

Verification of pre-monsoon temperature forecasts over India during 2016 with a focus on heatwave prediction

Harvir Singh, Kopal Arora, Raghavendra Ashrit, and Ekkattil N. Rajagopal
Natural Hazards Earth System Science, 17, 1469-1485

Abstract: The operational medium-range weather forecasting based on numerical weather prediction (NWP) models are complemented by the forecast products based on ensemble prediction systems (EPSs). This change has been recognised as an essentially useful tool for medium-range forecasting and is now finding its place in forecasting the extreme events. Here we investigate extreme events (heatwaves) using a high-resolution NWP model and its ensemble models in union with the classical statistical scores to serve verification purposes. With the advent of climate-change-related studies in the recent past, the rising number of extreme events and their plausible socio-economic effects have encouraged the need for forecasting and verification of extremes. Applying the traditional verification scores and associated methods to both the deterministic and the ensemble forecast, we attempted to examine the performance of the ensemble based approach in comparison to the traditional deterministic method. The results indicate an appreciable competence of the ensemble forecast at detecting extreme events compared to the deterministic forecast. Locations of the events are also better captured by the ensemble forecast. Further, it is found that the EPS smoothes down the unexpectedly increasing signals, thereby reducing the false alarms and thus proving to be more reliable than the deterministic forecast.