

Abstract

WANG, Shengqiang (王 勝強)

Department of Earth and Environmental Sciences

Remote sensing algorithms have been developed to derive phytoplankton size structure in order to understand the spatial and temporal variations. Most algorithms focus only on the global open ocean, and some of them rely on an assumption that small and large phytoplankton dominate in low and high chlorophyll *a* (Chl *a*) waters, respectively. However, this assumption may not be necessarily valid in a local region as well as with future environment changes. Light absorption spectra of phytoplankton provide great potential for retrieving phytoplankton size structure because of the strong dependence on phytoplankton size structure. In this study, we investigated the validity of the assumption of the relationship between phytoplankton size structure and Chl *a* and the potential of light absorption spectra for estimating phytoplankton size fractions in a river influenced region taking the case of the East China Sea (ECS). We found the assumption of the relationship between phytoplankton size structure and Chl *a* broken down in ECS, indicating that it should be careful to use Chl *a*-based algorithms in some local regions. However, we also found that light absorption spectra were still mainly controlled by phytoplankton size structure. Therefore, we developed a new approach for estimation of phytoplankton size fractions using spectral characteristics of phytoplankton light absorption. Our approach is applicable to both coastal waters and the global ocean and showed great potential for future satellite applications.