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Spectral Solar Irradiance over Solar Cycle 23 from Sunphotometers of VIRGO on SOHO.

Claus Fröhlich
PMOD/WRC, Davos Dorf, Switzerland (cfrohlich@pmodwrc.ch)

Within the VIRGO experiment on SOHO two 3-channel sunphotometers (SPM) measure solar spectral irradiance at 402, 500 and 862 nm with a bandwidth (FWHM) of 5 nm. The time series cover the period from April 1996 until present, more than 14 years and a full solar cycle from the minimum in 1996 to the one in late 2008. SPMA measures the irradiance continuously with a 1-minute sampling and after being exposed to the sun during more than 14 years the sensitivities of the red, green and blue channels are at 74.1, 24.3 and 7.1 percent of their first light values, respectively. SPMB, is exposed rarely and is used to monitor degradation; the result of a detailed analysis of these data can be used to correct SPMA for long-term changes and degradation effects. These are determined by a degradation model and the result shows that the changes due to exposure to the sun depend not only on the exposure time and the cumulated dose of UV radiation received, but also on the temperature of the instrument (Boltzmann factor). Moreover, during the dark periods some recovery from the degradation is observed, which also depends on temperature. This indicates that simple degradation corrections by e.g. fitting multi-degree polynomials can not be adequate. The result of the detailed analysis are reliable time series of solar spectral irradiance at the three wavelengths. The results confirm the positive correlation of all three channels with solar activity and TSI, which is in contrast to the results from SIM on SORCE - at least for the green channel.