

Forecasting the heavy rainfall during Himalayan flooding-June 2013

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Abstract

On 17th June 2013 the state of Uttarakhand in India (Latitude 28.72°N to 31.45°N and Longitude 77.57°E–81.03°E) received more than 340 mm of rainfall, which is 375% more than the daily normal (65.9 mm) rainfall during monsoon. This caused heavy floods in Uttarakhand as well as unprecedented damage to life and property. In this study we aim at assessing the performance of two deterministic forecast models, Global Forecast System (GFS/T574) and Unified Model (NCUM), run at NCMRWF, in predicting the heavy rainfall observed over Uttarakhand region of India during 17–18th June, 2013.

Verification of the synoptic features in forecasts of the two models suggests that NCUM accurately captures the circulation features as compared to T574. Further verification of this event is carried out based on the contiguous rain area (CRA) technique. CRA verification is used in computing the total mean square error (MSE) which is based on displacement, volume and pattern errors. This verification technique also, confirms the better skill of NCUM over T574 in terms of forecast peak rainfall amounts, volume and average rain rate, lower MSE and root mean square error (RMSE) as well as having higher hit rates and lower misses and false alarm rates for different rainfall thresholds from Day 1 to Day 5 forecasts.

Keywords

Southwest monsoon; Uttarakhand; Global Forecast System; Unified Model; Contiguous rainfall area; Event verification