



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

(2015.5-2016.4)

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.

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

I. ICCES Overview – Ongoing Projects

Currently, there are **55 on-going projects undertaken by ICCES. Among these projects,**

- 16 are funded by Ministry of Science and Technology (MOST) of China or Ministry of Finance (MOF) of China;
- 28 are funded by National Natural Science Funds of China (NSFC);
- 7 are funded by Chinese Academy of Sciences (CAS);
- 4 are respectively sponsored by National Marine Environmental Forecasting Center, provincial level government and other organizations.

I. ICCES Overview - Awards & Honors

- ◆ Dr. Xiangjun Tian won the **China Surveying and Mapping Geographic Information Society Science and Technology Award**.
- ◆ Dr. Fei Zheng was awarded a second class prize for the **Military Science and Technology Progress Award**.
- ◆ Dr. Fei Zheng was selected as member of excellence of **Youth Innovation Promotion Association, CAS**.
- ◆ Mr. Xianghui Fang was selected as **merit student of University of Chinese Academy of Sciences** and obtained **National Scholarship for Doctoral Students**.

II. Major Research Progress

Research Focus

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

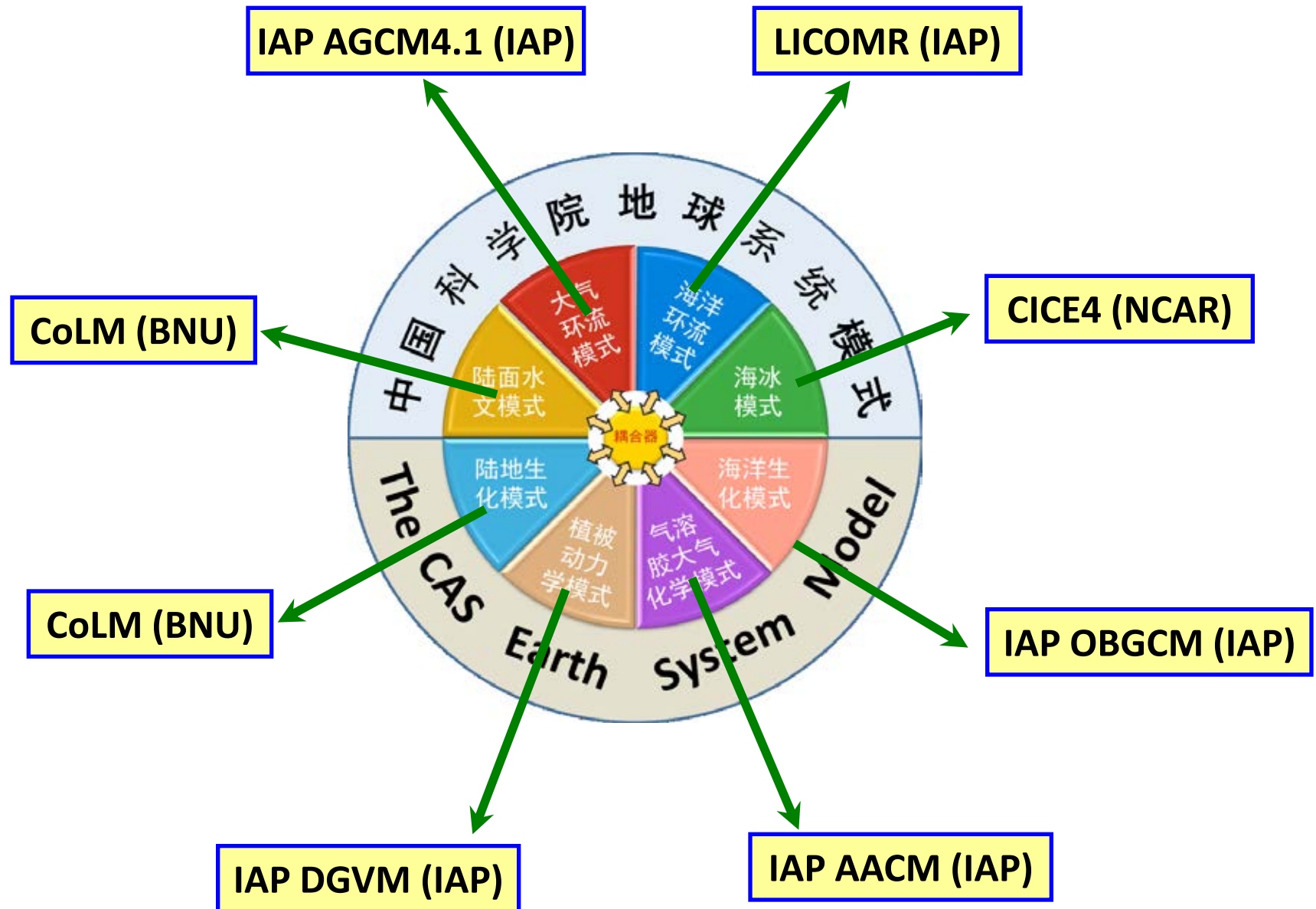
CAS-ESM1.0 Published in Beijing, September 23, 2015



