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Statistical Models for Long-range Forecasting of Southwest Monsoon Rainfall over India Using Step Wise Regression and Neural Network

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ABSTRACT

The long-range forecasts (LRF) based on statistical methods for southwest monsoon rainfall over India (ISMR) has been issued by the India Meteorological Department (IMD) for more than 100 years. Many statistical and dynamical models including the operational models of IMD failed to predict the operational models of IMD failed to predict the deficient monsoon years 2002 and 2004 on the earlier occasions and so had happened for monsoon 2009. In this paper a brief of the recent methods being followed for LRF that is 8-parameter and 10-parameter power regression models used from 2003 to 2006 and new statistical ensemble forecasting system are explained. Then the new three stage procedure is explained. In this the most pertinent predictors are selected from the set of all the potential predictors for April, June and July models. The model equations are developed by using the linear regression and neural network techniques based upon training set of the 43 years of data from 1958 to 2000. The skill of the models is evaluated based upon the validation set of 11 years of data from 2001 to 2011, which has shown the high skill on the validation data set. It can be inferred that these models have the potential to provide a prediction of ISMR, which would significantly improve the operational forecast.

KEYWORDS

Monsoon; ISMR; LRF; Step-Wise Regression; Neural-Networks

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