Abstract Details

AOGS 1st Annual Meeting > Ocean and Atmospheres > Assessing the impacts of ENSO and NAO on Indian monsoon using the multiple spectral and Non-linear forecasting techniques >

Corresponding Author : Dr. Rama Krishna Tiwari (rk_tiwari3@rediffmail.com)

Organization: National Geophysical Research Institute,Hyderabad,India

Category: Ocean and Atmospheres

Paper ID: 57-OOA-A297

Title: Assessing the impacts of ENSO and NAO on Indian monsoon using the multiple spectral and Non-linear forecasting techniques

Abstract: Prediction of climate variability is, at present, one of the major concerns of global environmentalists. The Indian rainfall variability is the end product of a series of complex interactions between the coupled ocean and atmospheric processes and hence any change in these processes will be lead to corresponding perturbations in Indian monsoon. Several recent studies have also demonstrated influences of solar and greenhouse radiative forcing on the amplitude of the El Nino-Southern Oscillation (ENSO) and North Atlantic Oscillation (NAO) variability on different time scales. Hence the available complex climatic signals appear to be a somewhat "confused amalgam" produced by stochastic, chaotic and periodic processes. In order to achieve the goal of forecast of rainfall variability, it is imperative to study the oceanic and atmospheric data from a global perspective in conjunction with external forcing parameters. To resolve the complex signals, it is essential to examine these data using the multiple techniques of spectral and nonlinear forecasting analyses. We examine here three sets of global data: (i) updated Indian Rainfall (IRF) time series of the whole country (ii) NAO decoded from tree ring records from North America and NW Europe and (iii) NINO3 sea surface temperature record from Eastern Equatorial Pacific region to investigate the signature of ENSO and NAO responses on the Indian monsoon. Non-linear forecasting and artificial neural networks analyses reveal deterministic components dominated with chaotic and stochastic processes. Wavelet and Multitaper method (MTM) of spectral analyses of the above time series reveal non-stationary "localized modes" of ENSO and NAO evolution corresponding to 2.2-8 year terms and multi-decadal cycle (65-70 years) of internal ocean-atmospheric oscillation. Although matching periodicities are present in these records, the cross-spectrum analysis of IRF, NINO3 and NAO temperature records exhibits significant

Presentation Mode: Oral

Keywords: ENSO, NAO, Indian rainfall index, nonlinear forecasting analysis, Multi-taper method, wavelet analysis, artificial neural network, solar radiance

Status: Pending.

Co-Authors

No.	Title	First Name	Family Name	Organization
1	Mrs.	Sri Lakshmi	Sunkara	National Geophysical Research Institute, Hyderabad, India