

As on Sept 10, 2004

INDO-EU WORKSHOP

ON

CLIMATE CHANGE & NATURAL DISASTERS

September 06- 10, 2004, University of Hyderabad, Hyderabad, India

JOINT STATEMENT

The First Indo-EU Workshop on Climate Change and Natural Disasters was held in Hyderabad, India, 6-10 Sept, 2004. The workshop was co-sponsored and jointly organized by Research DG, European Commission and the Department of Science and Technology, Govt. of India and was hosted by the University of Hyderabad, Hyderabad, India. It was coordinated by Professor Kota Harinarayana, Vice-Chancellor, University of Hyderabad and Dr Anver Ghazi, Head, Global Change Unit/Adviser for Earth Observation, European Commission.

15 experts from over 10 European countries and about 60 Indian scientists from 10 scientific agencies participated in the workshop. The objective of the workshop was to present research activities in the areas of Climate Change and Natural Disasters and to jointly discuss these scientific areas with a view to identifying potential scientific topics for cooperation under INDO-EC Programme of Cooperation (POC) in Science and Technology 2004-06, in particular, in the context of EU Framework Programmes. The following areas of potential scientific cooperations were discussed:

Climate Change

- **Global warming and climate change**
- **Atmospheric pollutant and climate forcing, Albedo reduction, biosphere/atmosphere interaction.**
- **Climate modeling**
- **Ocean – Atmosphere coupling – El Nino**
- **Middle atmosphere coupling processes: stratospheric ozone and climate interaction**
- **Tropical monsoon dynamics**
- **Satellite climatology**
- **Medium range weather forecasting**
- **Ocean mechanisms and climate change**

- **Palaeoclimate**

Natural Disasters

- **Floods and flash floods**
- **Earthquake**
- **Landslides**
- **Forest fires**
- **Desertification/Drought**

The workshop recommended the following:

Identified Subtopics of Mutual Interests

The specific research topics (Annexure I) were jointly agreed for proactively intensifying cooperation under the INDO-EC Programme of Cooperation (POC) in Science & Technology, 2004-06 by Department of Science & Technology, Govt. of India and DG, Research, European Commission, utilizing the existing modalities of EU Sixth Framework Programme (FP6) and those of Indian programmes. The overall objective is to develop an INDO-EU partnership in Climate Change and Natural Disasters research.

Lateral Entry in EC FP 5 & 6 Projects

The possibility of participation of Indian scientists in the ongoing EU Integrated Projects and Networks of Excellence and relevant activities such as ENSEMBLES, AMMA, ACCENT, SCOUT, MERSEA, NARA, LESSLOSS, FLOODsite, DESURVEY, and OASYS (Annexure II) was identified to be a pragmatic way forward in order to implement cooperation in immediate future. Department of Science & Technology, Govt. of India and DG, Research, European Commission will facilitate this process.

Input for Present and Future EC Calls

Furthermore, both in the areas of Climate Change and Natural Disasters research, the involvement of Indian scientists in the research proposals to be submitted in response to the present and future Calls of the Global Change and Sustainable Development Programme of the EC is encouraged and a few concrete possibilities are identified. (Annexure III).

Possible Dedicated Call by EC Relevant to Developing Countries in FP6

It is highly recommended that the results of the workshop discussions are utilized for formulating a dedicated call for proposal of FP6 on the subjects of common interests to developing countries (e.g., Afro-Asia Monsoon research, Floods, Climate-Chemistry Interactions).

Signed at Hyderabad, India on September 10, 2004


Dr Kota Harinarayana 10/9

Indian Workshop Coordinator


Dr Anver Ghazi 10/9

EC Workshop Coordinator

ANNEXURE I

Identified Subtopics of Mutual Interests

A: CLIMATE CHANGE

A.1 Global and Regional Climate Modeling

- a. Validation of climate model simulations**
- b. Monsoon variability and teleconnections**
- c. Monsoon prediction and predictability**
- d. Climate Change scenario development**
- e. Climate impact analysis**

A.2 Atmospheric Composition- Climate Interaction

- a. Study of the chemical and physical of atmospheric composition in urban and rural areas**
- b. UV radiation and actinic fluxes**
- c. Budgets of greenhouse gases**
- d. Use of in-situ, ground-based balloon and satellite methods for monitoring of atmospheric composition**
- e. Development of measurement methodology**
- f. Modelling: aerosol chemistry-physics, radiative properties/parameterization of aerosols, radiative transfer.**
- g. Cloud and climate: microphysics, dynamics, transformation function on satellite data and influence to atmospheric parameters (including aerosol indirect effects).**
- h. Air pollution effects on precipitation and related landuse feedback at various spatio-temporal scale.**

