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Copula-based probabilistic characterization of precipitation extremes over North Sikkim Himalaya

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Abstract

Changes in climate extremes are studied based on the daily precipitation in North Sikkim Himalaya. The Coupled Model Intercomparison Project Phase 5 (CMIP5) Global Climate Models GCMs) and their Representative Concentration Pathways (RCPs) and India Meteorological Department (IMD) daily precipitation dataset are used for future and observed time periods, respectively. The purpose of this study is to examine the copula-based probabilistic behavior of precipitation extremes over the eastern Himalayan region. Seven extreme combinations were developed based on the eight defined precipitation indices. The extreme combination designates the duration, frequency and amount of heavy and weak precipitation in the same year. **Statistical downscaling model (SDSM) and copulas are used for downscaling and bivariate behavior of precipitation extremes, respectively**. Trend analysis result exhibits that the precipitation and its extremes (**intensity, wet days, heavy precipitation days and very** heavy precipitation days) are increasing significantly during 2006-2100. The spatial distributions of joint return period (JRP) of

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