[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG38]Science in the Arctic Region

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The Arctic and circumpolar region is the key area for the study of global change because the anthropogenic impact is projected to be the largest in this area due to the complicated feedback processes of the nature. A number of international and interdisciplinary research projects have been conducted for the studies on the land-atmosphere-ocean system. In order to understand the feedback processes occurring in the Arctic and to project the global warming in the future, we need to establish the intense observational network and to exchange the knowledge and information by combining the different scientific communities under the common interest of the Arctic. The objectives of this session are 1) to exchange our knowledge on the observational facts and integrated modelling and 2) to deepen our understanding on wide range of natural sciences related to the Arctic and the circumpolar region. Studies on humanities, social sciences, and interdisciplinary fields are also welcomed.

[ACG38-P14]Impacts of higher temperature, CO2, and salinity on the dynamics of phytoplankton communities in the western Arctic Ocean

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Seasonal change in the environmental conditions such as temperature and pH in the Arctic Ocean is highly dramatic. In addition, the impacts and magnitude of ongoing climate changes in the Arctic Ocean appear to be severer compared with the other ocean. However, the impacts of multiple environmental stressors on phytoplankton, forming a basis of marine ecosystem are still unclear. Here, we conducted temperature, $CO_{2,}$ and salinity manipulation experiment using natural plankton communities in the western Arctic Ocean during R/V Mirai MR15-03 and MR16-06 cruises. Temperature (control: LT and + ˜4/5°C: HT), CO_2 (control and + 300/500 μatm: HC), and salinity (control and −5%: LS) were manipulated using thermostatic circulator, the addition of high-CO_2 seawater, and pure water, respectively. Eight treatments were established as LT, LTHC, LTLS, LTLSHC, HT, HTHC, HTLS, HTLSHC and incubation bags were prepared in duplicate in MR15-05 and in triplicate in MR16-06 experiments, respectively. The higher temperature enhanced the growth of phytoplankton community in terms of chlorophyll-*a*, diatom biomass and small-sized phytoplankton groups in both incubations. The effect of acidification and lower salinity enhanced the growth of smaller-sized phytoplankton groups such as pico-eukaryotes (most probably prasinophytes) or nano-sized eukaryotes (probably non-calcifying prymnesiophytes). In contrast, larger phytoplankton groups such as diatoms and dinoflagellates did not respond significantly to acidification and lower salinity conditions. These results indicate that the impact of multiple environmental stressors tended to dominate smaller phytoplankton groups in a phytoplankton community, potentially resulting in a decrease in the efficiency of biological carbon pump and trophic transfer. The previous study suggested the recent increase in small-sized phytoplankton in a community in the Arctic Ocean is resulted from lower nutrient availability due to stronger

stratification via sea ice melt and freshwater convergence (Li et al. 2009, Science). This study suggests that the dominance of small-sized phytoplankton groups can further be accelerated because of the future more acidified and lower salinity conditions during the productive season in the Arctic Ocean.