A.3 Middle Atmosphere Climate Interaction

1. Measurements

- a. Aerosols: size distributions, chemical components etc. in-situ, AOD & satellite data**
- b. Cloud microphysics, dynamics, transformation function on satellite data and influence to atmospheric parameters**
- c. Vertical profiling of Water vapour.**
- d. Tropopause variability**
- e. Gravity waves**
- f. Troposphere/stratosphere interactions**
- g. Gases: e.g. NO_x, O₃, SO₂, CO, NMHCs, ground-based, balloons & satellites, with focus on aerosol chemistry -physics**
- h. Greenhouse gases & fluxes: CO₂, CH₄, N₂O**
- i. UV-radiation: spectral distribution & actinic fluxes**

2. Modelling

- a. Aerosol microphysics-chemistry**
- b. GHG local budgets**
- c. Improvement of aerosol & GHG parametrisation in GCMs**
- d. Radiative transfer**
- e. Air-quality-health**

3. Applications

- a. Impact of the chemical composition of the atmosphere & aerosols on climate**
- b. Health impacts of atmospheric pollutants**

A.5 Satellite Climatology, Ocean Mechanisms & Climate Change.

- a. Indian Ocean circulation and its response to monsoon, ENSO and impact on climate change including teleconnection e.g. NAO.**
- b. Development and implement an Indian Ocean forecasting system including validation for circulation, thermohaline structure, waves, tide and storm surges.**
- c. Integrate and validate Indian and European satellite data (ISRO, ESA, EUMETSAT) for ocean forecasting and climate change.**
- d. Bipolar atmosphere ice-ocean climate change under natural and anthropogenic forcing including future scenarios.**

A.6 Palaeoclimate.

High latitude- tropical teleconnections.

- a. Palaeoclimate modeling- outputs to be analysed for spatial variations in palaeomonsoon.**
- b. Data on climate proxies: Existing records need to be put in a better chronological framework (AMS ¹⁴C dating , TIMS U-Th dating etc...) and new high resolution records have to be generated that are compatible with the European records.(e.g. Alkenones, tree ring density, stable isotopes...)**

A.7 Nitrogen Cycle.

- a. Process studies related to the biosphere-atmosphere exchange of N₂O, supplementing activities of European partners**
- b. Field measurements on greenhouse gas exchange of primarily active greenhouse gases in agricultural ecosystems, adding additional values in terms of differences in climate and landuse**
- c. Model development, validation and application.**

B: NATURAL DISASTERS

B.1 Forest Fires.

- a. Assessment of forest fire danger associated to meteorological data, to remote sensing data and to other factors.**
- b. Use of satellite sensors to detect and monitor starting and developing fires and to assess fire damages.**
- c. Methods to predict fire behaviour, fire emissions to be included in decision support systems.**
- d. Socio-economic and ecological aspects related to forest fires occurrence and effects.**

B.2 Desertification/Drought.

- a. Assessment, early warning, monitoring and management related aspects.**
- b. Land Use Change Processes and Land Suitability**
- c. Land and Soil Remediation/Conservation**
- d. Remote Sensing and Advanced Geo-Information Processing as an element of methodological and conceptual research.**

B.3 Landslides.

- a. Multiparametric approach for predicting landslide**
- b. Landslide risk assessment- improving existing hazard models, integration of triggering information in landslide prediction models.**
- c. Landslide alert system**

B.4 Floods.

- a. Integrated flood risk assessment and management**
- b. Operationalization of satellite based rainfall estimation**
- c. Improving flood forecasting system.**
- d. Vulnerability to floods**

B.5 Earthquakes/Seismic Risks.

- a. Earthquake hazard assessment starting from identification of seismogenic structures.**
- b. Seismic early warning system.**
- c. Earthquake Engineering - Methodology and technology to reduce vulnerability of existing structures, Disaster loss modeling.**
- d. Earthquake source.**
- e. Assimilation of the observational data into decision support models for prediction, risk assessment and mitigation.**
- f. Use of methodology being developed in the context of Global Earth Observation System (GEO).**

ANNEXURE II

Lateral Entry in EC FP5 and FP6 Projects

ENSEMBLES: Ensemble-based prediction of climate changes and their impacts (IP)

*European Coordinator- Prof David Griggs, Hadley Centre for Climate Prediction and Research, UK.
dave.griggs@metoffice.com*

