

Potential differences between *in-situ* and remote oceanic primary productivity

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Oceanic primary productivity (OPP) is a source to keep marine ecosystem cycling;

it also plays an significant role in supplying the energy for marine lives; hence, it is essential to estimate OPP accurately so as to understand the ocean carbon cycle. There are two ways to measure OPP, including satellite remote sensing and *in-situ* observation. However, numerous previous studies indicate that there are differences between remote and *in-situ* OPP in diverse time and space scales. Therefore, this research intends to investigate the factors that cause the differences through remote and *in-situ* data on OPP at the northern South China Sea (NSCS). We draw on six cruise data, collected from November 2018 to November 2019, which contain spatiotemporal factors in different seasons and natural phenomena. The results show that the average value from satellite remote sensing is $266 \text{ mg-C m}^{-2} \text{ d}^{-1}$ and average mean from *in-situ* observation is $211 \text{ mg-C m}^{-2} \text{ d}^{-1}$. The former is 26% higher than the latter. One of the main cause of the difference may result from Chlorophyll-*a* (chl *a*). The surface chl *a* measured by satellites cannot truly reflect the integrated chl *a* effected by various spatiotemporal conditions and natural factors, it may result in inevitable differences when estimating of OPP by the VGPM (Vertically Generalized Production Model). In addition, the data in our preliminary study shows that OPP obtained by satellite remote sensing needs to be calibrated in the application at the NSCS.

Keywords: oceanic primary productivity, northern South China Sea