Comparison of Pigment Concentration Between CZCS-Estimation and Ship-Observation in the Waters Around Japan: Test of an Improved Atmospheric Correction Method

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Abstract

Comparison of CZCS-derived pigment concentration by standard atmospheric correction method with sea-truth data in the waters around Japan shows an underestimate by satellite to a different degree. In the range of pigment concentration from 0.2 to 6.0 mg/m^3, the CZCS observation is lower than in-situ data from about 50% to a factor of 6. Assuming a constant Angstrom exponent during atmospheric correction stage has been found to account for this bias, provided that bio-optical algorithm is valid in those waters. An improved atmospheric correction method which can estimate the Angstrom exponent pixel by pixel has been developed based on Gordon ocean color radiance model, and has been evaluated by comparison with these in-situ data. The results demonstrate that this method can increase the accuracy of CZCS-estimated pigment concentration to the level within the system error (30-40%) of CZCS in-water algorithm.