



国际气候与环境科学中心

International Center for Climate and Environment Sciences



Annual Report of ICCES

Center of excellence on
Climate and Environment Sciences

(2014.5-2015.4)

Zhaohui Lin

**International Center for climate and Environment Sciences
Chinese Academy of Sciences**

Outline

- ❑ **ICCES Overview**
- ❑ **Major Research Progress**
- ❑ **International Collaboration**
- ❑ **Future Plans**

I. ICCES Overview



ICCES was founded in 1991 with the research focus on the key scientific problems related with global climate and environmental changes.

ICCES is committed to solving the key scientific problems related with global climate and environmental changes and focuses on researches on earth system model development, climate and environmental disaster prediction, and the theoretical development and application of natural cybernetics.



I. ICCES Overview

- **2013, ICCES was certificated as one of TWAS-CAS Centres of Excellence**
- **2014, after expert evaluation, ICCES was approved by CAS to establish the “Key Laboratory of Earth System Theory and Model, Chinese Academy of Sciences” .**

Currently, there are **14** professors and **11** associate professors in ICCES. There are also two foreign Postdocs from Pakistan and Thailand respectively, and two PhD students from Nigeria and Thailand.

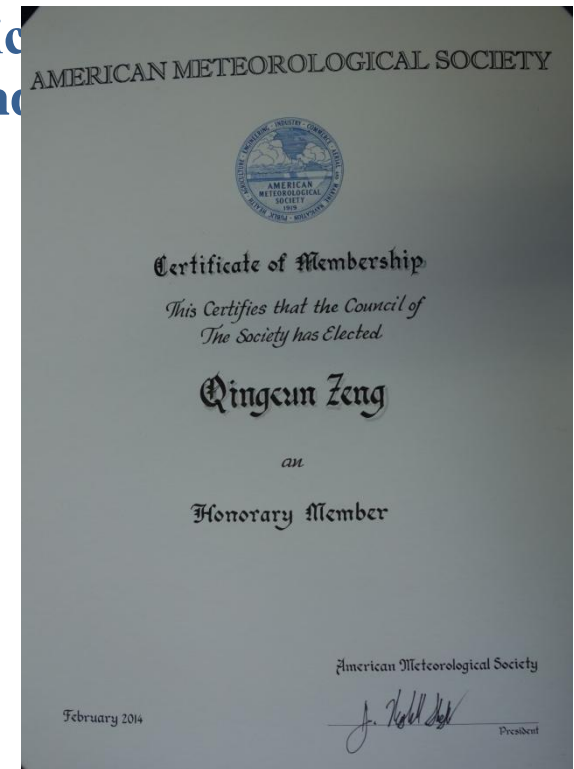
I. ICCES Overview – Ongoing Projects

Currently, there are 44 on-going projects undertaken by ICCES. Among these projects,

- 17 are funded by Ministry of Science and Technology (MOST) of China or Ministry of Finance (MOF) of China;
- 19 are funded by National Natural Science Funds of China (NSFC);
- 4 are funded by Chinese Academy of Sciences (CAS);
- 2 are international collaborative projects respectively sponsored by MOST and Thailand Research Fund (TRF).

I. ICCES Overview - Awards & Honors

- ◆ CAS Academician Prof. Qingcun Zeng selected as Honorary Member of American Meteorological Society in 2014 (AMS, the world's largest scientific society for the atmospheric and related oceanic and hydrologic sciences) .
- ◆ Dr. Fei Zheng won the Xie Yibing Youth Meteorological Science and Technology Award.
- ◆ Dr. Fang Li was awarded the 2014 Innovative Contribution Award by Institute of Atmospheric Physics (IAP), CAS
- ◆ ICCES members won The 2014 Best Supercomputing Application Award of CAS. (Dr. He Zhang, Dr. Dongling Zhang and Dr. Jiawen Zhu are awarded as the secondary, sixth and eighth co-author)



