Solar ultraviolet in the school environment: measurements and patterns in exposure

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Measurements of the environmental ultraviolet irradiance and personal ultraviolet exposure to school children have been recorded at a sub-tropical latitude in Queensland. Measurements of the environmental ultraviolet have been used to model ultraviolet exposure within a real school environment with the output being three dimensional topographical exposure models of the face, neck, arms, hands and legs. Representations of biologically effective solar ultraviolet radiation incident on exposed surfaces of the human body were developed from ultraviolet exposure measurements to manikin body parts and students. Personal manikin and student measurement exposures were used to develop a network of contours over the body to display biologically effective solar ultraviolet exposure relative to the incident horizontal plane biologically effective solar ultraviolet irradiance. Contour mesh functions have been developed for each body part that are consequently weighted to surface topography, providing a method for the estimation of biologically weighted incident solar ultraviolet across exposed body areas that minimises uncertainty due to exposure interpolation. Exposure models for clear sky conditions and winter and summer solar zenith angle ranges have been developed. Variation in personal ultraviolet exposure due to changes in the school environment, solar zenith angle and cloud cover will also be presented.