国际气候与环境科学中心
International Center for Climate and Environment Sciences

Reports of
COMSATS International Thematic Research Group on
"Climate Change and Environmental Protection"

Zhaohui LIN

International Center for climate and Environment Sciences
Chinese Academy of Sciences

Contents

I. Broad Objectives of COMSATS ITRG

- **To achieve South-South cooperation by creating linkages among the organizations working in the "climate and environmental sciences" in the developing countries:**
  - **Joint Research Projects**
  - **Experts Exchange**
  - **Knowledge Sharing**
  - **Capacity Building**
    - Short-term (Training Course, Visiting Scientist Program)
    - Long-term (Post graduate Studies; PhD and Master Programs)
  - **Sharing of Facilities and Resources**

II. Activities of COMSATS ITRG

1. New International Collaboration Established

- Status of group members
- Visiting and MoU signing

2. Capacity Building Activities

- International Training Symposium and Workshop
- Graduate students and Postdoc progra
- Short-term visiting

3. Research Progress from ITRG members

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Status of ITRG Group Members

➢ China: ICCES (Lead Center)

① Pakistan: CIIT, PMD
② Thailand: HAII (Hydro-Agro Information Insitute)
③ Sri Lanka: ITI
④ Mongolia: Institute of Meteorology, Hydrology and Environment, Mongolia（IMHE）
⑤ Iran: IROST, SCWMRI (Soil Conservation and Watershed Management Research Institute)
⑥ Nepal: Himalayan Cryosphere, Climate and Disaster Research Center, Kathmandu University
⑦ Malaysia: Centre for Electromagnetic and Lightning Protection, Faculty of Engineering, University Putra Malaysia
⑧ Nigeria: Department of Physics & Industrial Physics Imo State University

Status of ITRG Group Members

- Ethiopia: National Meteorological Agency
- Uganda: Department of Meteorology, Ministry of Water and Environment
- Sudan: Sudan Meteorological Authority

New Member:

✓ Bangladesh: **Institute of Water and Flood Management, Bangladesh University of Engineering and Technology**

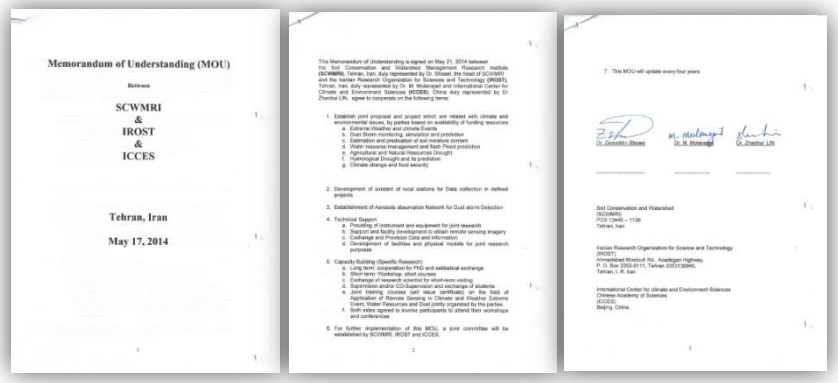
9 Members from Asia

4 Members from Africa (only 1 active)

None from South America

Visiting & MoU Signing - Iran

During the ICCES delegation's visit to the Iranian Research Organization for Science & Technology (IROST), Soil Conservation and Watershed Management Research Institute (SCWMRI) in May 2014, the collaborative MOU was signed regarding the scientific cooperation between ICCES , SCWMRI and IROST.