CAS-ESM is the first Earth System Model of Independent Intellectual Property Rights in China.



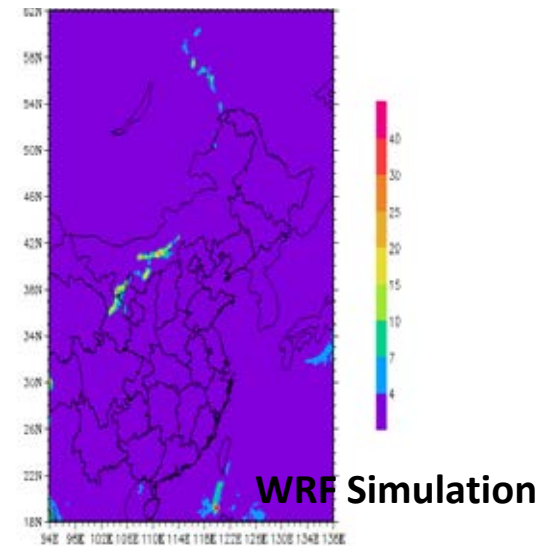
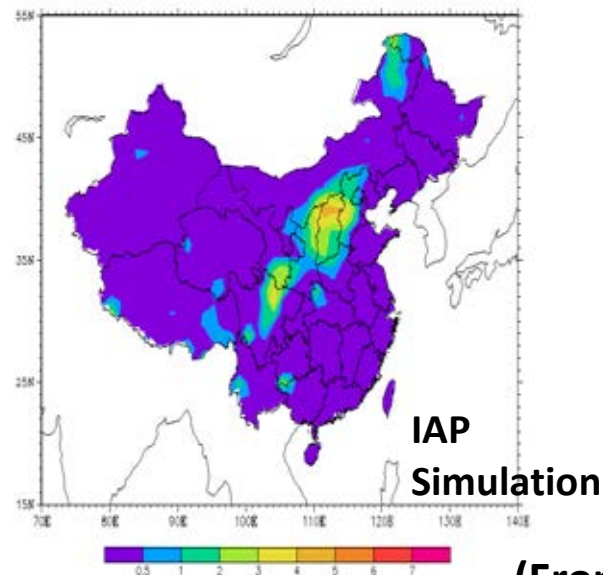
