

Solar UV Exposures Measured Simultaneously to all Arbitrarily Oriented Leaves on a Plant

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Cloud cover which is influenced by climate change, has a direct impact on the solar UV radiation incident on terrestrial ecosystems. In order to determine and evaluate the consequences associated with changes in solar UV radiation levels, research into the effects of solar UV radiation on different types of biota, such as plants is becoming increasingly significant. Therefore, a means of obtaining information on the solar UV radiation incident on plants is required. In this research, the spectral irradiances of the solar UV incident to the leaves on a plant were measured with a calibrated spectrometer. These spectra detail the correlation between solar UV irradiances with the inclination and orientation of each leaf, along with the effect of shading by other leaves. In order to measure the solar UVB exposures to plant leaves, polysulphone dosimeters were miniaturised to allow the measurement of UVB exposures to the leaves of smaller plants over the period of a day. For the cases of larger plants where exposure measurements were required over time intervals longer than the dynamic range of polysulphone, dosimeters based on polyphenylene oxide which has a dynamic range approximately five times longer than that of polysulphone were employed to measure the solar UVB exposures simultaneously on the leaves of a plant over a one week time period.