Memorandum of Understanding (MOU)

Between

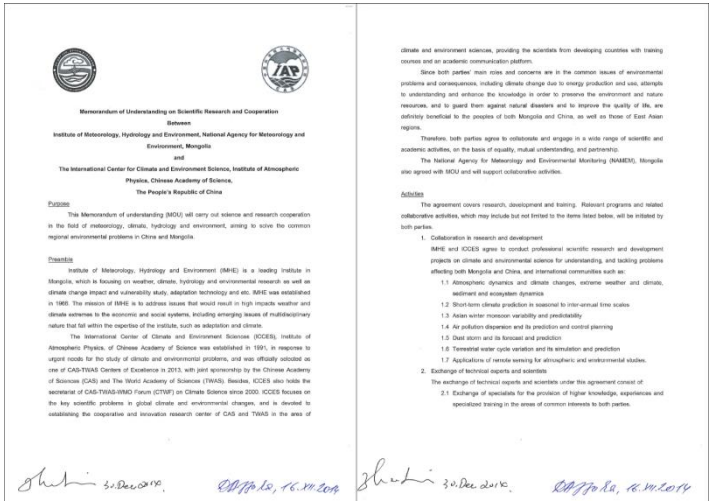
SCWMRI
&
IROST
&
ICCES

Tehran, Iran

May 17, 2014

Visiting & MoU Signing - Mongolia

After the visit of ICCES delegation to Mongolia in 2013, the MoU between ICCES and the Institute of Meteorology, Hydrology and Environment (IMHE), Mongolia was signed in December 2014, with focus on collaborative research and development, and the exchange of technical experts and scientists.



Memorandum of Understanding on Scientific Research and Cooperation
Between
Institute of Meteorology, Hydrology and Environment, National Agency for Meteorology and Environment, Mongolia
and
The International Center for Climate and Environment Science, Institute of Atmospheric Physics, Chinese Academy of Science,
The People's Republic of China

Purpose

This Memorandum of understanding (MOU) will carry out science and research cooperation in the field of meteorology, climate, hydrology and environment, aiming to solve the common regional environmental problems in China and Mongolia.

Preamble

Institute of Meteorology, Hydrology and Environment (IMHE) is a leading Institute in Mongolia, which is focusing on weather, climate, hydrology and environmental research as well as climate change impact and vulnerability study, adaptation technology and etc. IMHE was established in 1965. The mission of IMHE is to address issues that would result in high impacts weather and climate extremes to the economic and social systems, including emerging issues of multidisciplinary nature that fall within the expertise of the institute, such as adaptation and climate.

The International Center of Climate and Environment Sciences (ICCES), Institute of Atmospheric Physics, of Chinese Academy of Science was established in 1991, in response to urgent needs for the study of climate and environmental problems, and was officially selected as one of CAS-TWAS Centers of Excellence in 2013, with joint sponsorship by the Chinese Academy of Sciences (CAS) and The World Academy of Sciences (TWAS). Besides, ICCES also holds the secretariat of CAS-TWAS-WMO Forum (CTWF) on Climate Science since 2000. ICCES focuses on the key scientific problems in global climate and environmental changes, and is devoted to establishing the cooperative and innovation research center of CAS and TWAS in the area of climate and environment sciences, providing the scientists from developing countries with training courses and an academic communication platform.

Since both parties' main roles and concerns are in the common issues of environmental problems and consequences, including climate change due to energy production and use, attempts to understanding and enhance the knowledge in order to preserve the environment and nature resources, and to guard them against natural disasters and to improve the quality of life, are definitely beneficial to the peoples of both Mongolia and China, as well as those of East Asian regions.

Therefore, both parties agree to collaborate and engage in a wide range of scientific and academic activities, on the basis of equality, mutual understanding, and partnership.

The National Agency for Meteorology and Environmental Monitoring (NAMEM), Mongolia also agreed with MOU and will support collaborative activities.

Activities

The agreement covers research, development and training. Relevant programs and related collaborative activities, which may include but not limited to the items listed below, will be initiated by both parties.

1. Collaboration in research and development
   IMHE and ICCES agree to conduct professional scientific research and development projects on climate and environmental science for understanding, and tackling problems effecting both Mongolia and China, and international communities such as:
   1.1 Atmospheric dynamics and climate changes, extreme weather and climate, sediment and ecosystem dynamics
   1.2 Short-term climate prediction in seasonal to inter-annual time scales
   1.3 Asian winter monsoon variability and predictability
   1.4 Air pollution dispersion and its prediction and control planning
   1.5 Dust storm and its forecast and prediction
   1.6 Terrestrial water cycle variation and its simulation and prediction
   1.7 Applications of remote sensing for atmospheric and environmental studies.
2. Exchange of technical experts and scientists
   The exchange of technical experts and scientists under this agreement consist of:
   2.1 Exchange of specialists for the provision of higher knowledge, experiences and specialized training in the areas of common interests to both parties.

