Is Recent Eurasian Winter Cooling Caused by Arctic Amplification?

Hye-Jin KIM[1], Seok-Woo SON[1], Jong-Seong KUG[2], Baek-Min KIM[3], Eun-Hyuk BAEK[3], and Jee-Hoon JEONG[4]

[1] *School of Earth and Environmental Sciences, Seoul National University, Seoul, Korea*
[2] *School of Environmental Sciences and Engineering, POSTECH, Pohang, Korea*
[3] *Korea Polar Research Institute, Incheon, Korea*
[4] *Department of Oceanography, Chonnam National University, Kwangju, Korea*

The observed surface air temperature in the northern mid-latitudes shows a significant cooling trend in recent winters despite greenhouse gas concentrations continuing to rise. Such an unexpected cooling is especially strong over the Eurasia from late 1990's to early 2010's, and this has been often related with an enhanced Arctic amplification. Although many conceptual ideas have been proposed to explain the so-called Warm Arctic-Cold Eurasia (WACE) pattern, its mechanism is not clearly understood yet. Here we examine the possible impact of Arctic warming on wintertime Eurasian temperature change by integrating the coupled model with a pre-industrial-like condition except for the Arctic regions where observed sea surface temperature is relaxed. The ensemble simulations show statistically insignificant correlation between the Arctic and Eurasian surface air temperature changes. The WACE-like temperature pattern does not appear in both linear trend and interannual co-variability. Even in the ensemble members that show a hint of WACE pattern, Eurasian temperature trend is highly underestimated. These results suggest that the observed Eurasian cooling from late 1990's and early 2010's may not be driven by the Arctic sea ice loss.

Key words: Arctic amplification, Warm Arctic Cold Eurasia, climate model