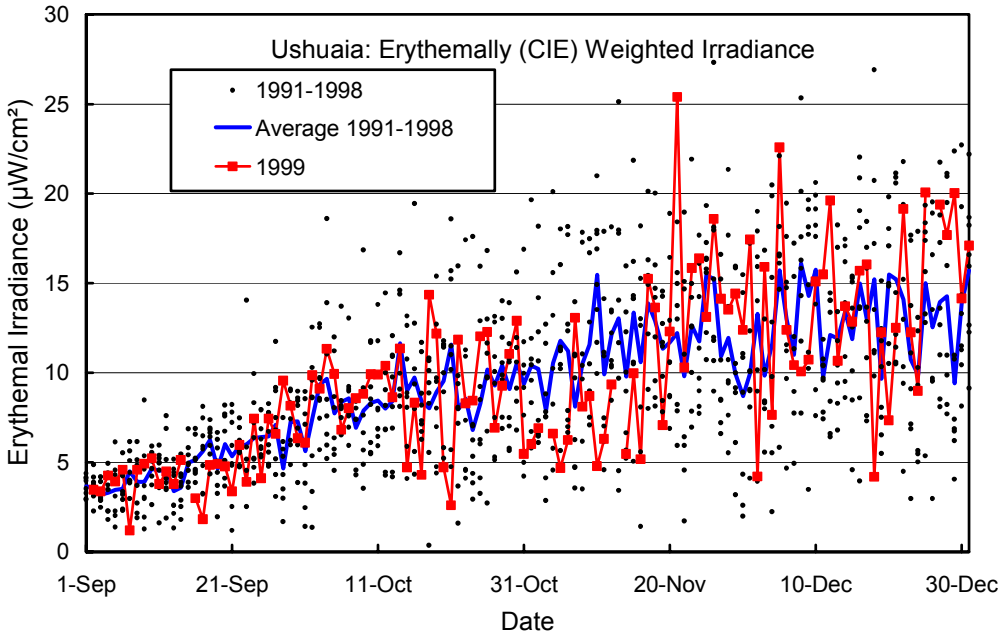

Figure 7.4.3. *Erythemally (CIE) weighted irradiance at Ushuaia. Measurements from 1999 (squares) are contrasted with individual data points and the average of measurements taken between 1991 and 1998.*

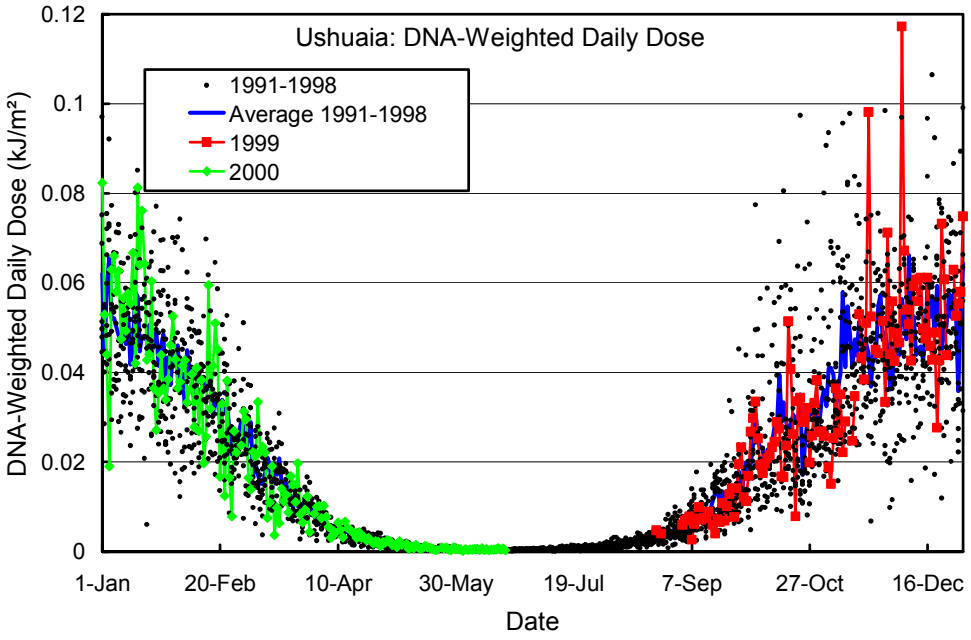

Figure 7.4.4. *Daily DNA-weighted dose for Ushuaia. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998*