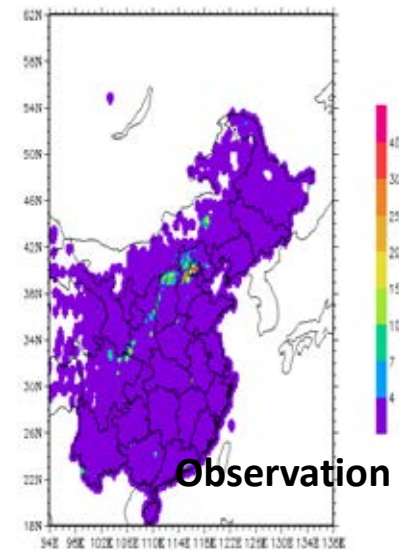
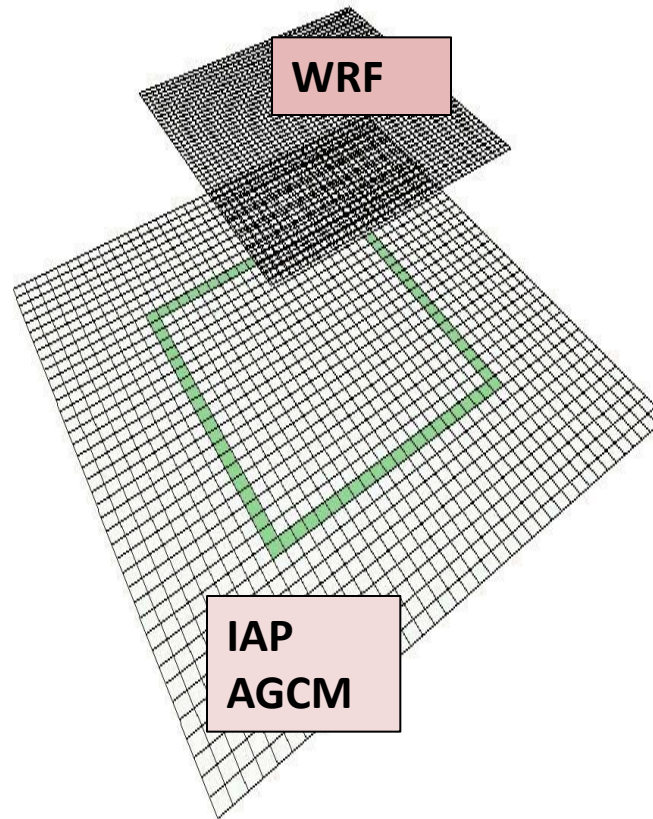
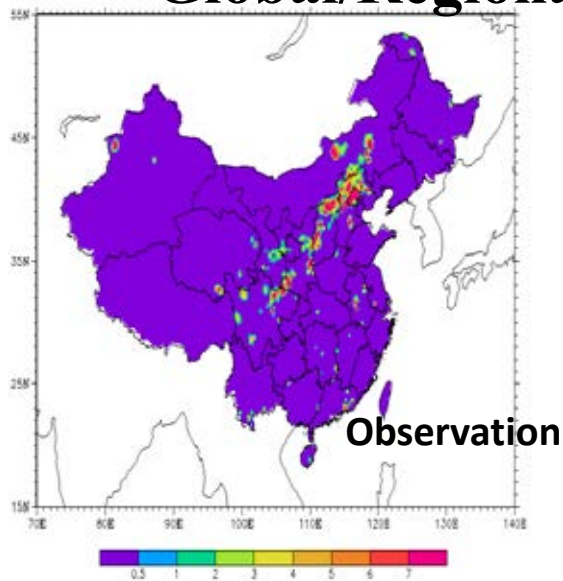
Components of CAS-ESM