Specific areas for contribution of Indian scientists to ENSEMBLES could include:

- a. Validation and diagnostics of Global Coupled Models for Indian climate and its variability, for example representation of the monsoon and its dynamics, with a view to model improvement.**
- b. Downscaling of Global Coupled Model output using a regional model driven by lateral boundary conditions from different GCMs.**
- c. When available, validation of the ENSEMBLES multi-model ensemble output for Indian climate, variability and teleconnections.**
- d. Conduct impact studies using downscaled ensemble products over the Indian region.**

MOTIF- Models and Observations To Identify Feedbacks (FP5)

European Coordinator- Dr Pascale Braconnot, CEA, IPSL, France.

Alternate contact- Dr M Crucifix <same as Dr Griggs>

- a. Model output analysis**
- b. Participation in workshop**

AMMA: African Monsoon Multi-Disciplinary Analysis (IP)

European Coordinator- Jan Polcher, CNRS, Institut Pierre Simon Laplace, France.

*Alternate Contact: Prof Laurence Eymard, University of Pierre et Marie Curie.
Laurence.Eymard@lodyc.jussieu.fr*

Specific areas for contribution of Indian scientists to AMMA could include connection and comparisons between West African and Indian monsoons as follows.

- a. Large scale studies: (WP1)**
 - monsoon dynamics and tropical climate variability (up to decadal scales)**
 - thermodynamics of the northern Indian ocean and ocean – atmosphere coupling**

- intraseasonal to seasonal variability
 - teleconnections
- b. Process studies: (WP2)**
- ocean atmosphere interactions at the regional scale
 - land surface – atmosphere interactions from local to regional scales
 - cyclone / extreme events: initiation and development
 - aerosol formation and feedbacks
- c. Tools and observations: (WP4)**
- field campaign (VASCO)
 - model development and validation
 - satellite data retrieval methods and validation
 - historical in situ and satellite data set recovery (IMD, other sources) and analysis (atmosphere, ocean, land)

ACCENT: Atmospheric Composition Change- An European Network (NOE)

*European Coordinator- Dr. Sandro Fuzzi/CNR ISAC, Italy.
Alternate contact- Dr Millan M Millan, Fundacion CEAM, Spain
pilarz@ceam.es*

SCOUT: Stratosphere-climate links with emphasis on the UTLS (IP)

*European Coordinator: Dr John Pyle, University of Cambridge, UK
Alternate Contact: Dr. Petteri Taalas, Finnish Meteorological Institute, Finland petteri.taalas@fmi.fi*

MERSEA: Marine Environment and Security for the European Area (IP)

*European Coordinator: Dr. Yves Desaubier, MERSEA Project Director, Ifremer France merseaip@ifremer.fr
Alternate Contact: Dr. Ola Johannessen, Nansen Environmental and Remote Sensing Centre, Norway
Ola.Johannessen@nerisc.no*

NARAS: Natural Risk Assessment- harmonisation of procedures, quantification and information. (SSA).

European Coordinator- Dr Paolo Gasparini, Universite di Napoli, Italy paolo.gasparini@na.infn.it

Specific areas for contribution of Indian scientists to NARAS could include education to seismology in schools and participation of early warning research community under the EU NARAS project and to the EDUSEIS project.

LESSLOSS: Risk Mitigation for Earthquake and Landslides (IP).

*European Coordinator- Prof M Calvi, Universita degli Studi di Pavia, Italy
gm.calvi@unipv.it*

Alternate Contact : Prof. Paolo Gaspirini, Universita di Napoli, Italy Paolo.Gaspirini@na.infn.it

Specific areas for contribution of Indian scientists to LESSLOSS could include a close involvement of Indian Earthquake Engineering and Design national Group.

FLOODsite: Integrated Flood Risk Analysis and Management Methodologies (IP)

*European Coordinator: Dr Paul Samuels, Wallingford Institute of Hydrology, UK
Alternate Contact: Dr Z.W.Kundzewicz Poland kundzewicz@yahoo.com*

Operationalization of satellite based rainfall estimation

Improving flood forecasting systems

Technology transfer, training and dissemination

DESURVEY: A Surveillance System for Assessing & Monitoring of Desertification (IP)

*European Coordinator: Dr. Juan Puigdefrãgas, Estacion Experimental de Zonas Aridas (CSIC), Spain
www.eeza.csic.es*

Alternate Contact: Prof J Hill, University of Trier, Germany. hillj@uni-trier.de

Collaboration in terms of knowledge exchange and dissemination (workshops, capacity building, demonstration).

