

Estimation of chlorophyll-a from RGB digital camera data collected in Ise-Mikawa Bay

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Development for survey methods for phototrophs and/or environmental condition using RGB digital camera data has been increasingly studied for two decades. In examples for the ocean are studies of estimation of water quality using smart phone's camera (Goddijn et al. 2009, Leeuw and Boss 2018), detection of sea grass from aerial photo images and estimation of chlorophyll-a (Goddijn and White 2006). The portability and convenience of the digital camera are the reasons of interest for the RGB data. It is possible to be used as supplementary observation of satellite sensing because digital camera can use regardless of the cloud. Also, citizen participation surveys may be possible because anyone can take photographs using his or her digital camera.

Thus, we attempted to develop estimation method for chlorophyll-a from RGB digital camera data for Ise-Mikawa Bay, Japan. For Ise-Mikawa Bay, method of estimation of chlorophyll a concentration from SeaWiFS and MODIS data was developed by Hayashi et al (2015), but estimation method with digital camera data was not developed yet.

We used chlorophyll-a concentration, RGB data from photo images of surface water, sky and a photographer's 18% reflectance gray card during monthly survey cruises in Ise-Mikawa Bay. Spectral remote sensing reflectance data from RAMSES/TriOS was also obtained. We calculated RGB from spectral remote sensing reflectance data and compared RGB from digital camera. Digital camera RGB data was correlated with RGB from spectral data and in-situ chlorophyll-a concentration. In the future, we will reduce effect of reflection of sunlight from estimation of chlorophyll-a concentration using photographs of sky and gray card.

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