**Sea Ice Experiment for Examining the Relationship Between**

**Sea Ice Thickness and Its Reflectance**

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***ABSTRACT***

Due to global warming, the sea ice extent in the polar regions has been dramatically reduced for the past decades. Monitoring the global sea ice extent is becoming increasingly important. Remote sensing is a powerful tool for monitoring the global distribution of sea ice. The optical sensors onboard satellites such as MODIS, VIIRS, and MSI can monitor the detailed distribution of sea ice under clear-sky conditions. One of the interests of optical sensors is to estimate the ice thickness. In this study, the author performed a sea ice experiment in the sea ice area near the Notsuke Peninsula, Hokkaido, Japan in February 2024. The area was covered with sea ice with thicknesses between a few cm to 40cm. The author moved the sea ice area on a small vessel and measured sea ice thickness and reflectance. The result suggested that under the snowless condition, up to 30 cm of ice thickness, the linear relationship between ice thickness and reflectance was confirmed. This suggests the possibility of estimating thin ice thickness with optical sensors onboard satellites. On the other hand, if the ice thickness becomes thicker than 30cm, the reflectance is likely to be saturated and it becomes difficult to estimate the ice thickness. We also compared the relationship between ice thicknesses and data value of the optical sensor MSI onboard the Sentinel-2 satellite.

**Keywords:** optical sensors, Notsuke Peninsula, thin ice, global warming