Analysis of the uncertainty of backscattering coefficient by radiative transfer simulation in coastal areas and lakes

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In coastal areas and lakes, the ocean color change is greatly complicated because of various substances which are derived from terrestrial and internal production coexist in the water. Therefore, in radiative transfer simulation in the water, the inherent optical properties per substance concentration, which is the basic parameter change greatly in spatiotemporal, resulting in errors in calculation accuracy. In particular, it has been pointed out that the uncertainty of the backscattering coefficient is one of the major error factors in radiative transfer simulation. (Lain et al., (2017)). In this study, we have conducted field observations to measure water quality, apparent optical properties and inherent optical properties which are basic parameters in radiative transfer simulation in coastal areas and lakes having different optical characteristics such as Tokyo Bay, Kasumigaura Lake, Thailand Bay, and Seto Inland Sea respectively. Furthermore, we tried to conduct radiative transfer simulation by using Hydrolight 4.1 (Mobley et al., (2000)) based on in-situ specific light absorption coefficient and specific backscattering coefficient in each water areas. As a result, it was found that the simulated remote sensing reflectance: R_{rs} (/str) is remarkably variable due to the fluctuation of backscattering probability expressing the particle scattering form in the water.
It was suggested that this result is because of not considering properly the variations of scattering form related to particle characteristics.

Keywords: Ocean color remote sensing, Coastal areas and lakes, Radiative transfer simulation, Inherent optical properties, Backscattering probability