Simulation of Beijing Rainstorm(July 21,2012) by CAS-ESM

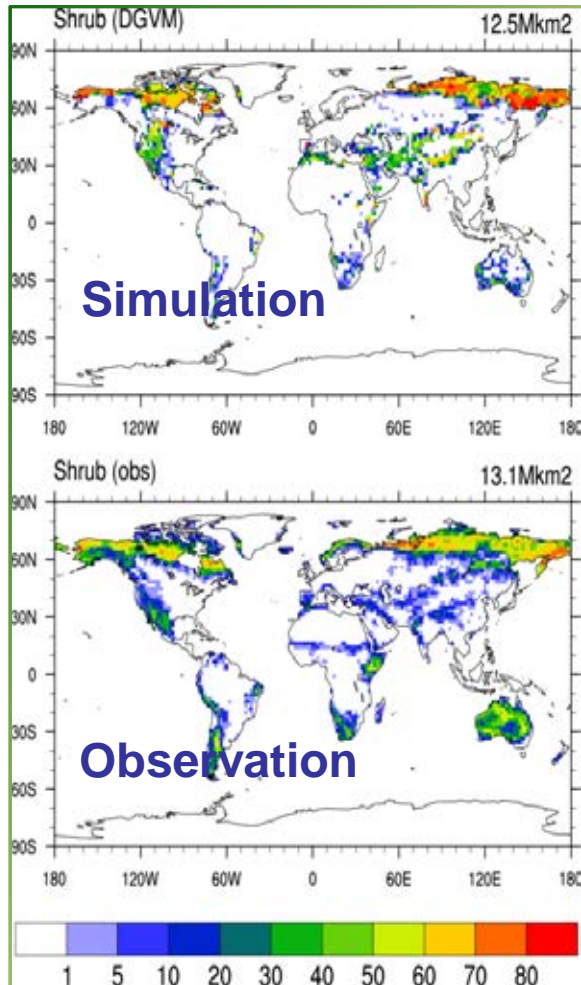


-----Global/Regional Nest Pattern



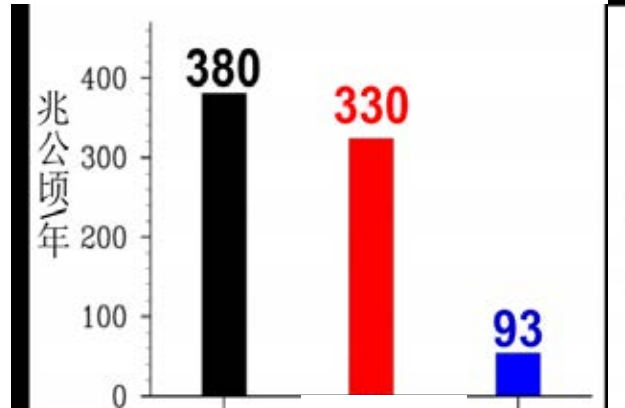
(From Juanxiong He, Xinxin Zhang, Xunqiang Bi, Jianhua Sun 2015)

CAS-ESM Dynamic Vegetation Model IAP DGVM



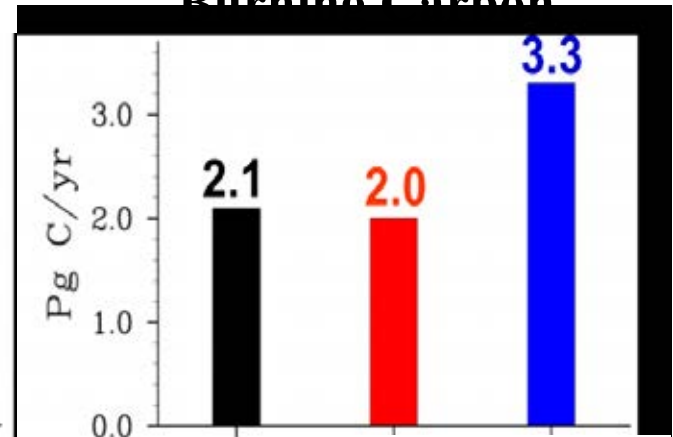
Simulation of Global Shrub Distribution by IAP Shrub Forest Model (Zeng et al., 2010, 2014)

