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Dynamically downscaled climate projection over the Maritime Continent using the MIT Regional Climate Model

Eun-Soon Im (1) and Elfatih A. B. Eltahir (2)

(1) Singapore-MIT Alliance for Research and Technology, Center for Environmental Sensing and Modeling, Singapore, Singapore (esim@korea.kr), (2) Ralph M. Parsons Laboratory, Massachusetts Institute of Technology, Cambridge, Massachusetts

Modeling the climate over the Maritime Continent is particularly challenging, potentially leading to substantial errors even in climate simulations using state-of-the-art models. In spite of some discrepancies with observations, the MIT Regional Climate Model (MRCM) has been significantly improved in its ability to simulate the regional climate over the Maritime Continent through the modification of model physics. For the fine-scale climate information suitable for representing the complexity of climate change over the Maritime Continent, dynamical downscaling is performed using the MRCM during two thirty-year period for reference (1970-1999) and future (2070-2099) climate. Initial and boundary conditions are provided by Community Earth System Model (CESM) simulations under the emission scenarios projected by MIT Integrated Global System Model (IGSM). Changes in mean climate as well as the frequency and intensity of extreme climate events are investigated at various temporal and spatial scales. Our analysis is primarily centered on the different behavior of changes in convective and large-scale precipitation over land vs. ocean during dry vs. wet season. In addition, we attempt to find the added value to downscaled results over the Maritime Continent through the comparison between MRCM and CESM projection.

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