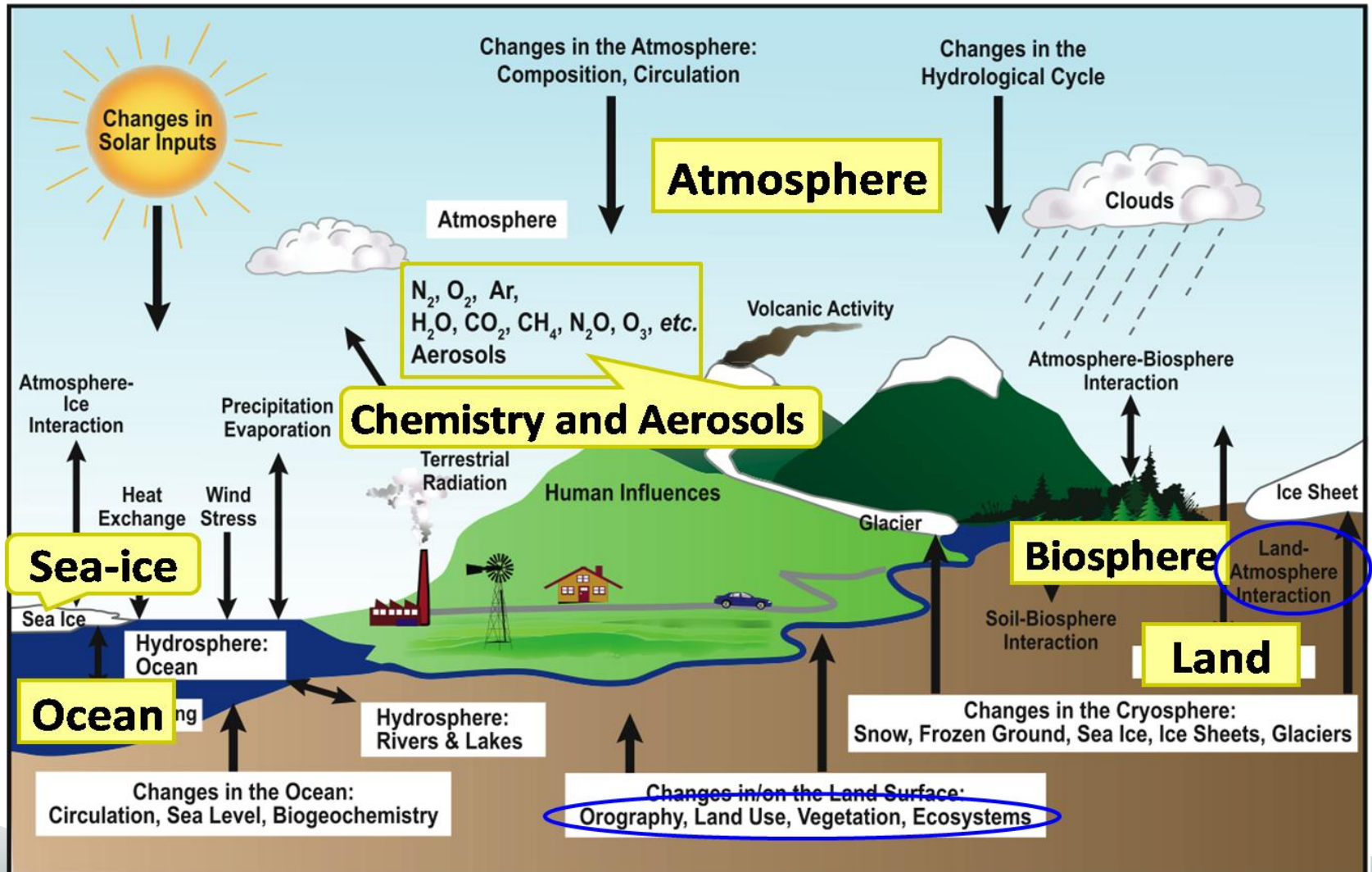
II. Major Research Progress



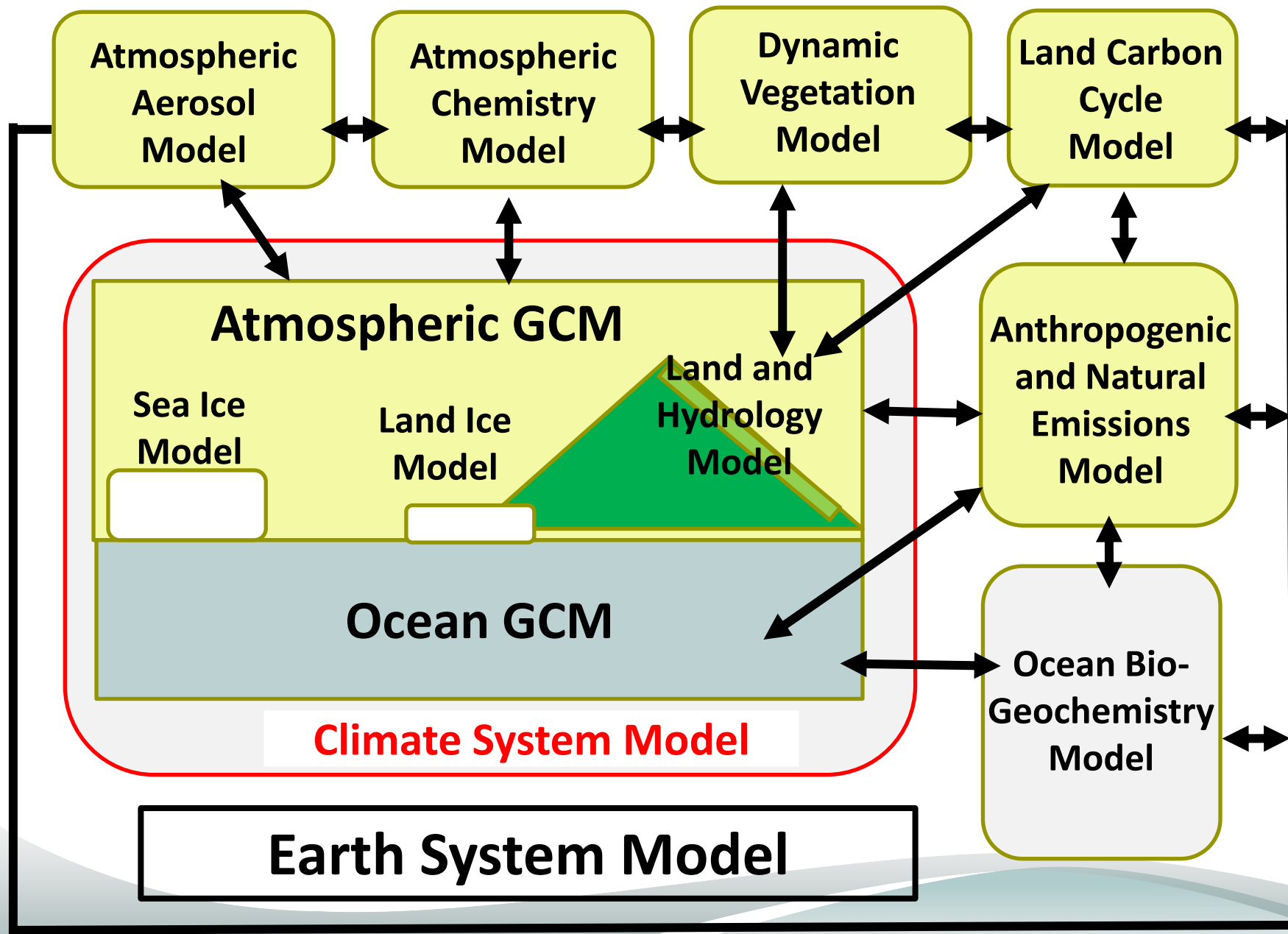
Research Focus

- ◆ **Development of Dynamical Earth System Model and Numerical Simulation**
- ◆ **Meteorological and Environmental Forecast and Related Disaster Assessment Theory and Technique**
- ◆ **Data Assimilation Theory and Methodology**
- ◆ **Earth System Theories and Natural Cybernetics**

Component and processes in the Earth System

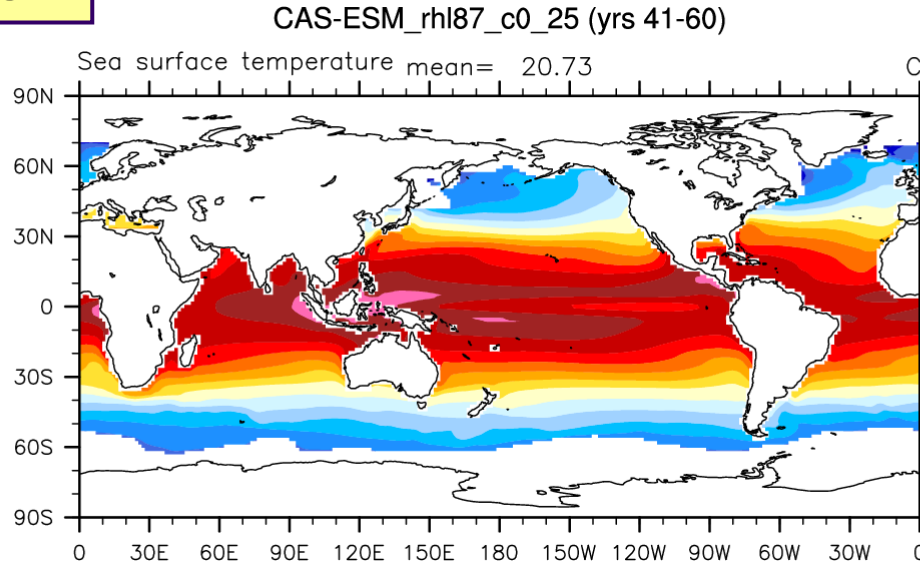


Version 0 of CAS Earth System Model



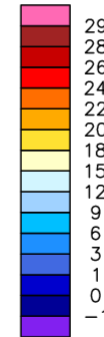
Simulated Annual mean Sea Surface Temperature by the CAS Earth System Model

