Joint Indo-US center

on

‘Weather & Climate Studies’

: A Proposal

Before I begin my briefing let us recall the glowing track record of Indo-US collaborations in various areas of science and technology including atmospheric science. Under Indo-US Forum weather and climate modeling has been identified as thrust area for collaboration. It presents a new window of opportunity to serve the society jointly. Here is why

ASIAN MONSOON: Accurate simulation / prediction of the monsoon is still a challenge for the scientific community

TROPICAL CYCLONES: Some of the most devastating ones have occurred over Indian Seas. It is speculated that in current global change scenario the intensity and frequency over BoB have increased

Climate Variability and Predictability

Sea level changes
Precipitation and other local climate conditions
Forests cover and crop yields
Water supplies
Human health
Animal and ecosystems/forests
Deserts cover

Countries in the tropical belt like India might be affected more.
Impact of increased carbon dioxide and ozone in coming years might reduce the crop yield.

Regional / global food security, economy, stability and even peace is linked to this scientific challenge

We need to and can do something

- **India and USA together can influence the development plans of the human race in terms of the environment policies and planning by investing in 'Weather and Climate' science**

- **There is an urgent need for investment in 'Weather and Climate' area in terms of collaboration between premier US institutes with advanced knowledge and technological skills and centres from India**

Recent Advances in Prediction Capabilities

Atmospheric science has shown impressive advances during the last 20 years

Current Numerical analysis/forecast systems can capture many weather systems/events and predict them with reasonable accuracy

An effective mechanism to utilize these new technologies for the welfare of people must be devised

These advances provide the context

US atmospheric modeling community has remained on the vanguard of model development

Indian scientific community has also gained sufficient expertise in global modeling application

It is perhaps the only country in the tropics that has acquired skill in real time global modeling on daily basis to issue Forecasts

Why a joint Centre ?

A coordinated organized institutional collaborative programme can serve the purpose better for applied research and operational needs

A joint center can effectively steer the scientific research related to weather and climate understanding and prediction

The center will work on jointly identified scientific issues in this area

A joint center can optimize the resources as well as the scientific development in the field.

An integrated effort has to be undertaken in both the countries enveloping various institutions and organizations.

This would eventually enable us to exploit the best talents of both the countries and utilize the resources optimally.

Scientific problems to be addressed

· Improved understanding and realistic prediction of tropical weather/climate events and their tele-connections with the mid-latitude climate systems

·Utilisation of more satellite data from India/US to improve models, prediction and model validations

·Work on understanding/improving physical processes like land-surface, cloud, convection and radiation in numerical models

· Improved understanding and prediction of tropical cyclones by models

· Planning and execution of joint observations for better understanding of processes and to improve model skills for various scales

Themes for study at the Joint Centre

- Improve Forecast skill for Tropics/Monsoon
- Joint projects for tropical cyclones track and intensity prediction, warning systems, societal and economic impact
- Joint Projects on other high impact weather(THORPEX)
- Joint projects on process studies specific to Indian region
- Climate variability and Predictability
- Global / Regional environmental change and impacts
- Develop, test / verify components of 'Earth System Model'
- Asian-Australian Monsoon system / Indo-Pacific climate

JOINT ACTIVITIES ENVISAGED

- Processes understanding for model improvement
- Improving prediction/simulation models for various scales
- Joint field campaigns for Understanding / improving the physical processes in models
- Workshops/Seminars, Training Programs
- Network scientists from India and USA
- Expanding linkages among operational centers of India and USA

Improved Operational Forecast from COSMIC GPS/MET

- Data Sparse regions will benefit
- All weather data
- Improved moisture distribution representation in model
- Good for tropical water-vapor distribution
- Data from CHAMP, SAC-C , GRACE to be tested

COMET: Cooperative program for Operational Meteorology Education and Training

- **Work as an active partner to NCAR on COMET program**
- **Contribute to COMET for Indian region/Monsoon meteorology**
- **Make NCMRWF as the regional hub for COMET-India**
- **Adopt the international project of COMET for India**

UNIDATA

- Educate and train professionals about unidata system
- Work closely with NCAR to include South/South-East Asian data/products
- Adapt unidata concept and technology at the joint centre
- Use products/data from UNIDATA for operational use in India

Research Application: Air-Port Weather

- Use available information, expertise and technology
- Combined use of models, new Obs system and hardware
- NWP / Data Assimilation
- Convective storm nowcasting / forecasting
- Study Precipitation Physics / Snow / Fog
- Atmospheric Turbulence
- Visibility nowcast / forecast
- Real time operational system: algorithms and special graphics
- New Instruments and Hardware have to be used for aviation

Societal Impacts of Weather and Climate

- Agriculture and economy
- Drought monitoring
- Aviation
- Public health
- Water Resources and Hydrometeorology
- Internal security and Defense sector
- Surface transport
- Energy
- Planning and Policy making

We need to address

- What are institutional objectives?
- What are scientific objectives?
- What is the estimated budget(initially and recurring)?
- What are Expectation from Indian Side(Government/DST/NCMRWF)?
- What are Expectations from US Side(Government/NSF/NOAA/NASA/UCAR/NCAR)?
- From where will the Centre get Funds? How funding will be sustained?
- What Role Indo-US Forum shall play in this?
- What are deliverables?