Global Burning Area



Observation IAP方案 NCAR方案

Total Emission of Burning Carbon

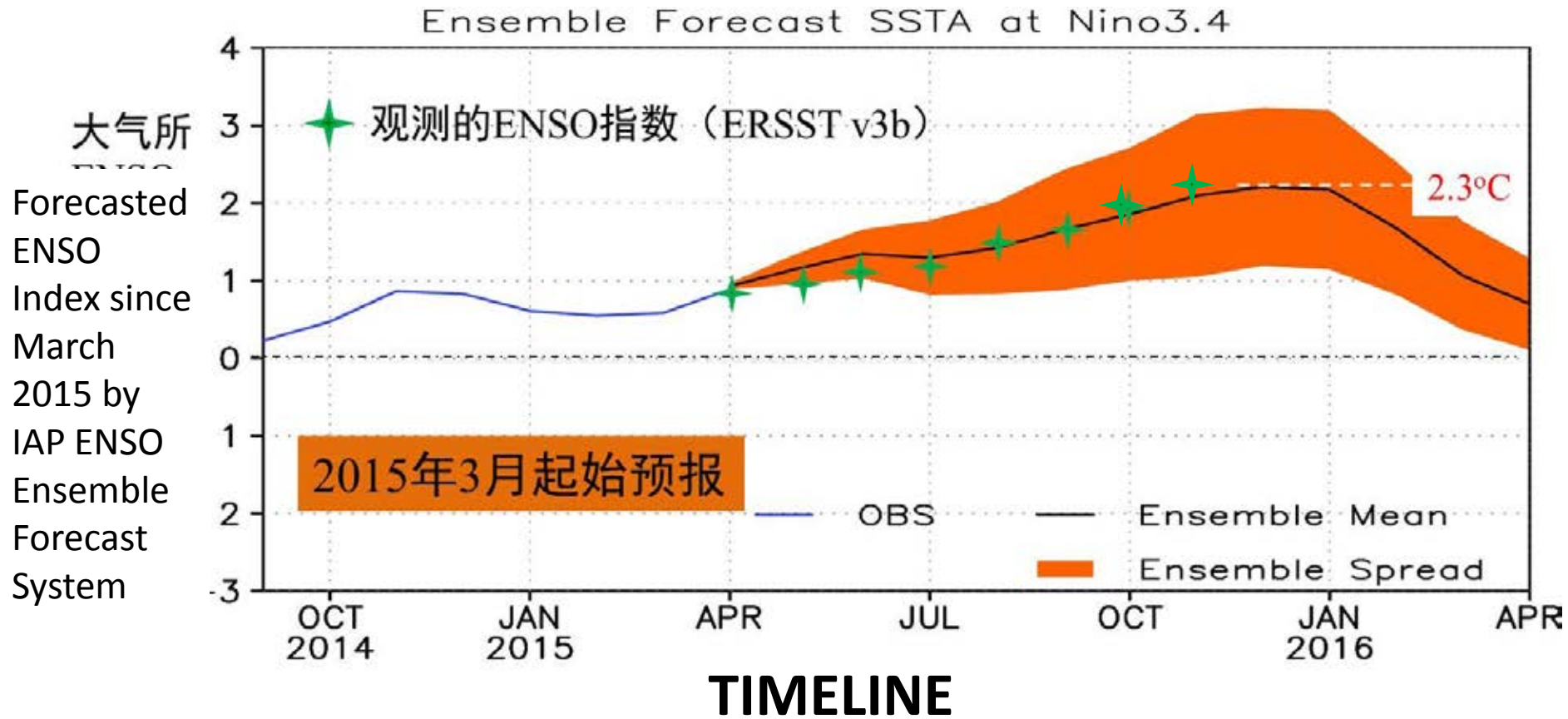


观测 IAP方案 NCAR方案

(Li et al., 2012)

IAP Shrub Forest Model and Fire model are respectively adopted by CLM4 and CLM4.5 of Community Land Model of National Center for Atmospheric Research, USA.

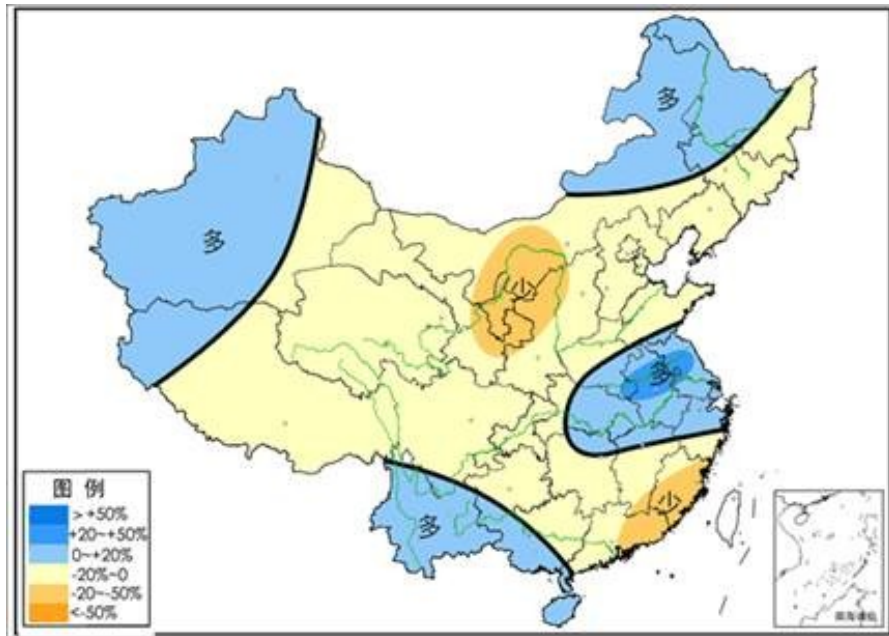
Successfully predict the onset, development and magnitude of 2015 super El Niño event 9 months ahead of time



