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Statistical assessment of changes in daily precipitation extremes over the Asia-Pacific Region

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This paper provides the application of a generalized extreme value (GEV) distribution to extreme precipitation data over more than 30 years specifically from Asia-Pacific region. It is demonstrated that at about 20% of the stations, extreme precipitation showed significant linear trends over the past several decades and significantly increasing trends in annual extreme precipitation mainly occurred in the northern inland areas in the Asia-Pacific region. Based on the best fitted GEV distribution, the return levels corresponding to various return periods are estimated. The high return levels are mainly observed in the Philippines, Thailand, Korea, Japan, India and part of northern Australia, where precipitation has seasonal variation associated with the seasonal evolutions of the summer monsoon. Spatial distribution of changes in average return period for a 50-year extreme precipitation event in the last decade with respect to the previous two decades shows that in the northern inland Asia the precipitation extreme events which rarely occurred in the previous two decades occurred more often in the recent decade. In addition, the spatial pattern of changes in average return period in the past is consistent with that of the projected return levels of extreme precipitation for the future.