[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-P02]Wintertime cooling trend over Eurasian continent and Arctic sea ice decline

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Cooling tendency is observed over wintertime Eurasian continent after 2000s. Many of recent studies attribute this cooling trend to the recent decline of Arctic sea ice (e.g., [1]), while some studies argue that the tendency is due to natural variability (e.g., [2]). The aim of this study is to evaluate not only the influence of the Arctic sea ice decline, but also that of long-term sea surface temperature (SST) changes, on Eurasian continent through a set of atmospheric general circulation model (AGCM) ensemble experiments. The first set of experiments (Exp. A) is forced with observed varying SST and sea ice. The second set (Exp. B) is forced with observed SST and daily-climatological sea ice, while the third set (Exp. C) is with climatological SST and observed sea ice. Climatological SST and sea ice are given to the fourth experiment (Exp. D). Each of experiment consists of 15 ensemble members and the period is from 1982 through 2013. Note that the radiative forcing is constant. DJF-mean 2-meter temperatures averaged over (40-60N, 60-120E) is used as winter-mean temperatures over Eurasian continent.

Out of 15 ensemble members, only 4 members show cooling trend over Eurasia continent in Exp. A. Particularly, none of members show cooling trend in Exp. B, which suggests that observed SST changes tend to warm up Eurasia. While in Exp. C, 11 out of 15 members show cooling trend, which suggests tendency of the observed sea-ice decline lowering temperatures over Eurasian continent. We can confirm that model bias should not affect the simulated tendency because Exp. D does not show a particular trend. Our results suggest that the recent sea ice decline should induce cooling over Eurasia to a certain degree, while observed SST change should bring temperature rise over Eurasian continent, which may overcome the sea ice effect.