Mongolian scientists participates in ICCES conferences

II. Activities of COMSATS ITRG

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2. **Capacity Building Activities**
   - **International Training Symposium and Workshop**
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   - **Short-term visiting**
3. Research Progress from ITRG members

Training Workshop

“Asian Monsoon Variability and Predictability” Training workshop

- The International Training Workshop on “Asian Monsoon Variability and Predictability” was held during July 6-15 in Beijing, China.
- 6 invited lecturers, coming from China and the United States, had given 16 lectures during the 10 day workshop. Over 40 participants from 10 developing countries attended the training workshop.

Sessions:

a) Asian monsoon: general description
b) Indian summer monsoon
c) Asian winter monsoon
d) Modeling and predictability of the Asian monsoon
e) The global monsoon system and the East Asian monsoon

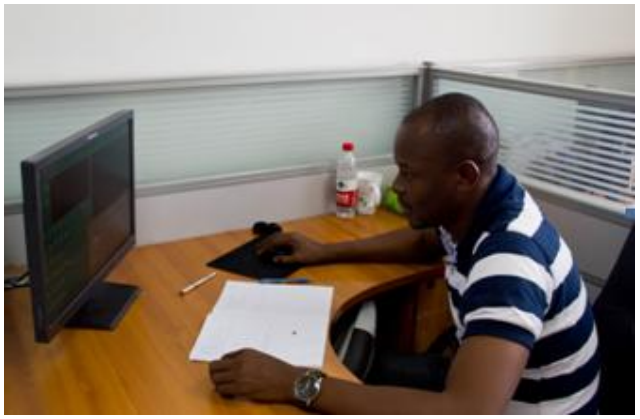
CAS-TWAS-WMO Forum (CTWF)

13th CTWF, the International symposium on "Extreme Weather and Climate: Past, Present, Future" , September 8-11 in Beijing, China

- **45 researchers presented their research results on the following topics: inland and coastal flooding, heat wave and drought, extreme events of air pollution and society impacts of extreme events. Over 90 researchers from 10 countries attended the 13th CTWF.**

Students & Postdocs

- ✓ **2 CAS-TWAS President's Fellowship awardees, Mr. Victor Nnamdi Dike from Nigeria and Mr. Kritanai Torsri from Thailand, started their PhD program at ICCES**



- ✓ **Dr. Worachat Wannawong from Hydro and Agro Information Institute (HAII), Thailand and Dr. Bushra Khalid from COMSATS Institute of Information Technology (CIIT), Pakistan, won the support of The CAS President's International Fellowship for Postdoctoral Researchers through the recommendation of ICCES. They will start their postdoc program at ICCES in 2015.**

They are all supported by the CAS President's International Fellowship Initiative (PIFI): http://english.bic.cas.cn/AF/Fe/201408/t20140807_125680.html

Short-term visiting

- ✓ **Mr. Sunil Kumar from Nepal visited ICCES for 2 months working on the extreme rainfall analysis over Nepal, in collaboration with Prof. Zhaohui Lin in ICCES.**

- **Invitation has also been sent to Mr. Mr. Azmat Hayat , under the recommendation by Prof. Shahina, but unfortunately, he didn't come for conducting joint research**
- **Mr. Sherly from ITI has also been invited as recommended by Prof. Keerthi Fonseka**

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Group Members' Action Plan of the 3rd Progress Meetings

