Measurement of Solar UVB Exposures in Sea Water With A High – Exposure Dosimeter

Peter Schouten, Alfio Parisi, David Turnbull

University Of Southern Queensland, Toowoomba, Queensland, Australia

For several decades, marine scientists have investigated the underwater ultraviolet light environment using a wide variety of spectroradiometric and radiometric equipment. These types of instruments are extremely useful for taking underwater measurements of the solar UV within a short window of time, for example recording fluctuations in UV levels caused by rapidly changing environmental parameters, like cloud cover or water turbidity. However, over long phases these spectroradiometers and radiometers become increasingly problematic to use, with high amounts of maintenance time necessary involving routine calibrations and corrections for the immersion effect.

However, to supplement the short – term underwater measurements using spectroradiometers and radiometers, a new long – term dosimetric system employing Poly (2,6-dimethyl-1, 4-phenylene oxide) (PPO) film has been developed. The PPO film dosimeter has proven to be capable of measuring underwater UV dosages of at least five times that of the more commonly used polysulphone dosimeter, at a level of accuracy close to what would be expected of dosimetric measurements made in air provided that the necessary calibrations are completed correctly.

This presentation details a measurement campaign made in a simulated sea water environment using a batch of PPO dosimeters set at different depths and aligned to a range of different inclinations and azimuths by means of attachment to a custom built dosimeter submersible float (DSF) unit. The results obtained from this measurement campaign were used to compute a diffuse attenuation coefficient (K_d) for the sea water. This K_d value was compared to a K_d value derived from results taken using a radiometer in the same water.

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