ANN SST

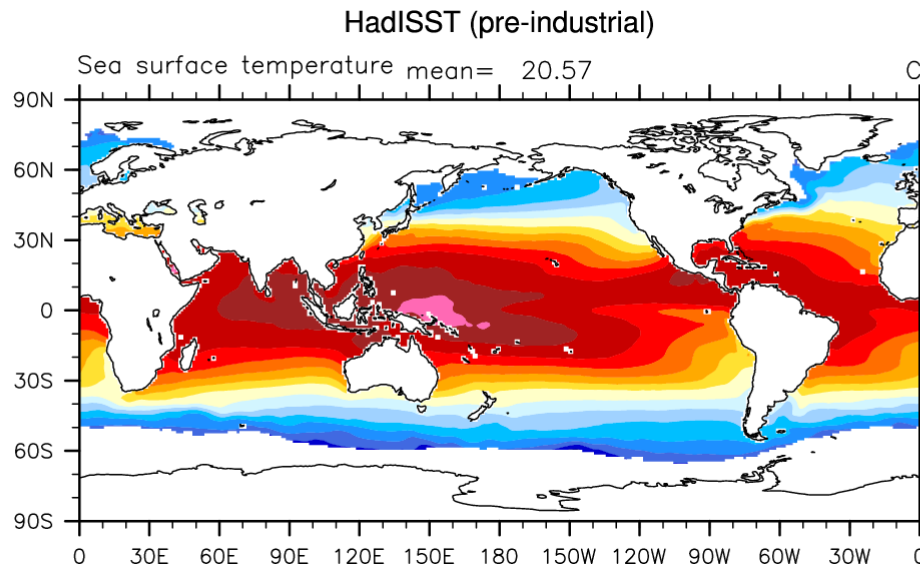


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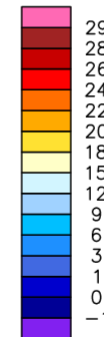
Min = -1.24 Max = 29.89



CAS_ESM



Min = -0.12 Max = 29.34

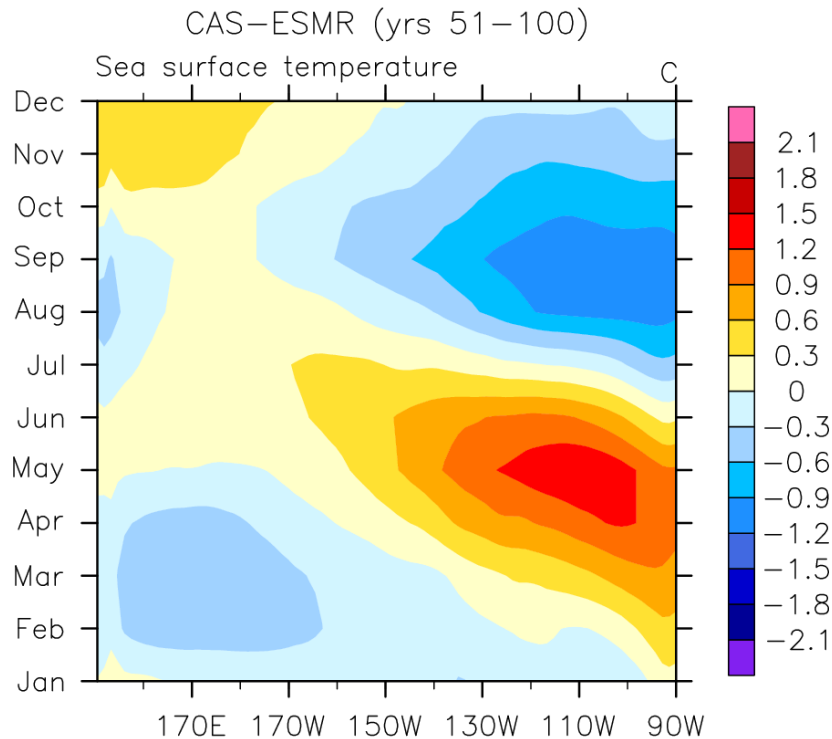


OBS

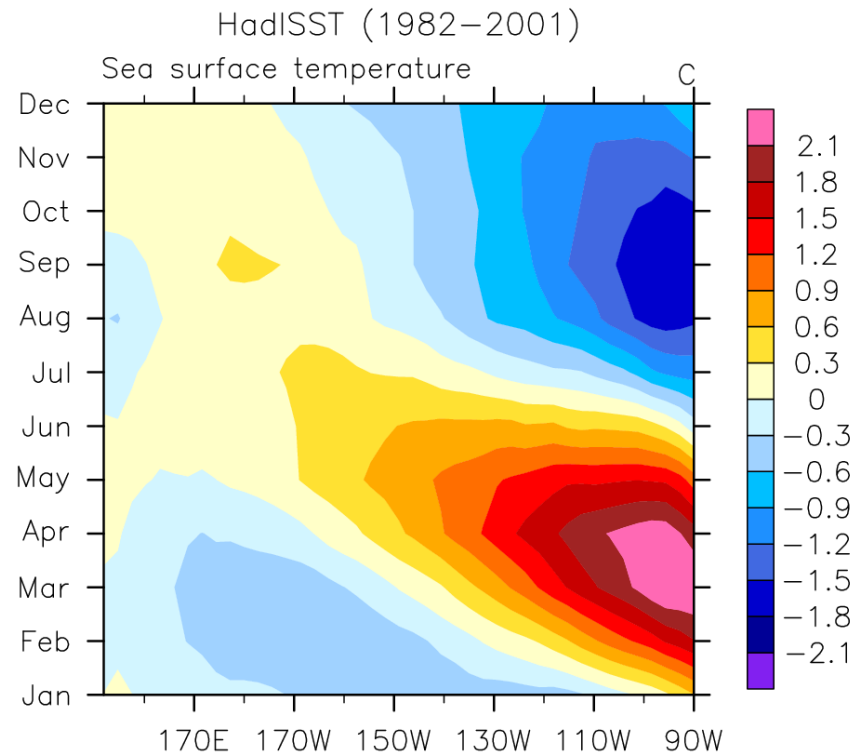
Annual cycle of SST

IAP_CoLM_LICOMR

Equatorial Pacific Ocean (5S-5N)

