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

[A-CG38] Science in the Arctic Region

convener: Shun Tsutaki (The University of Tokyo), NAOYA KANNA (Arctic Research Center, Hokkaido University), Shunsuke Tei (北海道大学 北極域研究センター, 共同), Tetsu Nakamura (Faculty of Environmental Earth Science, Hokkaido University)

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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-P05] Interannual variability of summer precipitation over northern Eurasia in multiple climate models: Part II.

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Arctic sea ice extent has clearly decreased in recent decades. Also, the decreasing of Arctic sea ice extent has possibly affected hydrological cycle in the northern part of Eurasia (e.g., Fujinami et al. 2016, Hiyama et al. 2016). On the other hand, extreme events like heatwaves and heavy snow, which seems to be the influence of global warming, are also occurring in the middle and high latitudes. For reliable projection of such extreme events, it is important to understand the mechanism of interannual variability of the hydrological cycle.

We have been investigating interannual variability by the use of multiple climate models in order to understand the mechanism of the hydrological cycle in northern Eurasia. Last year, we reported that the mode of the east-west seesaw pattern, which is seen in the observation, included in the interannual variability of summer precipitation in northern Eurasia in many models (Abe et al. 2017). In addition, a frequency of such modes of the interannual variabilities in the models has not been modulated by recent Arctic sea ice reduction.

In this presentation, we report on the mode of the interannual variability with peaks of fluctuation in northern Eurasia or the Arctic coast area. Many models show this mode as EOF 1, the most outstanding variation pattern. This spatial pattern indicates the positive anomalies of precipitation in the Arctic coast region and negative anomalies in the southern part of Siberia (vice versa). Patterns of the atmospheric circulation at 850 hPa related to these anomalies are the low-pressure anomaly in the Arctic coast and the Arctic Ocean and the high-pressure anomalies in the south of the low-pressure anomaly. Furthermore, in relation to this atmospheric circulation pattern, latent and sensible heat fluxes from the ocean to the atmosphere show positive anomalies in the Barents Sea and the Kara Sea. Also, the atmospheric circulation pattern at 850 hPa is similar to that of the increasing trend pattern reported in Fujinami et al. (2016). However, there was no significant temporal trend in the EOF score of the pattern

of the models. In the presentation, we would like to discuss both the relationship between this interannual variability and the Arctic sea ice change and why this interannual variability in the model does not have a temporal trend unlike the similar pattern in the observations.

References

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- Fujinami, H., T. Yasunari, and T. Watanabe (2016), Trend and interannual variation in summer precipitation in eastern Siberia in recent decades. *Int. J. Climatol.*, 36: 355–368.
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- Hiyama, T., H. Fujinami, H. Kanamori, T. Ishige, and K. Oshima (2016), Recent interdecadal changes in the interannual variability of precipitation and atmospheric circulation over northern Eurasia, *Environmental Research Letters*, 11(6), 065001, doi:10.1088/1748-9326/11/6/065001.