[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-P03]On the atmospheric response experiment to a Blue Arctic Ocean

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We demonstrated atmospheric responses to a reduction in Arctic sea ice via simulations in which Arctic sea ice decreased stepwise from the present-day range to an ice-free range. In all cases, the tropospheric response exhibited a negative Arctic Oscillation (AO)-like pattern. An intensification of the climatological planetary-scale wave due to the present-day sea ice reduction on the Atlantic side of the Arctic Ocean induced stratospheric polar vortex weakening and the subsequent negative AO. Conversely, strong Arctic warming due to ice-free conditions across the entire Arctic Ocean induced a weakening of the tropospheric westerlies corresponding to a negative AO without troposphere-stratosphere coupling, for which the planetary-scale wave response to a surface heat source extending to the Pacific side of the Arctic Ocean was responsible. Because the resultant negative AO-like response was accompanied by secondary circulation in the meridional plane, atmospheric heat transport into the Arctic increased, accelerating the Arctic amplification.