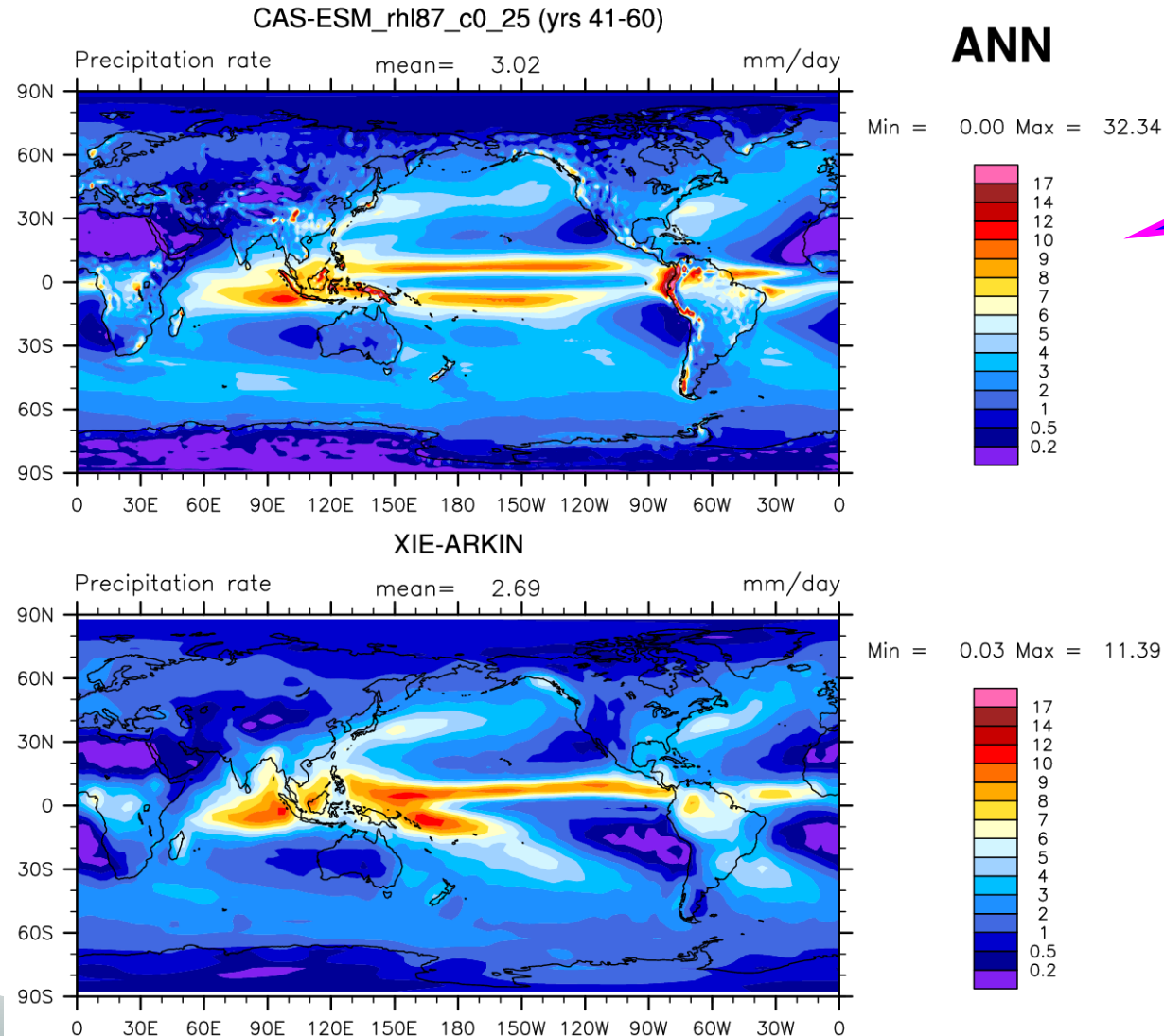


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Simulated Annual mean Precipitation by the CAS Earth System Model

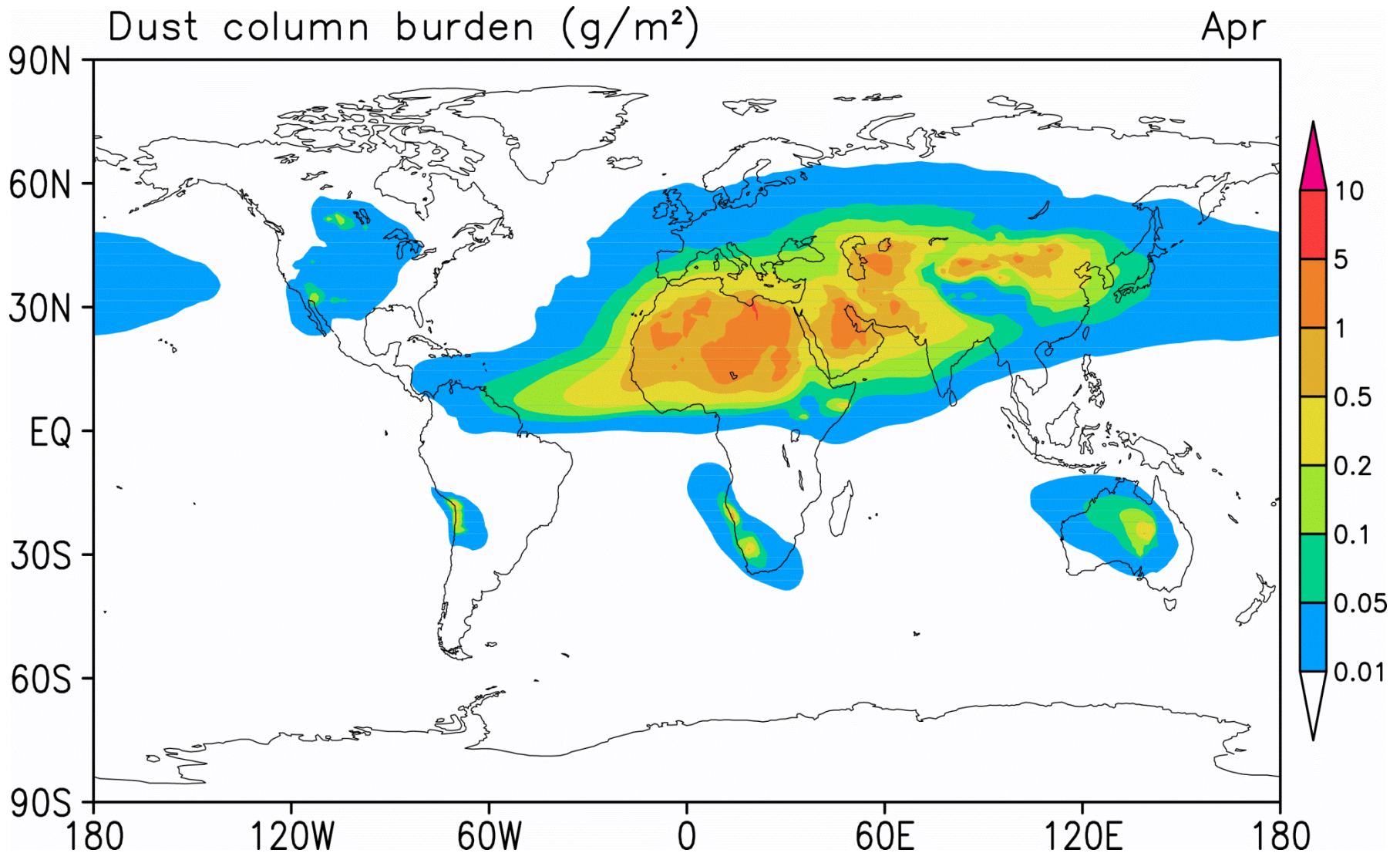
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CAS_ESM