OASYS: Integrated Optimization of Landslide Alert Systems (STREP).

European Coordinator- Dr Helmut Wenzel, VCE Holding GmbH, Germany vce@atnet.at

Alternate contact- Dr Barbara Theilen-Willige, BAGF, Germany Barbara.Theilen-Willige@surf24.de

Specific areas for collaboration with Indian scientists in the scope of OASYS could include

- **Exchanging ideas and knowledge of methodology developed in the OASYS project which can be adopted for one of the landslide test sites in India.**
- **Including data from the Indian test site into the OASYS geodatabase for modeling.**

- **Participation in the OASYS meetings to exchange knowledge and perhaps instruments for the geotechnical research in the Indian test site is planned.**

ANNEXURE III

Indicative List of Titles of Joint Project Proposals

A: CLIMATE CHANGE

A.1 Global and Regional Climate Modeling

- a. High-resolution regional climate change scenario development using multi-model ensembles of regional climate models
- b. Improvement of short and medium range forecasts over the Indian region by regional/global models.
- c. Multi-scale interactions and prediction and predictability of seasonal mean monsoon.
- d. Indo – EU Conference in India in 2005 on ‘Monsoon Processes, Prediction and Predictability’.

A.2 Atmospheric Composition- Climate Interaction

- a. EC Science Panel on Atmospheric Sciences. Planning meeting on 29 October 2004 at Helsinki. Dr Taalas/FMI, Dr Lelieveld/MPI, Dr Kulmala/ Univ. Helsinki, Dr Millan/CEAM, Dr Prodi, ISAC/CNR, Dr Griggs/UKMO, Indian scientists/input

A.3 Middle Atmosphere Climate Interaction

- a. Study the impact of atmospheric composition and its changes and their impacts on global climate and on human health.
- b. EC may consider having atmospheric composition-climate interactions as one of the priority areas of the 4th call of the FP6.

A.5 Satellite Climatology, Ocean Mechanisms & Climate Change.

Project proposal on Earth Observation System (EESOP).

European Coordinator – Craig Donlan, craig.donlan@metoffice.gov.uk,

Alternate contact- Prof.Ola M.Johannessen, ola.johannessen@nerisc.no

Joint Contribution to Global Observing Systems(e.g GEO)

A.6 Palaeoclimate.

Modeling and high resolution palaeoclimate data generation to study teleconnections.

European contact- Dr Michel Crucifix, UKMO, <same as Dr Griggs>

A.7 Nitrogen Cycle.

Theme- Nitrogen Cycle and its interaction with the carbon cycle (Project proposal for the 3rd Call with participation of Indian scientists).

European contact- K. Butterbach-Bahl

B: NATURAL DISASTERS

B.1 Forest Fires.

Integrated project on Forest Fire Management proposed to be submitted by Dr. D. X. Viegas to the next call (26 Oct 2004) with participation of Indian scientists.

B.2 Desertification/Drought.

- a. If the topic of mitigating and combating desertification is re-opened in 4th call (expected for early 2005) under FP 6, a participation of Indian scientists is possible.**
- b. J. Hill (Coordinator of the FP5 Project on “Land Degradation Assessments in Mediterranean Europe”, LADAMER) is available to disseminate available information on this project (www.ladamer.org).**

B.3 Landslides.

Theme - Satellite based observations of the Indian test site for landslide analysis.

Participation of Indian scientists in October 26, 2004 Call.

European contact- Dr Barbara Theilen-Willige

B.4 Floods.

- a. Proposing participation of Indian partners and an Indian case study (vulnerability to floods in Godavari Basin) as a new IP in FP6 Third Call under II.I.I.I Global Water Cycle by Prof. Kundzewicz (Poland).**

- b. Considering feasibility of issuing a dedicated call devoted to integrated flood risk assessment and management on a global scale with participation of Indian experts.**

B.5 Earthquakes/Seismic Risks.

- a. Earthquake source: A SSA project for EC Call within FP6 to organize a Workshop with focus including feasibility of a joint program including a deep drilling in the seismogenic volume of the Koyna area.
European contact- Dr Pascal Bernard, IPGP, Paris, France,**
- b. Seismic hazard: Proposal of an international workshop to be held in India followed by a research proposal to be presented for a dedicated Call within FP6.
European contact- Dr Mustapha Meghraoui, IPG, Strassbourg**
- c. Potential participation of Indian partners in project proposal on early warning .
European contact- Dr Paolo Gasparini**