Timeline	Activities and Responsibilities
Feb-March 2014	Meteorological data Collection , Preparing research proposal
April-May 2014	Preliminary analysis of extreme events in respective home institutions, under the supervision of the Group Leader
Mid of June 2014	Submission of 1st Progress Report to the Group Leader regarding the status of implementation of the project
July-Sep 2014	Execution of different segments of the joint research project as agreed with the Group Leader ● Selecting eligible active group members for the CTWF workshop ● Present research findings in CTWF 2014
End of Sep 2014	Submission of 2nd Progress Reports to the Group Leader
Oct-Dec 2014	• Execution of different segments of the joint research project • Manuscript preparation of Joint Papers
End of Dec 2014	Submission of Annual Progress Reports to the Group Leader

Group Leader's Action Plan of the 3rd Progress Meetings

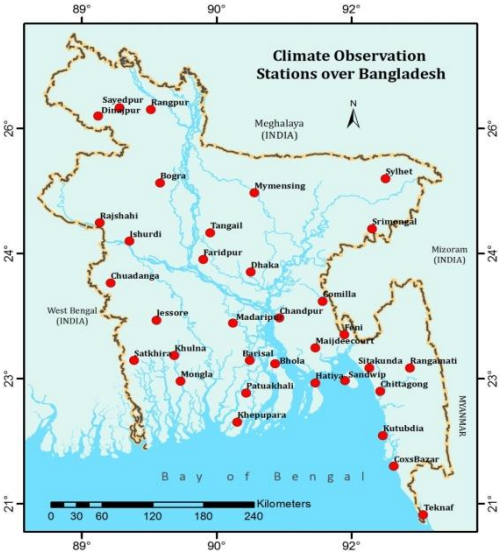
Timeline	Activities and Responsibilities
Jan-March 2014	Collection of meteorological data from Group Members
April-June 2014	Providing guidance to Group Members for preliminary analysis
Mid of June 2014	Collection of 1st Progress Report from the Group Members
July-Sep 2014	• Providing guidance to the Group Members regarding the execution of different segments of joint research project • Sideline meeting for the ITRG with focus on extreme events
End of Sep 2014	Collection of 2nd Progress Report from the Group Members
Oct-Dec 2014	• Providing guidance for the execution of segments of joint research project • Publication of Joint Papers in collaboration with Group Members
End of Dec 2014	Collection of 3rd Progress Report from the Group Members
Jan-March 2015	Compilation of Progress Reports submitted by Group Members
April/May 2015	Presentation of the progress made by the ITRG during 18th Coordinating Council Meeting (April/May 2015)

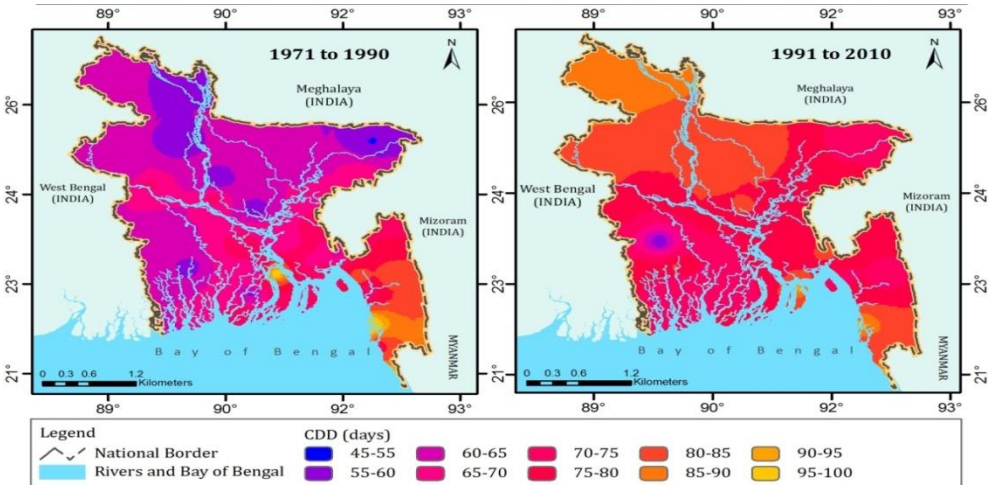
Major Research Achievements - Bangladesh

Institute of Water and Flood Management, Bangladesh University of Engineering and Technology

Meteorological data of 28 stations out of 34 stations of BMD used was collected during 1971-2010, and then applied for the analysis of rainfall and temperature extremes over the different Agro Economical Zones of Bangladesh.

