



Application of a model derived cosine correction method on Brewer spectral measurements

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Some types of spectroradiometers used for measuring solar irradiance on a horizontal surface suffer from non-ideal angular response of their entrance optics, known also as “cosine error”. The angular response error introduces large systematic uncertainties in the measurements, and their magnitude may vary from a few percent up to 10-15%, depending on the measurement conditions and the characteristics of each particular system.

In this study, model calculated UV irradiance measurements were used for calculation of the correction factor for angular response of Brewer #086, operated at Thessaloniki, Greece. The fraction of the direct irradiance was calculated with respect to global irradiance as a function of wavelength, total ozone and cloud optical depth. Modeled correction factors were compared with those derived from quasi-simultaneous measurements of global irradiance and the direct component.