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Experimental set up to study the cloud radiative effects on UVB at Granada (Spain)

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Clouds are, together with solar zenith angle and total ozone amount, the most important factor influencing ground level UV radiation. The numerical description of clouds radiative influence yields special complications. The main reason is the large variability of clouds, which often occur as horizontally inhomogeneous cloud fields. Thus, information to describe the radiative properties of actual cloud conditions is generally poor.

At the University of Granada an experimental set up designed to acquire additional information on the cloud radiative effects has been recently installed at the Center for Environmental Studies (CEAMA). A digital CCD camera equipped with a fish eye lens mounted provides sky pictures each five minutes. The camera is mounted on an automatic sun tracker system in order to be shaded from the direct sun. Digital processing of the whole sky pictures allowed us to characterize the cloud cover. In this sense, we retrieve features of the cloud field, like total cover, proximity to the sun disk or cloud texture. This cloud information retrieved from surface is complemented with Meteosat Second Generation images that give us information on the cloud coverage seen from the space each fifteen minutes.

On the other hand a Bentham DMc150 spectroradiometer provides solar spectra in the range 290-500 nm. The availability of a shadow band allows us to alternate between global and diffuse spectra. The spectral scanning are optimized in order to obtain a complete scan in less than three minutes providing more detailed spectra in the range 290-320 nm.

In order to complete this instrumentation a complete set of broadband radiometers, including solar broadband, UV erythemal irradiance, PAR and thermal infrared irra-

diance, are operated at the same station. These radiative fluxes are registered, together with meteorological information, as one minute average and standard deviation values. These measurements are used to detect the stability of the sky conditions during the spectroradiometer scans.

The combination of the information registered will allow us for a better characterization of the steady and stationary effects of clouds, including attenuation and enhancement. On the other hand, a more complete picture of the cloud radiative effect spectral influence will be drawn from the set of radiometric devices operated.

Here we present the main features of the experimental set up together with some examples of measurements registered under different cloud conditions. These examples are used to show the potentiality of the experimental set up and the procedures applied in the data analyses.