



## **Simulation of Extreme Rainfall Events during Indian Summer Monsoon Seasons using the NCMRWF Global Modeling System**

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Accurate prediction of precipitation anomalies over India during the Indian summer monsoon season is very crucial for agricultural farming. In the past, frequent occurrences of flood and drought have severely affected the economy in the Indian sub-continent. NCMRWF is the only organization in India engaged in real-time global data assimilation and prediction. Medium-range weather forecasts are prepared and dynamically downscaled using several regional models. The model results indicate heavy precipitation events can be properly predicted 6-days in advance. Ensemble mean predictions have the best skill. In recent years, seasonal prediction activity has been initiated at NCMRWF to meet the demands of the user community, and to provide input for climate risk management. Hindcast simulations (1982-2005) have been carried out using global climate model with observed and predicted SST. Using these model simulations, role of SST variations in Pacific Ocean and the Indian Ocean have been examined on the interannual variability of the Indian monsoon rainfall. It was found that the mode does not respond to Indian Ocean SST variability in a realistic manner and the ENSO effects are very strong. Mechanisms on how the Indian Ocean (especially the Indian Ocean dipole) modulates the monsoon precipitation over India and East Asia have been examined using the NCEP reanalysis data. Capabilities of the climate model in simulating these mechanisms have been examined from the model simulations. Spread skill relationship has been evaluated using ensemble simulations of the model. Several extreme monsoon years (flood and drought years) have been examined in detail. It has been found that the skill of hindcast predictions improve using a statistical correction method to reduce the systematic errors. Economic values of deterministic and probabilistic predictions have been estimated. This metric provides an

approach to identify several user sectors who shall benefit from the predictions even if the model has several limitations. Results of these simulations along with results of several improvements in the model to correctly simulate the monsoon precipitation will be presented in the Conference.