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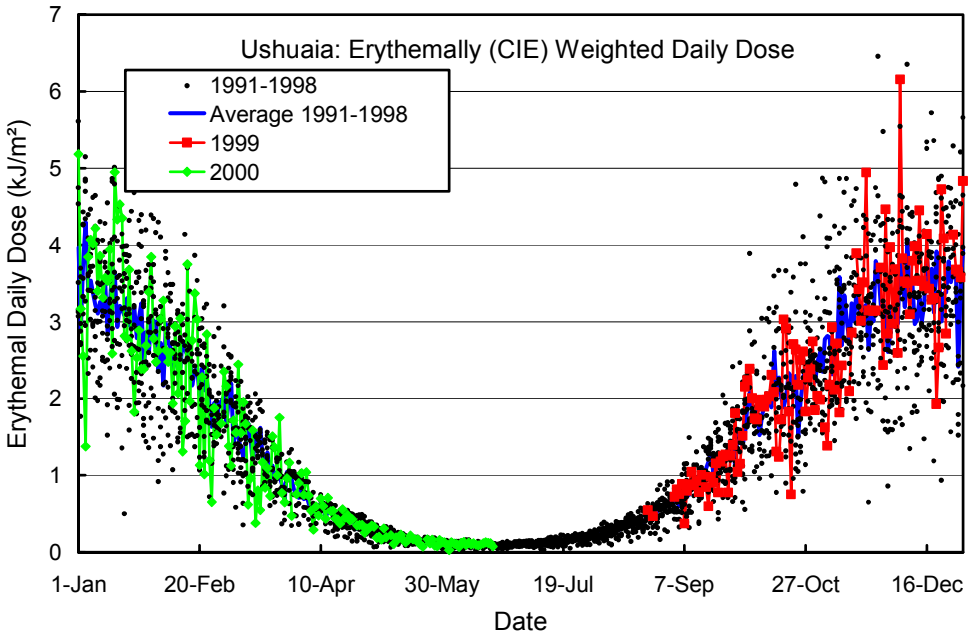

Figure 7.4.5. *Daily erythemal dose for Ushuaia. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998..*

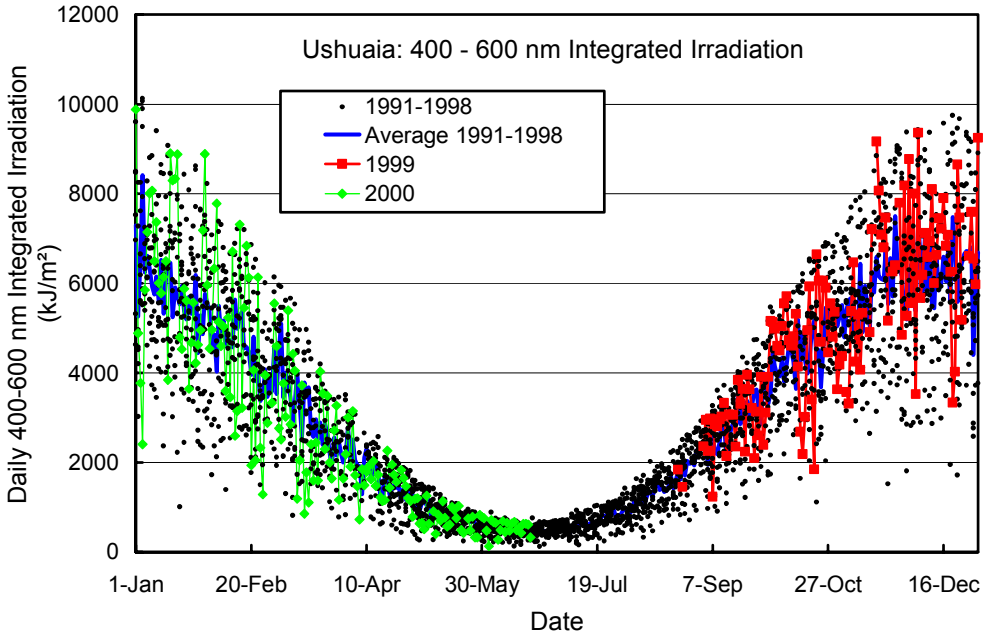

Figure 7.4.6. *Daily irradiation of the 400-600 nm band for Ushuaia. Volume 9 measurements from 1999 and 2000 are contrasted with individual data points and the average of measurements taken between 1991 and 1998.*