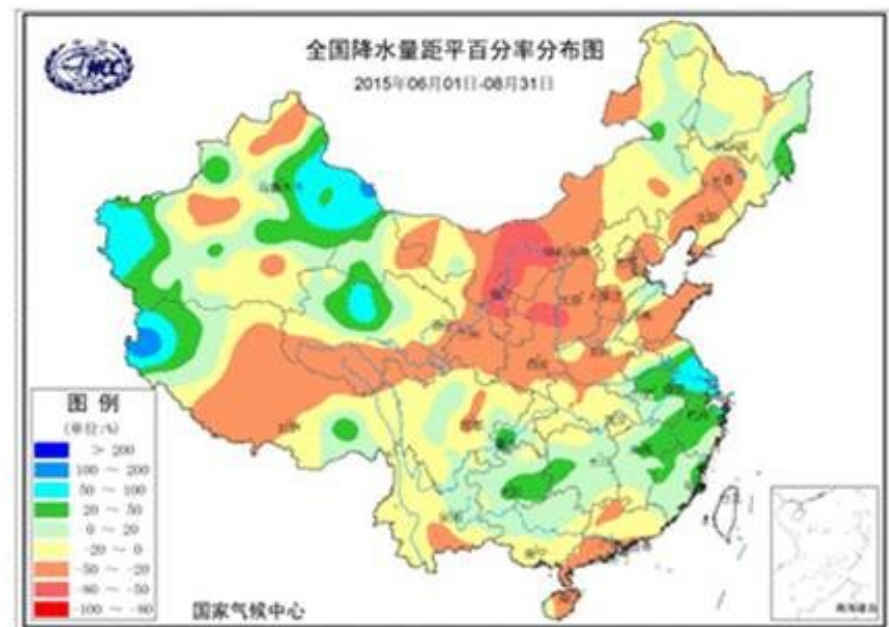
Successfully Predict the summer rainfall anomalies over China



2015 Summer Rainfall **Prediction**



2015 Summer Rainfall **Verification**



- Predictions of flood season climate by IAP are reported to the general office of central government and **obtained important instructions from state leaders** in March, 2015.
- IAP **ranks second** among 10 predictors for National Climate Center

Research Outcome Distribution

- Series of News Letter of Climate Prediction



III. International Cooperation

◆ International Conference

- ◆ The 14th CAS-TWAS-WMO Forum
- ◆ CAS-CSIRO Workshop on Climate Change and Impact
- ◆ International Symposium on Impacts of Extreme Atmospheric Events
- ◆ WCRP CORDEX Science and Training Workshop in East Asia
- ◆ International Symposium on Tropical Meteorology and Marine Science and Technology

◆ International programs

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

◆ Capacity Building Activities

- ◆ International Students
- ◆ Visiting Scholar Programs

14th CAS-TWAS-WMO Forum

- ◆ The 14th CAS-TWAS-WMO Forum, the International symposium on “Coupled Data Assimilation” was held during July 5-8 in Beijing, China.
- ◆ The 14th CAS-TWAS-WMO Forum is organized by ICCES and IAP, and sponsored by CAS, TWAS, WMO and Peking University.
- ◆ 37 researchers presented their research results on the following topics: data assimilation for coupled systems that may include interactions among atmosphere, land, water, chemistry, biosphere, and human dimensions; data assimilation that couples different temporal and/or spatial scales; data assimilation that couples and/or hybridizes different data assimilation methods. Around 120 researchers from 10 countries attended the 14th CTWF.



