

## Primary productivity and photosynthetic features of phytoplankton in the Sea of Okhotsk during late summer.

Tomonori Isada<sup>1</sup>, Koji Suzuki<sup>1</sup>, Hongbin Liu<sup>2</sup>, Jun Nishioka<sup>3</sup> and Takeshi Nakatsuka<sup>3</sup>

<sup>1</sup> Graduate School of Environmental Science and Faculty of Environmental Earth Science, Hokkaido University, N10 W5, Kitaku, Sapporo, Hokkaido, 060-0810, Japan. E-mail: [t-isada@ees.hokudai.ac.jp](mailto:t-isada@ees.hokudai.ac.jp)

<sup>2</sup> School of Science, Hong Kong University of Science and Technology, Hong Kong

<sup>3</sup> Institute of Low Temperature Science, Hokkaido University, N19 W8, Kita-ku, Sapporo 060-0819, Japan.

The Sea of Okhotsk is considered to be one of the most biologically productive regions in the world's oceans. However, little is known about primary productivity and its controlling factors after the spring blooms. Therefore, we examined primary productivity and photosynthetic features of phytoplankton in the Sea of Okhotsk during August and September 2006. Chlorophyll (Chl) *a* concentrations were generally high in coastal waters near the Sakhalin Island, while these were relatively low ( $< 1 \text{ mg m}^{-3}$ ) in open waters. Similar tempo-spatial patterns were also found in large-size ( $> 10 \mu\text{m}$ ) phytoplankton communities, maximum quantum yield of carbon fixation ( $\phi_{c \text{ max}}$ ) and primary productivity. Surface primary productivity and depth-integrated daily primary production within the euphotic layer were  $7\text{-}753 \text{ mg C m}^{-3} \text{ d}^{-1}$  and  $74\text{-}1986 \text{ mg C m}^{-2} \text{ d}^{-1}$ , respectively. These values were within the ranges reported previously in the study area during early summer. The higher values of  $\phi_{c \text{ max}}$  were found in the continental shelf of the Sakhalin and the Amur Bay (0.061 and 0.086 mol C mol photon<sup>-1</sup>, respectively). On the other hand,  $\phi_{c \text{ max}}$  was relatively low in the pelagic region. Although no significant relationships were found between photosynthetic parameters and both temperature and nutrients, the surface primary productivity correlated significantly with Chl *a* concentrations. These results suggested that primary productivity in this study period basically depended on the biomass, neither on their photosynthetic physiology nor on light intensity.