

AMBIENT AND PERSONAL SOLAR ULTRAVIOLET EXPOSURE MEASUREMENTS

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An understanding of the solar terrestrial ultraviolet (UV) environment is necessary for the minimisation of solar UV exposures to humans and reduction of the risk of human sun-related disorders. In the Centre for Astronomy and Atmospheric Research at the University of Southern Queensland (USQ), Toowoomba, the ambient and personal solar UV exposures are measured in different environments. Outdoor, temperature stabilised meters provide the erythemal UV and UVA throughout the day to a web page. At the sub-tropical latitude of this site, anti-correlations were measured between atmospheric ozone variations due to natural atmospheric processes and erythemal UV exposures. Increases of up to 14% over 5 days in the daily UV exposures to a horizontal plane were recorded.

The personal erythemal UV exposures in gum tree shade have been quantified with UV dosimeters. These dosimeters are fabricated from polysulphone in thin film form. Quality assurance procedures are in place to produce film of reproducible and constant thickness, as changes in the film thickness can cause errors of up to 37% in the dose response. When summed over the whole day for each day in summer, the exposures in the gum tree shade were in excess of the erythemal UV exposures for horizontal plane incidence in full sun for an entire summer in England. The UV spectrum in gum tree shade was measured and the spectral shade ratio decreased with increasing wavelength for all of the trees. The tree shade is not as effective at providing protection at the shorter wavelengths where the erythema, actinic and DNA action spectra have a higher relative effectiveness.