

Medium-range forecasts of extreme rainfall events during the Indian summer monsoon

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Meteorological Applications, 23, 282-293

Abstract: Extreme rainfall events occur rarely but are integral elements of climatic conditions in any region. The frequency of occurrence of extreme events has been studied using 57 years of observed rainfall data over India and its neighbouring countries. In this study, the rank method has been used to compute the threshold rainfall amount based on past observations. If the model forecasted rainfall is above the climatological threshold, then that event is identified as an extreme at that grid point and for that specific day. The results show an increasing trend in the number of extreme weather events during monsoons. The National Centre for Medium Range Weather Forecasting (NCMRWF) uses the Unified Model (NCUM) for operational weather forecasting on a medium-range timescale. The capability of the model in predicting extreme rainfall events over India and its surrounding regions has not been evaluated so far. Therefore, this study has been undertaken to identify extreme rainfall events from the medium-range rainfall forecasts and compare the same with observations so that forecasts for extreme events can be obtained. The rank method has been applied to the NCUM forecast of rainfall during the period June to September 2014. Several extreme rainfall cases are identified during this monsoon. The frequency of occurrence of extreme events is compared with observations, and it is found that the model has reasonable skill to predict up to day three forecasts. However, this skill reduces when the forecast period length increases.

Keywords: extreme event; NCUM model; threshold; rainfall; southwest monsoon