Prof. G M Tarekul Islam and Prof. AKM Saiful Islam attended the 13th CAS-TWAS-WMO ForumInternational Symposium on Extreme Weather and Climate: Past, Present, Future held in September 8-11, 2014 in Beijing, China.



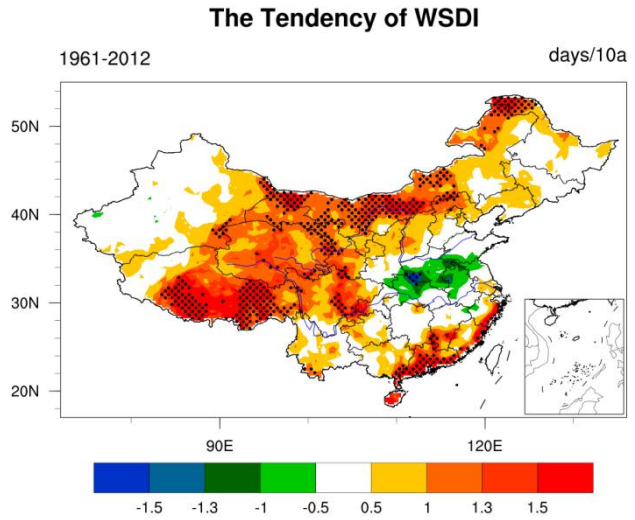


Consecutive Dry Days are increased

Major Research Achievements - China

International Center for Climate and Environment Sciences, CAS

- The observation meteorological datasets have been collected, along with the model simulation and hindcast datasets. The observed features of temperature extremes, including the extreme hot days in summer were then investigated. It is found that the Hot Days (HDs) occurred most frequently in Yellow and Huaihe river basin, Southern China, Xinjiang, Sichuan and Chongqin region, with significant inter-annual and inter-decadal variations.



The tendency of WSDI (Warm Spell Duration Indicator) at Yangtze and Huaihe River basin is decreasing, On the while , WSDI in Northern China and Southern part of China are increasing, and the tendency of latter is stronger.

Major Research Achievements - Iran

Soil Conservation and Watershed Management Research Institute

43 meteorological station data in Iran since 2000 has been acquired for the investigation of dust storm activities during recent decades.

It's found that, the high frequency of dust storm events occurs in Khuzestan, Ilam and Kermanshah provinces, in addition, the lowest frequency of the events is found in Chaharmahal province.

Annual distribution of the events in the Iranian western provinces show that the years 2008, 2009, 2000 and 2003 respectively have the highest frequency of the events. The increasing trend of dust storm activities can be found in all the stations, particularly in Kermanshah in the year 2009.

Dr. A.A.Noroozi attended the 13th CTWF International Symposium on Extreme Weather and Climate: Past, Present, Future, 8-11 September, 2014 Beijing, China.

Major Research Achievements - Malaysia

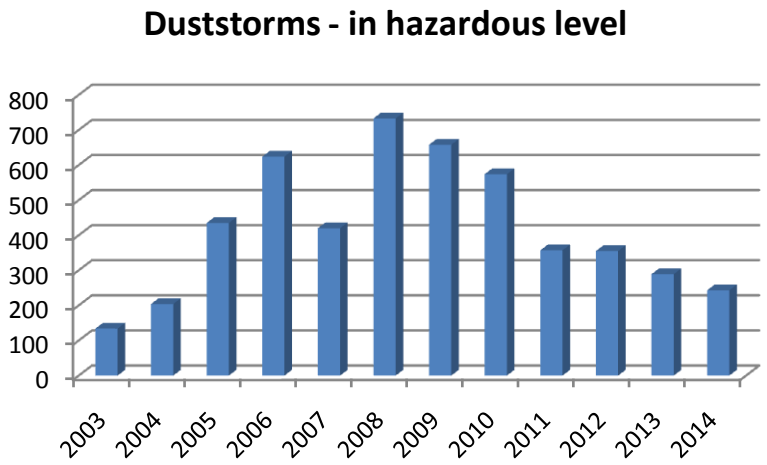
Centre for Electromagnetic and Lightning Protection, Faculty of Engineering, University Putra Malaysia