CAS-CSIRO Workshop on Climate Change and Impact

- ◆ The CAS-CSIRO Workshop on climate change and impact was held on June, 22-24, 2015 in Beijing.
- ◆ **20** scientists from CSIRO and Chinese Academy of Sciences (including Institute of Atmospheric Physics, Institute of Remote Sensing and Digital Earth, Institute of Geographic Sciences and Natural Resources Research, South China Sea Institute of Oceanology, Institute of Policy and Management, and the Bureau of International Cooperation) attended the workshop



International Symposium on Impacts of Extreme Atmospheric Events



- The International Symposium on ‘Impacts of Extreme Atmospheric Events on Geo-Surface in a Changing Climate’ was successfully held on 14-15 May 2015, in Colombo, Sri Lanka.
- The event was jointly organized by COMSATS, International Center for Climate and Environment Sciences (ICCES), the Industrial Technology Institute (ITI), Sri Lanka. About **60** participants attended the symposium.
- The key objective of the event was to provide a forum for the exchange of knowledge on natural disasters and mechanisms of extreme atmospheric events; sharing of skills and know-how for prediction of such events and preparedness for future environmental calamities; and encouraging the participants to initiate collaborative research projects related to the prediction of extreme atmospheric events.

WCRP CORDEX Science and Training Workshop in East Asia



- “The 4th WCRP CORDEX Science and Training Workshop in East Asia” was held in 23-26 November 2015, Beijing.



- This workshop is jointly supported by WCRP (World Climate Research Programme), ICCER, APN (Asia-Pacific Network for Global Change Research), RIMES (Regional Integrated Multi-hazard Early warning System) and Monsoon Asia Integrated Regional Study (MAIRS).

More than **50** students and young scientists from East and Southeast Asia region, including **Mongolia, China, Thailand, Pakistan, Malaysia, Indonesia, Vietnam, Myanmar, Sri Lanka**, took part in the training part.


 The 4th WCRP CORDEX Science and Training Workshop in East Asia
 23-26 Nov 2015, ICCER International Conference Center, Beijing, China



International Symposium on Tropical Meteorology and Marine Science and Technology



- International Symposium on Tropical Meteorology and Marine Science and Technology was successfully held on 7-9 April 2016, in Guangzhou, China.
- This conference covers 3 sessions for discussing: Extreme weather event monitoring and prediction; Tropical Marine disaster monitoring, forecasting and application of satellite data; Monsoon variation, climate prediction and services. About **180** participants coming from southeast Asia, tropical Pacific and Indian Ocean attended the symposium.
- CAS Academician **Prof. Qingcun Zeng** is the president of the scientific committee; **Prof. Jiang Zhu** and **Prof. Zhaohui Lin** are convenors for parallel session II and session III. Mr. **Ali Baqadar Shah** and **Alam Zeb** from **PMD, Pakistan** also attended the meeting and present their talks respectively.

International Symposium on Tropical Meteorology and Marine Science and Technology



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)**
- ◆ Researchers from ICCES and KMUTT has successfully installed the IAP climate forecast system on the super computing system in KMUTT, and accomplished debugging of the whole system. Meanwhile, ICCES also trained Thai researchers in running and maintaining the systems. The project has passed examination by Thailand.



International Students

- ◆ Kritanai Torsri (Thailand), Victor Nnamdi Dike (Nigeria) and Sherly Selton (Sri Lanka) continue their PhD program in ICCES.
- ◆ Two young scientists, Bushra Khalid from COMSATS Institute of Information Technology (CIIT), Pakistan and Worachat Wannawong from Hydro and Agro Information Institute (HAI), Thailand, joined ICCES this year.
- ◆ Dr. Bushra Khalid won the **Gro Brundtland Award** February 26, 2016.