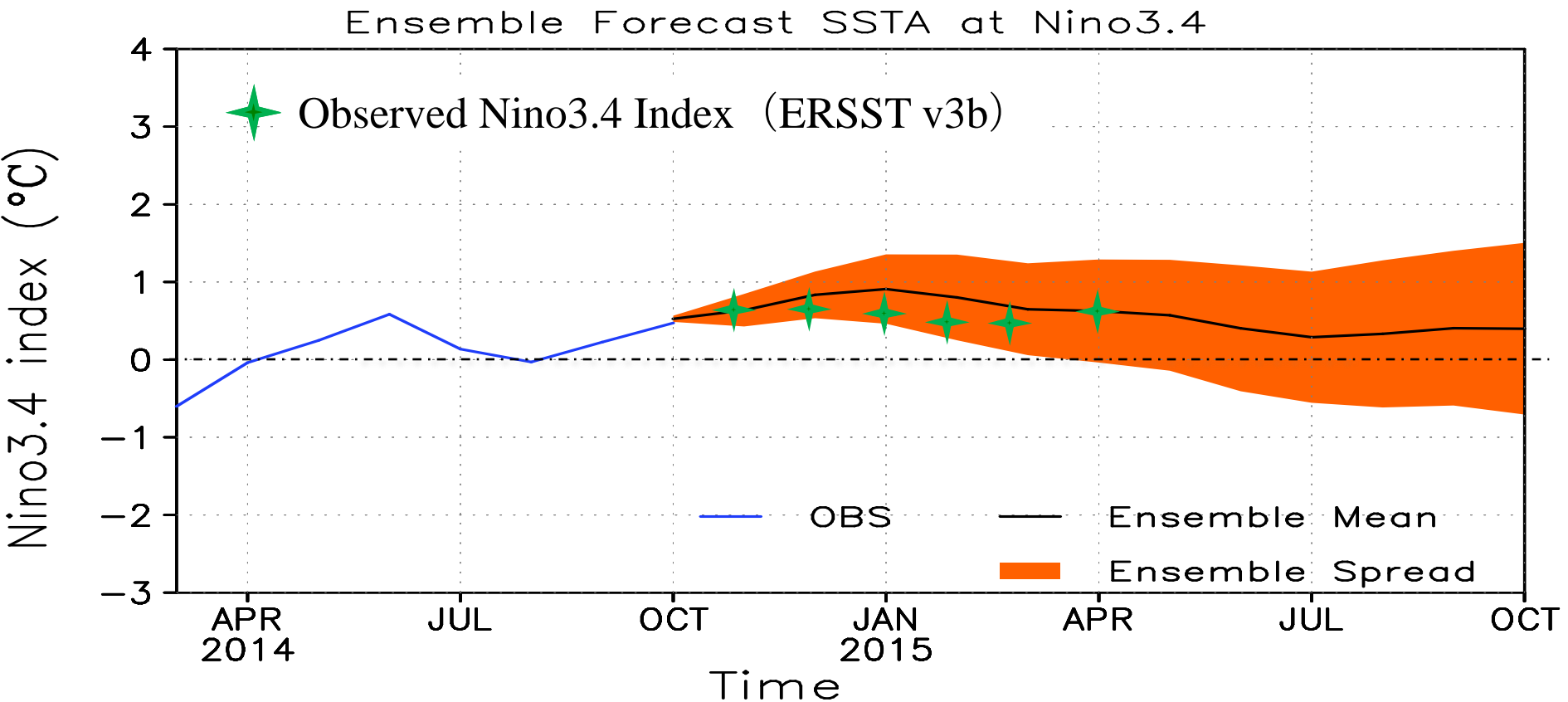
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Simulation of Global dust cycle



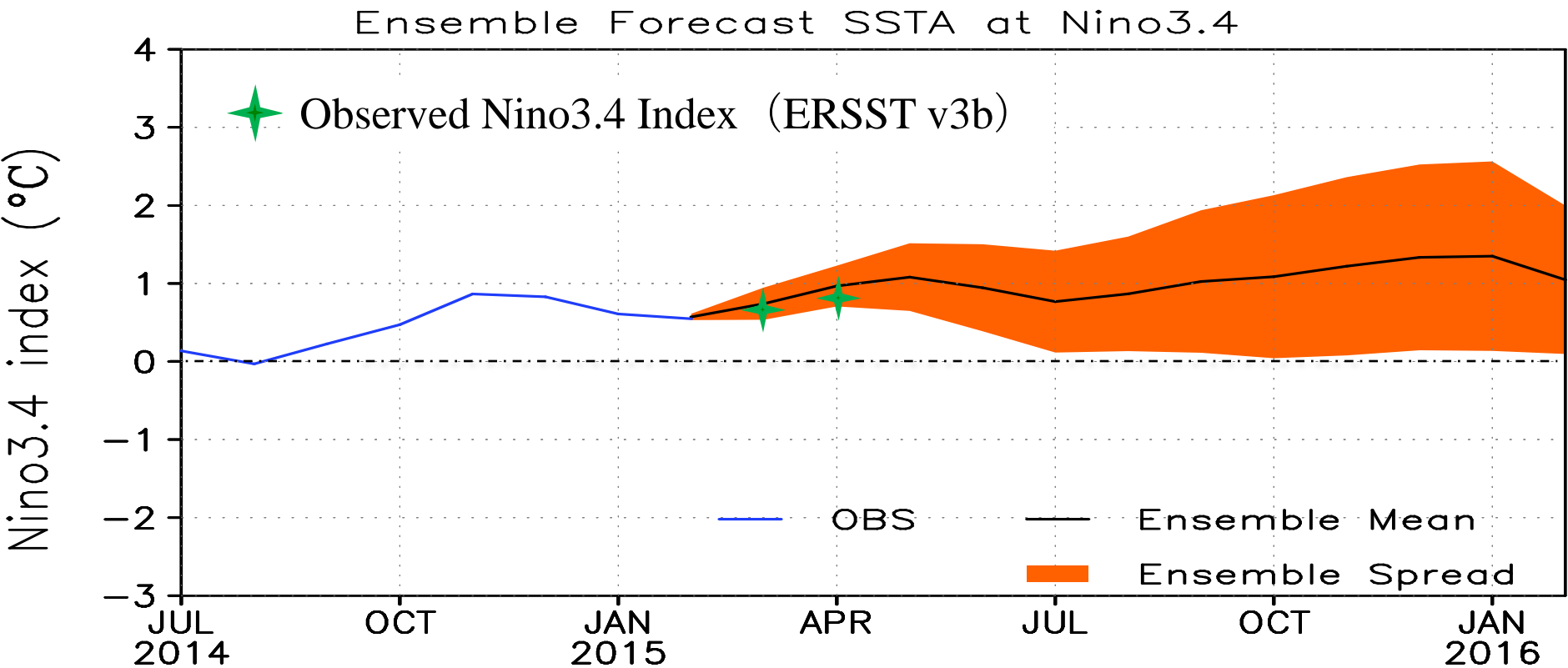
Last forecast for Climate Discussion in China

(Oct. 2014 Started)