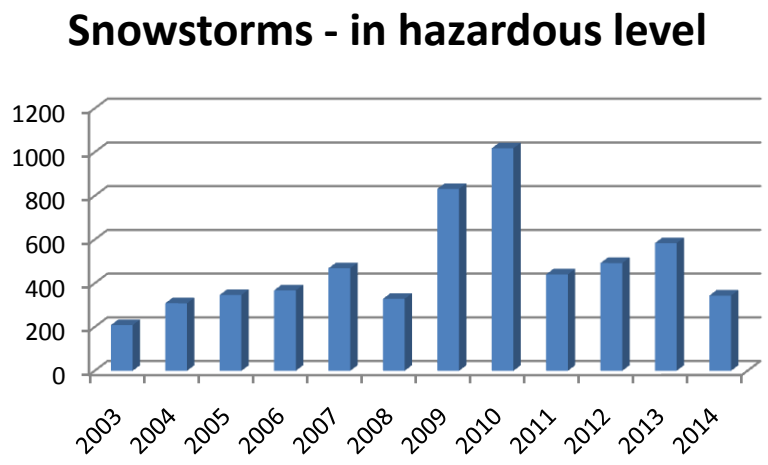
A thorough literature survey on the research done in Malaysia with respect to rainfall analysis, extreme weather hazards, correlation of meteorological data and other human and natural systems (agriculture, hydrological systems, natural disaster, economy, sociological aspects etc.) and establishing research problems based on the gaps of knowledge.

Major Research Achievements - Mongolia

IMHE, Institute of Meteorology, Hydrology and Environment, Mongolia

Using the meteorological observation datasets, the climate disasters and its variability in Mongolia has been investigated.

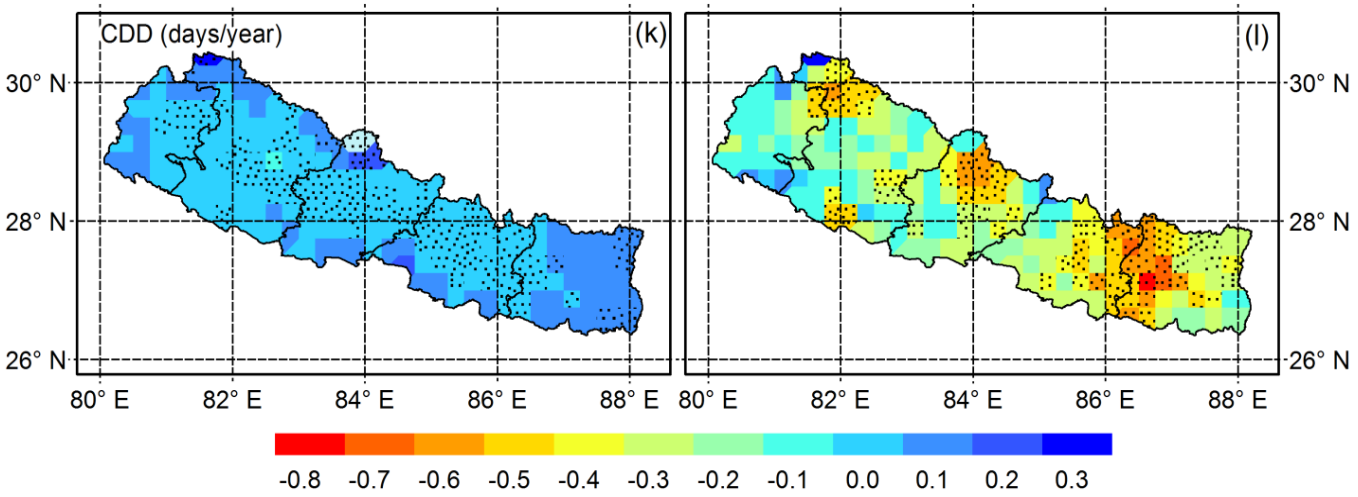




Major Research Achievements - Nepal

Himalayan Cryosphere, Climate and Disaster Research Center, Department of Environment Science and Engineering, School of Science, Kathmandu University

