

Biologically effective UV radiation trend in Florence, Italy as measured at ground station and assessed by remote sensing.

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Beside some positive effects of solar UV (280-400 nm) radiation (as the stimulation of pre-vitamin D bio-synthesis) it is well documented the risk associated to an overexposure to UV radiation, primarily for what concern skin damages whose first step is the onset of erythema. Based on this consideration measurements of the amount of UV radiation responsible for erythema (U_{Very}) have been initiated in many countries. Broadband sensors with a spectral sensitivity mimicking the erythema action spectrum made possible the monitoring of this parameter *in continuum* day after day. On the other hand satellite-derived data of total O₃ and cloud cover associated with radiative transfer model output allow an assessment of daily U_{Very} dose as reported on the web pages of the Tropospheric Emission Monitoring Internet Service, TEMIS (www.temis.nl).

The objective of this study was to compare ground-based and remotely sensed daily U_{Very} data, to analyze the frequency distribution of the daily maximum UV-Index values and the U_{Very} doses to which outdoor workers may be exposed to.

Ground based data have been recorded in Florence up to now since 2000 with a time step of 15 minutes using a broadband sensor (Solar Light 501A) periodically calibrated during various intercomparison campaigns. Daily erythemal dose have been downloaded also from the TEMIS web pages.

Results indicate that daily doses of U_{Very} remotely sensed are in good agreement with ground-based ones both when considering all the days or only those with clear sky conditions. Nevertheless TEMIS derived data resulted always higher than ground based ones and average highest difference was reached in June (0.7 KJm², a 15% less than satellite-derived data). Daily UV-Index maximum (UV-I_{max}) values analyzed according to the WHO classification reported as “protection required”, “moderate” and “high” showed an occurrence respectively of 54.7%, 71.3% and 26.8%. Days classifiable as “very high” accounted for 1.9%. Results are also illustrated in terms of daily U_{Very} doses occurring during the working hours of different months indicating the high level of U_{Very} to which outdoor workers are exposed to respect to 30 Jm², the limit still proposed by ICNIRP.