



Biologically effective surface UV climatology at Rome and Aosta, Italy

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The Italian territory has the potential for receiving high solar ultraviolet (UV) doses during most of the year. This may represent a serious hazard for human health as UV radiation is responsible for skin cancer: Italy is in the third place, after Australia and USA, for melanoma occurrences. It ought to be remembered that UV radiation has well-established beneficial effects on the skin, most notably the synthesis of vitamin D₃. However a climatological characterization of biologically effective UV radiation in Italy is still missing.

Given the dual biological effect of UV radiation, we focused on the characterization of erythema and vitamin D dose rates at two Italian sites with different environmental conditions: Rome (41.9°N, 12.5°E, 70 m a.s.l.) and Aosta (45.8°N, 7.4°E, 569m a.s.l.). For both sites multi-year series of high quality spectral UV measurements, provided by Brewer spectrophotometers are available, especially at the Rome station which has the longest available spectral measurements of UV irradiances in Italy (more than 15 years).

The climatological characterization of erythema and vitamin D radiation has been carried out in relation to total ozone, solar zenith angle, and aerosol optical index. In addition, the results of the climatological analysis allowed to study the applicability of an innovative method to derive vitamin D doses based on polysulphonatedosimetry – normally used to measure erythema exposures – and hence to expand the potential applications of the PS dosimetric technique.