BYPASSING CONVENTIONAL ATMSOPHERIC CORRECTION PROCEDURES IN THE RETRIEVAL OF OCEAN COLOUR PRODUCTS: A NOVEL STATISTICAL APPROACH

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Achieving accurate atmospheric correction of satellite measured radiance over optically complex waters is notoriously challenging, often meaning that ocean colour products cannot be reliably derived in regions such as coastal waters and inland water bodies. Using a straightforward statistical technique, we derive models to estimate chlorophyll a and inherent optical properties (IOPs) from top of atmosphere satellite products, to which no atmospheric correction is applied. The approach is first developed and tested on the NASA NOMAD global validation dataset and found to perform very well for the estimation of chlorophyll a (R2 = 0.82, N = 344) and spectral IOPs including total, particulate, dissolved and phytoplankton absorption (R2(λ) = 0.81-0.84, N = 149-163) and particulate backscattering (R2(λ) = 0.78-0.81, N = 108). The technique is then applied to MERIS data from an optically complex estuarine body of water in Canada’s east coast and yields very encouraging results, with R2 values of 0.72 (N = 34) for chlorophyll a and spectral phytoplankton absorption of 0.93-0.97 (N = 23). We propose that this technique could offer a means to derive accurate ocean colour products in scenarios where it may otherwise not be possible.

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