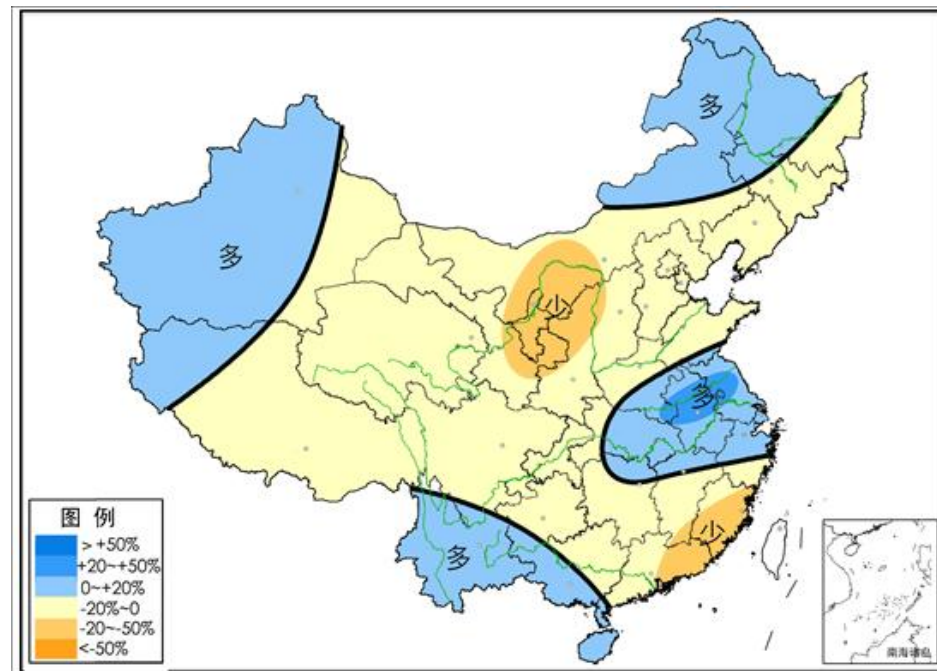
- An El Niño event will occur in winter 2014 with an approximately 50-60% chance.
- The amplitude of this El Niño event will be around 0.8-0.9°C, indicating a weak warm event.

Current forecast for Climate Discussion in China (Mar. 2015 Started)



- The El Niño conditions occurred in 2014, which will continue through the Northern Hemisphere summer 2015 with an approximately 60-70% chance, and a greater than 60% it will last through autumn and winter.
- The amplitude of this El Niño event will be around 1°C, indicating a weak-medium warm event.

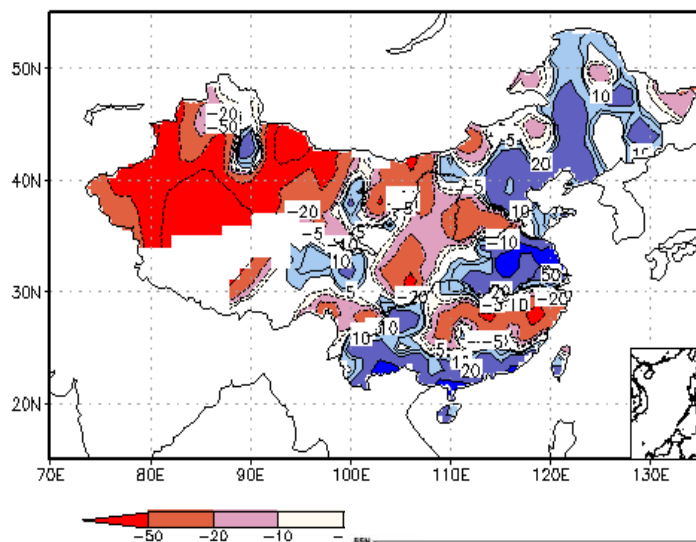
Season Outlook of Precipitation Anomalies in Summer 2015



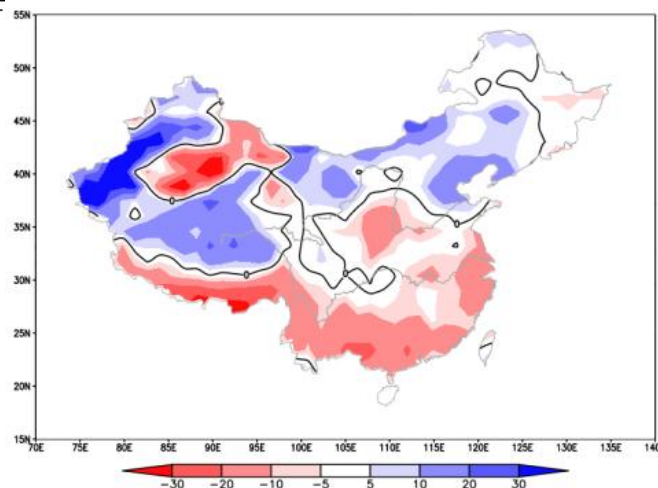
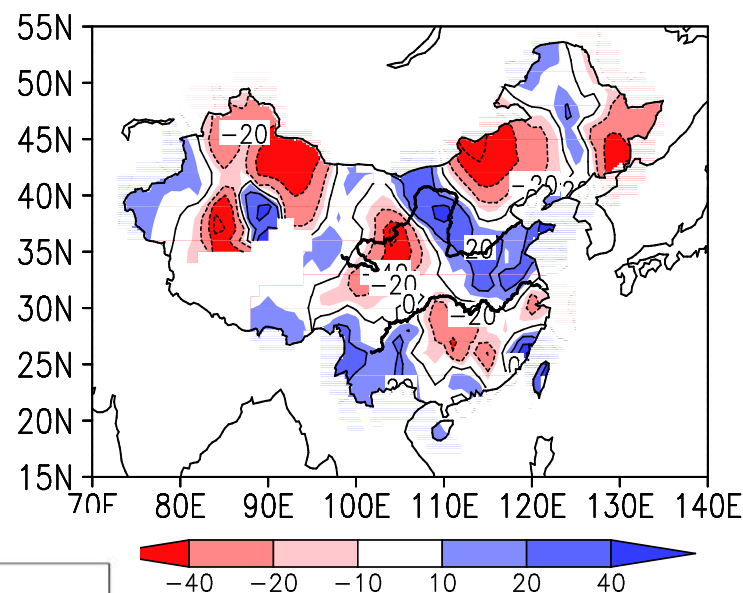
The precipitation in most part of China will be below-normal during the summer of 2015. The precipitation in the Huaihe Valley, the northern part of the Northeastern China, the western part of the Xinjiang Uygur Autonomous Region, and the western part of Southwestern China seemed to be above-normal.

