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## Changes in spring and Mei-yu extreme precipitation in the Western North Pacific and East Asia in the warmer climate in two high-resolution AGCMs

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In this study, we estimate the changes in extreme precipitation indices over the western North Pacific and East Asia region (WNP-EA) during the spring and Mei-yu seasons in the warmer climate. Our analyses are based on two high-resolution atmospheric general circulation model simulations. The high-resolution atmospheric Model (HiRAM) was used in a series of simulations, which were forced by 4 sets of sea surface temperature (SST) changes under Representative Concentration Pathways 8.5 (RCP8.5) scenario. The Database for Policy Decision-Making for Future Climate Change (d4PDF) consists of global warming simulation outputs from MRI-AGCM3.2 with large ensemble members and multiple SST warming scenarios.

In the spring season, the changes in the spatial pattern of SDII, RX1day, and PR99 demonstrate greater enhancement over the northern flank of the climatological rainy region in both HiRAM and d4PDF, implying a northward extension of spring rain band. Besides, the changes in probability distribution display a shifting tendency that heavier extreme events occur more frequently in the warmer climate. The above changes are larger than the internal variability and uncertainty associated with SST warming patterns, indicating the robustness of the projected enhancement in precipitation intensity in the WNP-EA region. The spatial pattern for changes in CDD and total rainfall occurrence are less consistent between two datasets. In the Mei-yu season, the tendency toward more frequent extreme events in the probability distributions are consistently found in HiRAM and d4PDF. However, the changes in the spatial pattern of all indices are less consistent between HiRAM and d4PDF, implying larger uncertainty in the projection of extreme precipitation in the Mei-yu period in the warmer climate.