- A daily gridded precipitation dataset covering a period of 57 years (1951-2007) produced by collecting and analysing rain gauge observation data across Asia through the activities of the Asian Precipitation—Highly Resolved Observational Data Integration Towards Evaluation of Water Resources (APHRODITE) project is used for this study.



Long term trend of Consecutive Dry Days (CDD) indices from 1951 to 2007 for wet and dry season

Major Research Achievements - Pakistan

Department of Meteorology, COMSAST Institute of Information Technology

- Using the GCM model output, drought predictability for Southern Pakistan using Multi Model Ensemble Technique has been conducted. The three state of the art models as used in the EUROSIP have a potential to predict the drought events in the area as verified by ROC method.

- Dr. Tariq Shahina attended the 13th CTWF International Symposium on Extreme Weather and Climate: Past, Present, Future, 8-11 September, 2014 Beijing, China.

Major Research Achievements - Thailand

Hydro and Agro Information Institute, Ministry of Science and Technology, Thailand

- The hierarchical clustering technique was applied to various teleconnection indices from December 1980 to May 2014 using the meteorological observation dataset, and the prediction of Thailand's Extreme Rainfall Events Based on Similarity of Tele-connection Indices has been proposed.

- Ms. Aisawan CHANKARN attended the 13th CTWF International Symposium on Extreme Weather and Climate: Past, Present, Future, 8-11 September, 2014 Beijing, China.

Thailand-China Joint Research project

Theme:

Development of Seasonal Climate Forecast System in Thailand Using IAP-DCP Model

Sponsor & Partner:

Thailand Research Fund (TRF)

Kings Mongkut's University of Technology Thonburi (KUMTT)

Joint Graduate School of Energy and Environment (JGSEE)

- **The IAP Seasonal climate prediction system has been transferred and installed in KMUTT's computing system.**
- **30-year hindcast experiment over Thailand has been finished.**

III. Future Plan for Group Activities

1. **2015 ICCES international training workshop**
2. **Short-term visiting scholars and PhD students**
3. **More institutions from COMASTS member countries**

2015 ICCES International Training Workshop

Basic Information:

1.Theme: Land-hydrological model system and its applications

2.Time: 3-12 September, 2015

3.Venue: Beijing

Tentative Sessions

a) Land surface model

b) Hydrological Model

c) Atmospheric forcing and its uncertainties for land-hydrological modeling

d) Downscaling issues

e) Satellite monitoring of land-hydrological cycle

Welcome to join us!

Short-term visiting scholars and PhD students

- **Under the support of COMSATS, CAS, TWAS, ICCES can:**

  - Invite selected ITRG member as the visiting scholars for collaborative research on the extreme events in their respective countries

  - Encourage young scholars from developing countries to apply for CAS-TWAS president's Fellowship for PhD study

How to join us (ITRG-CCEP)

Open to all research institutions from COMSATS member countries. Those who are interested in joining with us, please follow the procedures:

Preparing the proposal on the extreme events weather and climate studies for respective countries:

1. Specify the topics on extreme events: Drought, Flooding, Dust Storm, etc
2. Identify the focal point both for research and management for respective group
3. Describe the feasibility of the research project, especially the availability of the meteorological datasets needed for the research
4. Draft working plan and timeline for the execution of the project

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Submit the proposal to group leader, and modify the proposal as suggested

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Discussion of Group leader with COMSATS for final decision

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Formal Certification Letter from COMSATS and Group

Thank You !