



Robust intensification of hydroclimatic intensity over East Asia from multi-model ensemble regional projections

Joong-Bae Ahn (1), Eun-Soon Im (2), and Yeon-Woo Choi (1)

(1) Pusan National University, Division of Earth Environmental System, Busan, Korea, Republic Of (jbahn@pusan.ac.kr), (2) Hong Kong University of Science and Technology, Hong Kong, China

This study assesses the hydroclimatic response to global warming over East Asia from multi-model ensemble regional projections. Four different regional climate models (RCMs), namely, WRF, HadGEM3-RA, RegCM4, and GRIMs, are used for dynamical downscaling of the Hadley Centre Global Environmental Model version 2–Atmosphere and Ocean (HadGEM2-AO) global projections forced by the representative concentration pathway (RCP4.5 and RCP8.5) scenarios. Annual mean precipitation, hydroclimatic intensity index (HY-INT), and wet and dry extreme indices are analyzed to identify the robust behavior of hydroclimatic change in response to enhanced emission scenarios using high-resolution (12.5 km) and long-term (1981–2100) daily precipitation. Ensemble projections exhibit increased hydroclimatic intensity across the entire domain and under both the RCP scenarios. However, a geographical pattern with predominantly intensified HY-INT does not fully emerge in the mean precipitation change because HY-INT is tied to the changes in the precipitation characteristics rather than to those in the precipitation amount. All projections show an enhancement of high intensity precipitation and a reduction of weak intensity precipitation, which lead to a possible shift in hydroclimatic regime prone to an increase of both wet and dry extremes. The forced responses of HY-INT and the two extreme indices are more robust than that of mean precipitation, in terms of the statistical significance and model agreement.

Acknowledgement: This work was funded by the Korea Meteorological Administration Research and Development Program under grant KMIPA 2015-2081.

Reference: Im, E. S., Choi, Y. W., & Ahn, J. B. (2017). Robust intensification of hydroclimatic intensity over East Asia from multi-model ensemble regional projections. *Theoretical and Applied Climatology*, 129(3-4), 1241-1254.