Development of a blue tide estimation method based on the optical properties of sulfur colloid particles by geostationary ocean color satellite

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Blue tides occurs every year from the summer to the fall in Tokyo Bay or Mikawa Bay, Japan. The blue tides occurs by upwelling sulfur colloid particles, which is generated by reacting oxygen with hydrogen sulfide in the hypoxic water at the bottom. The sulfur colloid particles scatter the light strongly at the surface and the ocean color changes to blue-white, therefore, it is called blue tide. When the magnitude of the blue tide is huge, mass mortality of shell and fish occurs and sometimes it is connected to damage of fisheries. Hence, the blue tides are recognized as an important water environment problem. Because the blue tide is short time scale phenomenon, it is difficult to monitor the spatial behavior adequately. Hence, the blue tide monitoring is expected by using geostationary ocean color satellite which spatio-temporal resolution is superior.
In the previous study, simple method of sulfur estimation method based on simple band of Rrs(Remote sensing reflectance) at 660 nm have been suggested(Higa et al., (2017)). However, it is impossible to separate the backscattering of sulfur and other detritus, respectively. In this study, we developed a bio-optical model, which is specialized in blue tide, based on the measured IOPs(Inherent optical properties) of Sulfur colloid particles. Furthermore, a sulfur estimation method was developed to separate the backscattering of sulfur and other detritus based on the QAA(Quasi-Analytical Algorithm).

Keywords: Blue tide, Geostationary Ocean Color Satellite

