3.2.5. BROADBAND UV

Introduction

Broadband UV instruments (Yankee UVB-1) were operational at MLO, BRW, BAO, Bermuda, Kwajalein, and Boulder as part of the various programs being operated by the STAR group. These instruments were all compared at various times with the MLO instrument and with the MLO UV spectroradiometer installed at MLO in July 1995 [*Bodhaine et al.,* 1998]. Because the erythemal response defined for human skin is significantly different than that of the broadband instrument, the calibration of the broadband instrument reporting in erythemal units is strongly dependent on total ozone [*Bodhaine et al.,* 1998]. When a broadband instrument is placed in the field, it is necessary to know the calibration as a function of ozone to determine accurate erythemal irradiance. However, the manufacturers of broadband instruments do not generally provide information on the ozone dependence of the calibration.

Instrumentation

The UVB-1 instrument uses a UV-sensitive phosphor that absorbs radiation in the UV-B region and re-emits in the green region. A photodiode that has its peak response in the green part of the spectrum is used to measure the green light emitted by the phosphor. The UVB-1 is temperature stabilized at 45°C. The manufacturer provides conversion factors for estimating various portions or weighted integrals of the UV spectrum, such as total UV-B (280-315 nm or 280-320 nm), Diffey Action Spectrum, Parrish Action Spectrum, or the DNA-weighted spectrum. However, these estimates can be significantly in error because of the fact that the actual spectral response of the instrument can be significantly different than the portion of the spectrum being estimated, which in turn causes strong ozone dependence of the measurements. Because of these uncertainties the broadband measurement program is currently being reviewed.