Summer Rainfall Predictions by different version of IAP Climate models

IAP-2L-AGCM



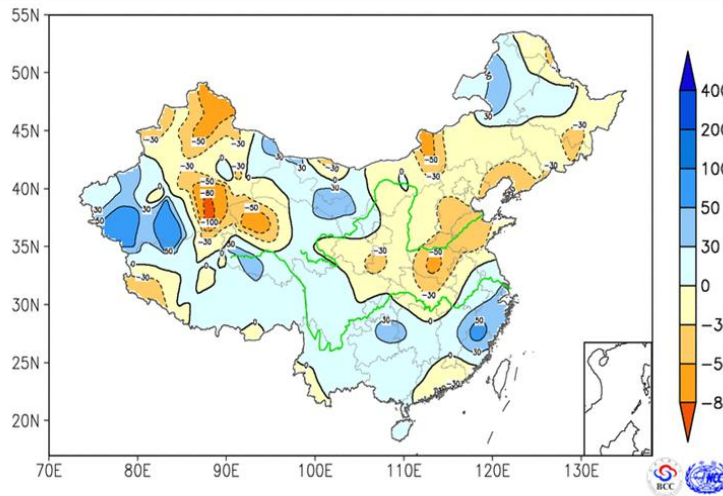
IAP-9L-AGCM



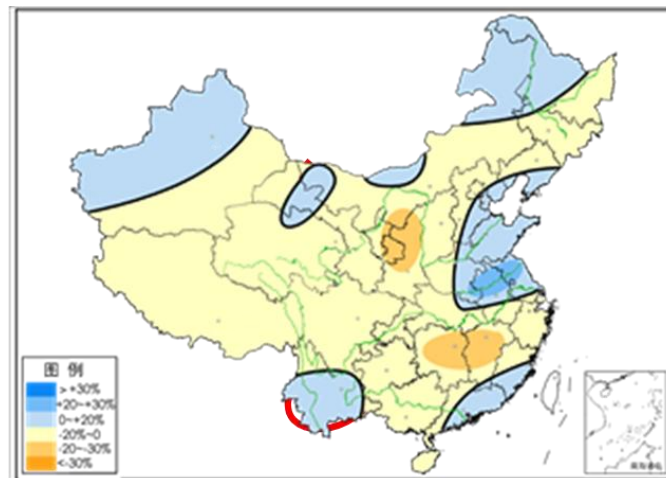
IAP-30L-AGCM

Verification of Seasonal forecast in 2014

Summer rainfall



Observation



Prediction

Prediction Score: 62

Spring Dust storm

Observation:

There were **7 sandstorms** in the spring 2014, which is **less than usual** (17 sandstorms).



Prediction:

The sandstorm over the Northern part of China will be **less than usual**.

Research Outcome Distribution

- Series of News Letter of Climate Prediction



III. International Cooperation

◆ International Conference

- ◆ The 13th CAS-TWAS-WMO Forum
- ◆ The International Training Workshop on “Asian Monsoon Variability and Predictability”
- ◆ The 4th XBT Workshop

◆ International programs

- ◆ ICCES-COMSATS joint program on extreme events
- ◆ China-Thailand joint program on seasonal prediction

◆ Capacity Building Activities

- ◆ International Students
- ◆ Visiting Scholar Programs

◆ Potential International Cooperation

- ◆ IROST, IRAN
- ◆ IMHE, MONGOLIA
- ◆ SUDAN

13th CAS-TWAS-WMO Forum

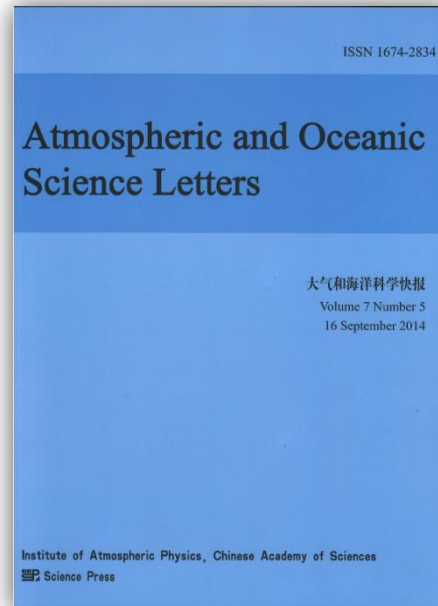
- ◆ The 13th CAS-TWAS-WMO Forum, the International symposium on “Extreme Weather and Climate: Past, Present, Future” was held during September 8-11 in Beijing, China.
- ◆ The 13th CAS-TWAS-WMO Forum is organized by ICCES and IAP, and sponsored by CAS, TWAS, CAS-TWAS-WMO Forum on Climate Science (CTWF) and Commissions on Science and Technology for Sustainable Development in the South (COMSATS).
- ◆ 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.



13th CAS-TWAS-WMO Forum



Group Photo



Meeting Outcomes

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“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.
- ◆ The workshop is organized by ICCES and supported by CAS and TWAS. 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.

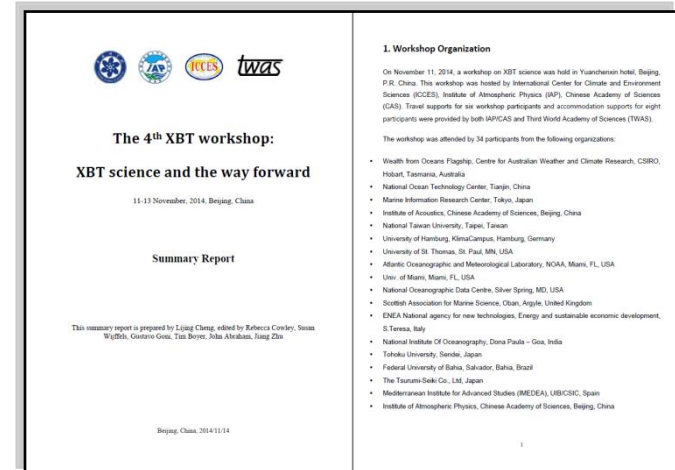


The 4th XBT Workshop



Dr. Gustavo Goni

director of Physical Oceanography Division
at NOAA/AOML, chair of XBT Community



- ◆ **The 4th XBT Workshop: XBT Science and the Way Forward was held on November 11-13 in Beijing, China.**
- ◆ **The workshop is organized by ICCES and supported by CAS and TWAS. Over 30 participants from 11 countries attended this workshop and 25 of them presented their research findings on the scientific and operational uses of XBT observations.**
- ◆ **The participants had deep discussions on recent advances in assessing XBT biases and their impact in related studies, trying to reach a consensus or recommended XBT corrections.**

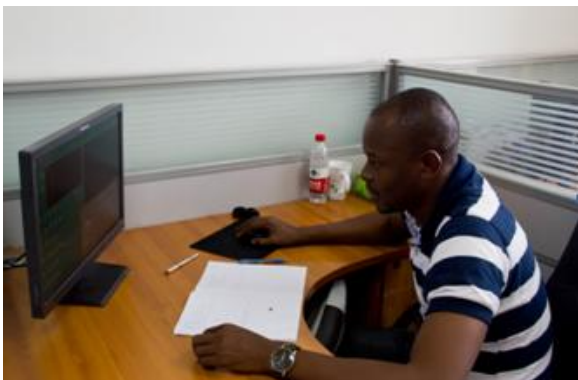
Thailand-China Cooperative Research Project

- ◆ **Project Title: Development of Seasonal Climate Forecast System in Thailand Using IAP-DCP Model; funded by Thailand Research Fund (TRF)**
- ◆ **Progress meeting of this project was held on October 19, 2014 at ICCES. The meeting scheduled the details of the research work plan of the second year of this project. Thai research team will continue conducting the experimental seasonal climate prediction in Thailand using the IAP-DCP model, in order to enhance the capability for flood/drought predictions in regional scale.**



