**Modelling Bio-Optical Properties of Singapore Waters: A Comparison between Field Spectral Measurements and Synthetic Reflectance Spectra**

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***ABSTRACT***

Aquaculture in Singapore has been rapidly expanding in recent years in order to meet the increasing demand for seafood and to ensure Singapore’s food security without heavy reliance on imports. However, variations in the water quality of Singapore waters and occurrences of harmful algae bloom events cause fish kills and hinder Aquaculture production. Therefore, it is imperative to develop ways to monitor such changes in water quality and bloom events. This paper analyses the preliminary development of bio-optical models that are representative of Singapore waters. Measurements of biological and optical properties of water such as absorption, backscattering, chlorophyll, and turbidity are conducted in situ at field stations around Singapore, and analyzed in the laboratory. These measurements are then used to develop preliminary bio-optical models and compared against synthetic data retrieved from Hydrolight. Our study showed that the results from our bio-optical models correspond well with the synthetic data generated from Hydrolight. With more data from in-situ measurements, it is possible to develop machine-learning algorithms to generate water-quality maps and even predict algae blooms in Singapore.

**Keywords:** bio-optical models, hydrolight, water-quality