

Climate change impacts on extreme rainfall and their differences between weather patterns

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The impacts of global warming/climate change on extreme rainfall events during the Baiu period in Japan and their dependency on weather patterns (WPs) were examined using the self-organizing map (SOM) method. To investigate the differences in climate change impacts on daily rainfall among the WPs, a SOM was applied to surface atmospheric circulation data from the Database for Policy Decision Making for Future Climate Change (d4PDF) to determine the dominant heavy rainfall WPs. The obtained SOM shows that different WPs are associated with regional variations in extreme rainfall events. Projected future changes in the occurrence of heavy rainfall displayed a non-uniform spatial distribution. To understand the spatial heterogeneous rainfall changes, the sensitivity of heavy rainfall WPs to climate forcing was evaluated. Results of the SOM analysis suggest that this regional variation in the future changes in extreme rainfall events could be attributed to sensitivity differences between WPs to the climate changes. These sensitivity differences can be attributed to the non-uniform spatial changes in the large-scale climatological background state in East Asia via modulations in the moist air intrusion into Japan.

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