



*Technical Cooperation in the Development of*  
**Climate Model and Ocean Assimilation**  
**Analyses for the Indian Ocean Region**

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**Between**

**the National Oceanic and Atmospheric  
Administration (NOAA) Department of  
Commerce of the United States of America**

**and**

**the Ministry of Earth Sciences (MoES) of  
the Government of India**



# Objectives

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- To coordinate development of a set of tools to assess and understand the performance of the climate model and ocean assimilation products over the Indian Ocean region
- Use the climate models to construct prediction schemes for rainfall over the region on seasonal to decadal timescales for all the seasons.



# Deliverables

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- Development of a regional climate monitoring system over Indian Ocean based on observed, reanalysis and ocean assimilation data
- Better understanding of for the regional variability of atmospheric and oceanic conditions over Indian Ocean at intra-seasonal, inter-annual and decadal scales.
- Explain the physical mechanism bridging the climate variability over Indian Ocean with that over the land and there by identify the precursors for the long and extended range prediction of rainfall and temperatures over south Asia.



# Deliverables

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- Analysis of the skill of the ocean data assimilation and experimental prediction systems at the Geophysical Fluid Dynamics Laboratory, on various timescales
- Couple the SFM model used by IMD for experimental long and extended range prediction with mixed layer (slab) ocean model.
- Development of hybrid models for generating real-time monthly probabilistic forecast products for smaller regions over India using climate model hindcasts and forecasts and ocean assimilation data products.
- Understanding of future climate over south Asia based on the observed data and GFDL climate model projections.

# **Work Plan and Implementation Schedule for first two years (2008-10)**

<b>Academic exchanges between US and India collaborators for discussion on the project regarding data requirements, methods to be followed etc.</b>	<b>September to December 2008</b>
<b>Exchange and analysis of observed &amp; model simulated data, exchange of results etc through internet and mutual visits</b>	<b>January to December 2009</b>
<b>Publishing of joint research reports, papers etc.</b>	<b>January to September 2010</b>



# Responsibility of IMD/INCOIS

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- Provide past and real time meteorological data (rainfall and temperature) from the Indian region for the development of global climate monitoring products.
- Depute an IMD/INCOIS scientist to GFDL, USA for the analysis and understanding of climate model and ocean data assimilation data products and assessments.
- Provide all travel/living expenses for the visiting scientists.
- Coordination and engagement with other organizational entities in India.



# Responsibility of NOAA

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- Provide support in analysis and access to model data, assimilation products and experimental forecast system hindcasts for the analysis in the Indian Ocean region.
- Provide relevant hindcasts of seasonal to interannual forecasts of the Indian Ocean region for the development and assessment of extended range forecasts over the south Asian monsoon region.
- Develop research into assimilation of Argo and altimeter data in the Indian Ocean region.



# Responsibility of NOAA

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- Provide office space and a computer workstation at GFDL for one (1) visiting Indian scientist, who will work on the development of data products for climate monitoring and development of statistical downscaling tools for the south Asian region.
- If necessary, provide travel expenses for NOAA Scientists to and from India.



# The working-level contacts

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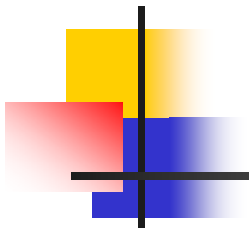
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**Thanks**