Evaluation of the diffuse attenuation coefficient Kd() algorithms in optically complex waters along the eastern Australian coast.

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Shelf waters along the east coast of Australia are optically complex as they are influenced by both by land processes as well as those of the Pacific Ocean that surrounds it. They are also impacted by extreme events such as tropical cyclones and periodic flood discharges. The diffuse attenuation coefficient, Kd(λ) is a fundamental radiometric parameter that is used to assess the light availability, water quality and general health of the ecosystem. Pelagic productivity and biological biodiversity are directly linked to light penetration and ocean depth hence aquatic environmental monitoring relies on precise estimates of Kd over open and coastal waters derived from remote sensing data.

To evaluate the performance remotely sensed Kd, an inter-comparison exercise was conducted on existing empirical and semi-analytical algorithms. Six algorithms have been included in this exercise (Brando et al., 2012; Jamet et al., 2012; Morel and Maritorena (2001); NASA; Tiwari and Shanmugam, 2013; Wang et al., 2009) for the MODIS-AQUA sensor. These algorithms have been evaluated using in-situ measurements of the remote-sensing reflectances (Rrs) collected in four contrasted regions along the east coast of Australia (covering tropical and subtropical regions) between 2010 and 2013. The inter-comparison exercise show that it is difficult to precisely estimate Kd in the region with values of the relative error varying between 51% (Jamet et al.) and 278% (NASA). Validation results for other MODIS-AQUA wavelengths will also be presented. Processing of MODIS-AQUA images with the best algorithm will be presented over the Great Barrier Reef.

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