International Students

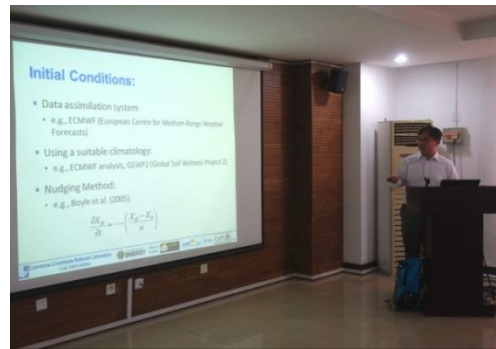
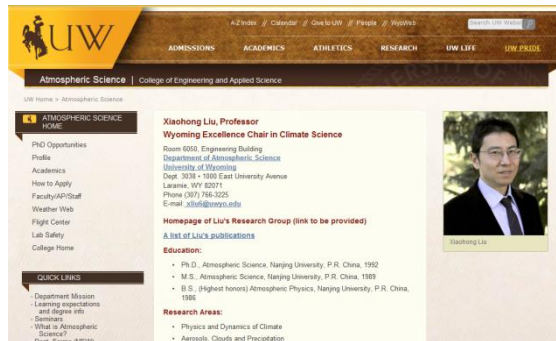
- ◆ In 2014, 2 CAS-TWAS President's Fellowship awardees, Mr. Victor Nnamdi Dike from Nigeria and Mr. Kritanai Torsri from Thailand, started their PhD program at ICCES.
- ◆ 2 candidates applying for the CAS President's International Fellowship Initiative (PIFI) through the recommendation of ICCES won the support of The CAS President's International Fellowship for Postdoctoral Researchers. They are Dr. Worachat Wannawong from Hydro and Agro Information Institute (HAI), Thailand and Dr. Bushra Khalid from COMSATS Institute of Information Technology (CIIT), Pakistan and they will start their postdoc program at ICCES in 2015.



link: http://english.cas.cn/cooperation/fellowships/201503/t20150313_145274.shtml

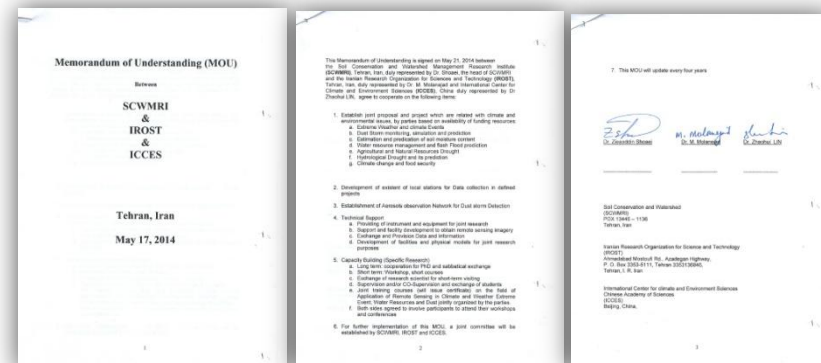
Visiting Scholars

In 2014, ICCES invited more than 10 visiting scholars from institutes and universities of different countries, including leading scientists, senior researchers, PhD students and postdoc fellows from Nepal, the United States, Italy etc. These scholars all expressed their gratitude for the essential skills and experiences learnt in ICCES and strongly expressed their desire of further collaboration with ICCES in the future.



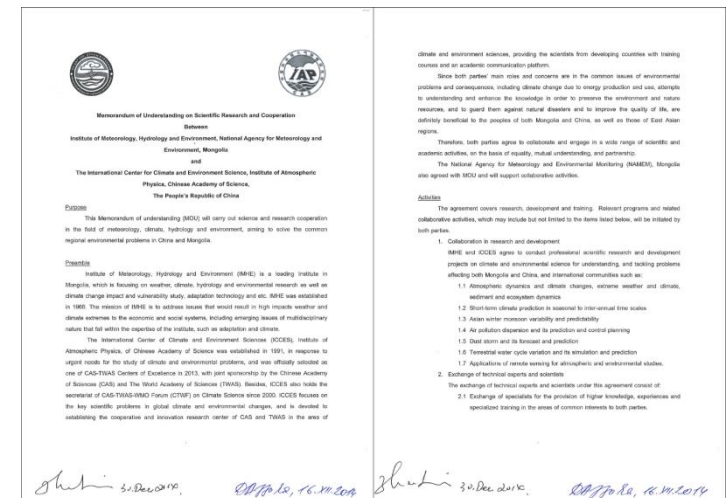
IROST, SCWMRI, IMO - IRAN

Prof. Zhaohui Lin, director of ICCES visited Iranian Research Organization for Science & Technology (IROST), Soil Conservation and Watershed Management Research Institute (SCWMRI), and Iran Meteorological Organization in May 2014, and signed MOU regarding the scientific cooperation between ICCES and Iran institutes. Collaboration will be oriented by dust storm research, approaches include joint research projects, short-term visiting etc..



IMHE - MONGOLIA

In October 2013, Prof. Cholaw Bueh, deputy director of ICCES and Dr. Chenglai Wu visited the Institute of Meteorology, Hydrology and Environment (IMHE), Mongolia, getting a better understanding about the environmental research progresses, especially on sand and dust storms achieved by the Mongolian institutes. In 2014, ICCES fostered the cooperation with IMHE and signed MOU with IMHE regarding the collaboration in collaborative research and development, and the exchange of technical experts and scientists.

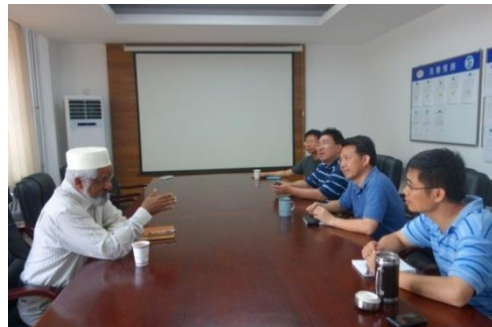


Mongolian scientists participates in ICCES conferences

MOU

SUDAN

- ◆ August 27, 2014, Prof. Hussein Sherief, director of Institute of Advanced Computing visited ICCES, and discussed with ICCES scientists on the further cooperation plan.
- ◆ ICCES will assist Sudan Meteorological Agency with building the prediction system of the EL-Nino type extreme weather for the Greater Horn of Africa Region (Sudan, Ethiopia, Kenya, Eritrea, Uganda, Burundi, Tanzania, Somalia, Djibouti) in the coming 3 years. A delegation representing the Governors of a couple of Nigerian States and Sudan will be formed and will directly experience the capabilities of ICCES, IAP (CAS) in 2015.



Future plan



■ ESM development:

- ✓ Release the first version of CAS Earth System Model by the end of 2015

■ Climate and Environment Prediction:

- ✓ Upgrade the IAP seasonal climate prediction system using climate component of CAS Earth System Model, and apply in the real-time prediction in 2015

■ International Collaborations:

- ✓ International conferences: CTWF international conference & ICCES training workshop
- ✓ Joint research project: Seeking funding from the agreement between Chinese NSFC & Thailand TRF
- ✓ Hosting short-term visits for young/senior scientists from developing countries through CAS PIFI program
- ✓ Supervise foreign students pursuing PhD degrees and post-doc programs

THANK YOU !

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