

INFLUENCE OF CLOUDS ON PRE-VITAMIN D₃ EFFECTIVE SOLAR UV EXPOSURES

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Abstract

Clouds are affected by aspects of climate change and are a major influencing factor on the pre-vitamin D₃ effective solar UV (UVD₃) exposures that humans receive. The aim of this research was to investigate the influence of clouds on the short wavelength cut-off of the spectral UVD₃ irradiances, on the maximum of the UVD₃ spectral irradiances and on the magnitude of the UVD₃ irradiances. The spectral pre-vitamin D₃ effective solar UV irradiances on a horizontal plane were calculated by weighting the spectral UV measured every five minutes by a spectroradiometer with the action spectrum for the synthesis of pre-vitamin D₃. The short wavelength cut-off was defined as the wavelength at which the UVD₃ irradiances were 0.1% of the maximum biologically damaging irradiance for that scan. Due to the higher relative effectiveness of the action spectrum at the shorter UV wavelengths, any variations will influence the UVD₃ exposures and consequently has public health implications. The short wavelength cut-off, the magnitude of the irradiances and the maximum of the UVD₃ spectral irradiances were investigated for a range of solar zenith angles for cloud free cases and cloudy cases.