A01-P15

OCEANIC CO2 EVOLUTIONS AT THE FIXED STATIONS IN THE ARCTIC IN SUMMER

Naohiro Kosugi *(Meteorological Research Institute, Japan)*
Daisuke Sasano *(Meteorological Research Institute, Japan)*
Masao Ishii *(Meteorological Research Institute, Japan)*
Shigeto Nishino *(JAMSTEC, Japan)*
Jun Inoue *(National Institute of Polar Research, Japan)*
Hisayuki Yoshikawa *(Hokkaido University, Japan)*

nkosugi@mri-jma.go.jp

Change in carbon cycle caused by long-term sea ice retreat has been attracted attention over the years. Some calculations based on model simulation indicate that CO_2 uptake is increasing in accordance with the decline of sea ice area. However, there is still a large uncertainty over the estimate of CO_2 flux in the Arctic Ocean.

In order to elucidate the carbon cycle in the Western Arctic Ocean, we participated in research cruises of MR13-06 in August 2013 and MR14-05 in August 2014 of JAMSTEC's R/V *Mirai* within the framework of GRENE Arctic Climate Change Research Project. During these cruises, two-week observations at fixed stations were made. The station was set at 72.75˚N, 168.25˚W in 2013 and the Chukchi Sea and 74.75˚N, 162˚W in the Canada Basin in 2014, respectively. Surface water was pumped up from the seachest and dissolved inorganic carbon (DIC) and partial pressure of CO_2 (pCO_2) were measured continuously.

In order to compare with observed variation in pCO_2, air-sea CO_2 flux was calculated using temperature, salinity, wind speed and difference in pCO_2 between atmosphere and ocean. Variation of pCO_2 caused by dilution/evaporation was also considered using salinity.

In 2013, surface water was significantly under saturated with respect to the atmospheric CO_2. This is because of the massive primary production in the Chukchi Sea in early summer. During the period of our observation, air-sea CO_2 flux was the main driver of pCO_2 increase (Figure 1). In 2014, however, surface pCO_2 at the fixed station was almost equilibrated with atmosphere (~350 □atm). Subsurface low pCO_2 layer as a result of biological production was capped with a thin surface mixed layer which was highly influenced by sea ice melt water in the Canada Basin. Contrasting pCO_2 between MR13-06 and MR14-05 indicated that sea ice melt water had a large impact on CO_2 chemistry in the Arctic Ocean.

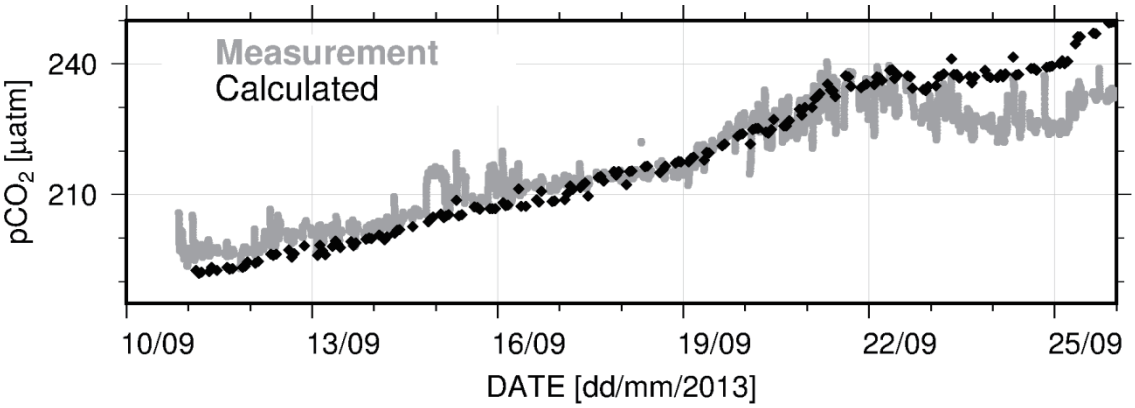

Figure 1 Temporal variation of pCO_2 at the fixed station in MR13-06.