

Measurement of ultraviolet radiation reflectivity: underestimating the influence of specular reflection in personal ultraviolet radiation exposure from non-horizontal surfaces.

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The reflectivity of a surface is predominantly expressed by the unitless quantity of albedo. Albedo is defined as the ratio of incident irradiance to the reflected irradiance from a surface and is an important variable in ultraviolet (UV) radiation measurement. However, albedo is assumed to be a product of a diffusing Lambert surface. For ground surfaces and some building materials this assumption is valid, but for certain building surfaces, reflectivity is not necessarily caused by a diffusing surface. Specular reflection, at which reflection occurs at the boundary of the surface, appears to be a major component of reflection for surfaces such as metal sheeting.

Metal sheeting is a common building product in Australia, used for residential constructions (fences, sheds, roofs and even walls) and industrial construction. The reflectivity of UV irradiance from metal has been shown to be variable [1], depending on the presence of direct UV irradiance, atmospheric conditions and surrounding structures. This suggests that the UV reflectivity from metal surfaces must be specular, given that specular reflectance is highly dependent on the angle of incident irradiance.

This study will discuss the current investigation into specular UV reflectance from metal surfaces, in particular from a vertical surface, given that in urban (and rural) settings, proximity to vertical surfaces occur more often than inclined or horizontal surfaces. Discussion will also include how the reflectance from metal surfaces influences personal UV exposure.

[1] J. Turner, AV Parisi, DJ Turnbull, J. Photochem. Photobiol. B: Biol. **92**, 29 (2008)