

## A01-O06

### A BIOLOGICAL CONTRIBUTION TO PARTIAL PRESSURE OF CO<sub>2</sub> IN THE WESTERN ARCTIC OCEAN AND BERING SEA

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Arctic Ocean contributes 5-14% to the global balance of CO<sub>2</sub> sink and source; particularly Chukchi Sea is large ocean sink for CO<sub>2</sub>. Major controlling factor of partial pressure of CO<sub>2</sub> in seawater ( $p\text{CO}_2$ ) in seasonal ice zone is physical processes, such as temperature, salinity, fraction of sea ice melt water, and wind-driven mixing. On the other hand, contribution of biological processes is also significant, such as blooming season after sea ice retreat. However, few studies have focused on the quantitative relationship between the biological process and  $p\text{CO}_2$ . Therefore, little is known about how much biological processes affect  $p\text{CO}_2$ . Objective in this study is to clarify biological contribution to  $p\text{CO}_2$  in the western Arctic and Bering Sea. We conducted cluster analysis to infer the controlling factor of  $p\text{CO}_2$  variability using in-situ sampled  $p\text{CO}_2$ , sea surface temperature, sea surface salinity and Chl.a, and satellite derived wind speed, sea-ice concentration and primary productivity as the input variable. The northern Bering Sea and the northern shelf of Chukchi Sea were classified into relatively low  $p\text{CO}_2$  with high primary productivity, weak wind and less stratified region (Fig.1). Our result suggests that biological contribution to  $p\text{CO}_2$  in the two regions is greater than other regions.

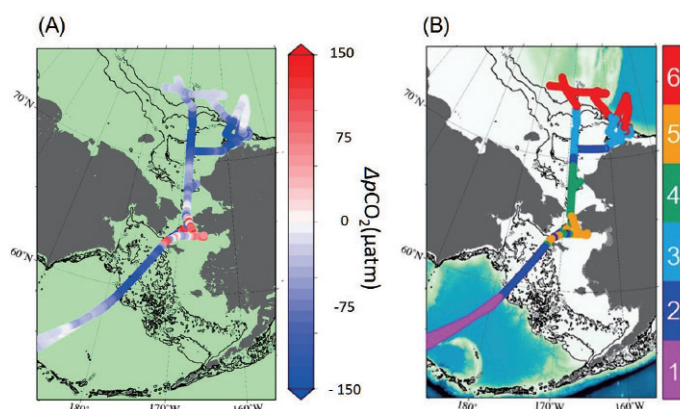


Fig.1. (A) distribution of  $\Delta p\text{CO}_2$  ( $p\text{CO}_2$  in sea water –  $p\text{CO}_2$  in atmosphere), (B) result of cluster analysis. Northern Bering and northern Shelf of Chukchi Sea (Cluster2, 3) had significant CO<sub>2</sub> sink condition. In these regions, mean primary productivity and in-situ Chl.a were relatively high, and mean wind speed was relatively weak, and then there is less stratification due to a little fraction of sea ice melt water.