



Calibration and Deployment of Solid State Spectroradiometers for Long-Term Solar UV Monitoring

A. R. D. Smedley, R. Kift, and A. R. Webb

University of Manchester, School of Earth, Atmospheric and Environmental Sciences, Manchester, United Kingdom

As part of the EMRP Joint Research Project: traceability of solar ultraviolet radiation, we present suggestions for a standardised calibration procedure for solid state spectroradiometers in the context of surface-based direct beam solar UV field measurements. Specifically the following aspects are considered: selection of narrow-band emission sources for wavelength calibration, dark current dependence on instrument temperature, a simplified, but fully traceable, absolute calibration procedure through consideration of suitable integration times and investigations into stray light issues. Although our work focuses on the challenges and applicability of these instruments to measurements of the direct solar beam at UV wavelengths (280 to 400nm), it also considers irradiance measurements and acquisition of high quality data at visible wavelengths.

The aim of these improvements to our calibration methodology is to deploy a photodiode array instrument at Manchester in the United Kingdom for the purpose of long-term monitoring of spectrally-resolved solar direct beam measurements. The rooftop site in question also hosts a number of other UV monitoring instruments including a Brewer spectrophotometer and forms part of the WMO-GAW network. In addition software will be developed that enables and builds the calibration procedure into our standard practice. Part of the preparatory work will be to design and build a temperature-stabilised weatherproof housing, and site the housed instrument alongside a commercial suntracker with automatic sun-sensing. We provide details of this experimental set-up, the temperature control systems and other considerations with a particular emphasis on the long-term aspect of this deployment.