

Relationship of Primary Productivity in Northwind Abyssal Plain with Beaufort Gyre Variation

WATANABE, Eiji^{1*} ; ONODERA, Jonaotaro¹ ; HARADA, Naomi¹ ; TERUI, Takeshi² ; KISHI, Michio³

¹Japan Agency for Marine-Earth Science and Technology, ²National Institute of Polar Research, ³Hokkaido University

The western Arctic marine ecosystem was addressed using a combination year-round mooring observation and multiple numerical models. Our previous studies have revealed eddy-induced biological pump from the Chukchi shelf region to the southern Canada Basin. Whereas this system caused an early-winter peak of sinking flux of Particulate Organic Nitrogen (PON), we then focused on summertime ecological processes. The sediment trap measurements in the Northwind Abyssal Plain (NAP: 75N, 162W) of the western Arctic Ocean captured a maximum diatom flux with dominance of sea ice species in summer 2011. However, the particle fluxes in summer 2012 were considerably suppressed probably due to extension of oligotrophic Beaufort Gyre water to the NAP area. To examine interannual variability in ocean circulation around the target region, the decadal experiment from 1979 to 2012 was performed using the pan-Arctic ice-ocean model COCO. A virtual passive tracer provided inside the Canada Basin certainly suggested that the Beaufort Gyre direction switched southwestward (toward Station NAP) during the early period of 2012. In addition, the three-box lower-trophic model with sea ice species was applied under physical environments at Station NAP to assess an impact of nutrient deficiency on primary production in 2012. Finally, we plan to discuss how to improve existent problems of Arctic marine ecosystem model.

Keywords: Arctic marine ecosystem model, ice algae, oligotrophic water