BIOGEOCHEMICAL CHARACTERISTICS OF NUTRIENTS, DISSOLVED AND PARTICULATE ORGANIC MATTERS IN THE AMUNDSEN SEA

Jinyoung Jung

Jinyoung Jung[1], Sun-Yong Ha[1], Eun Jin Yang[1], Kyung-Hoon Shin[2] and SangHoon Lee[1]*

[1]Korea Polar Research Institute, Incheon Korea
[2]Hanyang University, Ansan Korea

jinyoungjung@kopri.re.kr

ABSTRACT

The Amundsen Sea is one of the regions where ice sheet thinning is the fastest in Antarctica, which is mainly attributed to the intrusion of Circumpolar Deep Water (CDW) through deep troughs onto the Antarctic continental shelf. In addition, the Amundsen polynya is the most productive among those identified along the Antarctic coast. These features make the Amundsen Sea an ideal location to monitor the influence of environmental changes on marine biogeochemical cycles. Nevertheless, no study has been carried out over this region to investigate carbon and nitrogen biogeochemical cycles, simultaneously. Seawater samples were collected over the Amundsen Sea in January 2014 aboard Korean icebreaker *Araon*, and analyzed for nutrients (NO_3, PO_4, NH_4, SiO_2), dissolved and particulate organic carbon (DOC and POC) and nitrogen (DON and PON). Despite the exceedingly high biological production in the Amundsen polynya, NO_3 and PO_4 in surface water were not totally depleted, suggesting that remineralization is fast enough to maintain their concentrations, and/or that biological production is limited by other factors such as iron. DOC and POC concentrations ranged from 38–73 μM C and < 1–60 μM C, respectively. Both DOC and POC concentrations increased in the upper 100 m of the water column. However, below 100 m POC concentration remained low (< 3 μM C) when DOC concentration varied from 38–69 μM C. Likewise, DON concentrations deeper than 100 m increased by 7 μM N while NO_3 concentrations were distributed homogeneously. These results suggest that the biological drawdown of inorganic nutrients result in the net production of organic matter in the upper 100 m, and that sinking particle flux would be low because of remineralization of particulate matter by grazing and microbial activity.