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Comparison and Evaluation of Hydroclimate of CMIP5 Models over East Asia for Climate Application Field

Eun-Jeong Lee (1), Sun-Hee Shin (2), Ok-Yeon Kim (2), and Jaepil Cho (1)

(1) Climate Application Department, APEC Climate Center, Republic Of Korea, (2) Climate Prediction Department, APEC Climate Center, Republic Of Korea

Since researchers in the climate application field have difficulty using huge data of various climate change models, guidelines are needed for choosing a model. This study builds a climate model evaluation matrix that can be used in the hydrology field by comparing climate models of hydroclimate such as temperature/precipitation over East Asia. Using 29 CMIP5 models and NCEP/DOE reanalysis data, simulation characteristics of spatial climatology and interannual variability for the highest and lowest temperature and precipitation were compared by each model and season. Extreme indices were also calculated from model and reanalysis data to compare extreme climatic simulations for each model.
Based on these results, the pattern correlation coefficient (PCC) and the normalized root mean square error (NRMSE) were considered for each climate characteristic in constructing the matrix for CMIP5 model evaluation. Based on the average performance of the CMIP5 model, it was classified into a model group (GOOD) with higher PCC and lower NRMSE than the average, and a model group (BAD) with higher NRMSE and lower PCC. In addition, we compare the monsoon region and the intensity of the East Asian region with that of the two annual cycle modes. This model evaluation matrix can be useful as selection criteria guideline for CMIP5 models for each researcher's purpose in the hydrological field.

Keywords : CMIP5, Climate change, Hydroclimate, East Asia, Model evaluation

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