Dr. Worachat Wannawong	Study of the regional operating model with a Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System
Dr. Bushra Khalid	Model the spatial and temporal variations of physical environment that are mainly responsible to cause the outbreak of dengue fever.
KRITANAI TORSRI	To develop a seasonal rainfall forecasting system using a dynamical model for Thailand
DIKE VICTOR NNAMDI	Analytical and Simulation Studies of Extreme Weather & Climate Events over West Africa



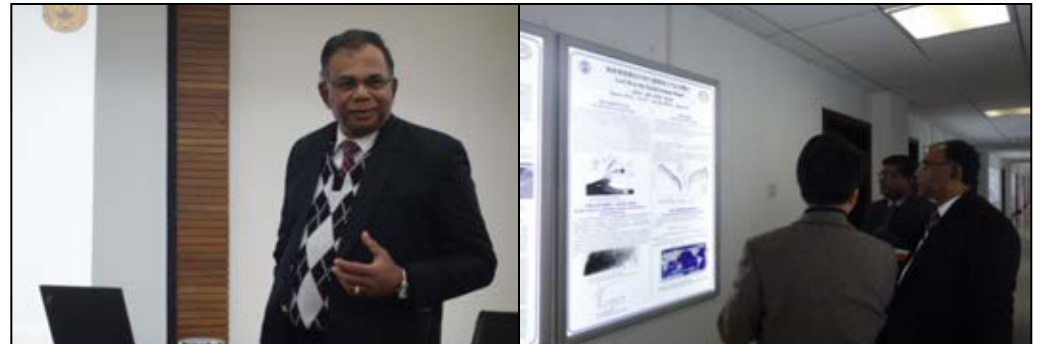
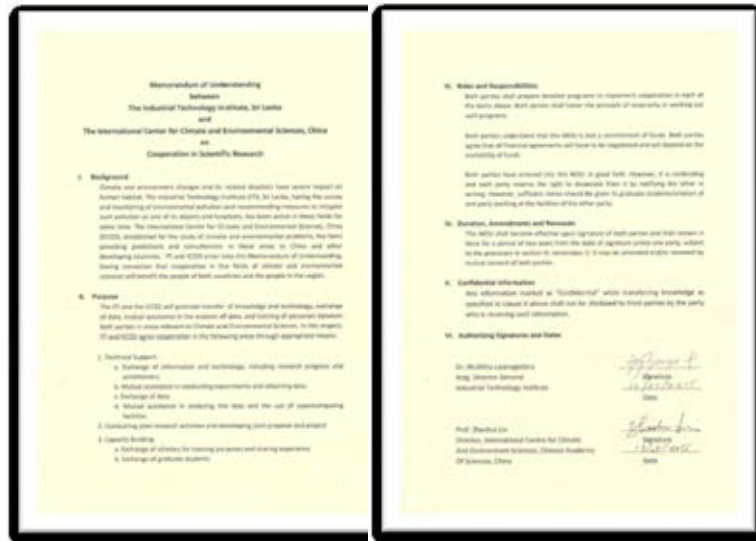
Visiting Scholars

- In 2015, ICCES invited **7** visiting scholars from institutes and universities of different countries, including leading scientists, senior researchers, PhD students and postdoc fellows from **Thailand, the United States, UK** 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.
- Dr. **Chakrit Chotamonsak** from Chiang Mai University visited ICCES from November to December, 2015.



SRI LANKA

- During the visit of Prof. Zhaohui Lin to Industrial Technology Institute (ITI) of Sri Lanka in 2015, the collaborative MOU was signed regarding the scientific cooperation between ICCES and ITI.
- Prof. Gamini Senanayake, vice Chancellor of University of Ruhuna (UoR), Sri Lanka, and Tilak Priyadarshana, Professor of UoR and director of center for international affairs, visited ICCES in 2015.



Future plan



■ International Cooperation

The overall objective of ICCES in 2016 is to further expand the international collaboration network among the developing countries sit nearby the **"Silk Road Economic Belt"** and **"21st Century Maritime Silk Road"**

■ International Conferences:

- 15th CTWF Forum on Atmospheric Aerosol (also known as the AeroCom and AeroSAT Workshops) along with AeroCom and AeroSAT in September, 2016.
- “International Symposium of Meteorological and Marine Service on Maritime Silk Road” and “2nd Symposium on Meteorological Science and Technology in Central Asia”
- Joint workshop on climate sciences will be held on Thailand in collaboration with JGSEE

International Cooperation

ICCES will act in close coordination with CAS and IAP in an effort to build a coordinated observing research network over “Belt & Road” region, play an active and important role in the eco-system test and management research project for the arid zone in **Central Asia** to cope with climate change.

- Work together with other institutions to apply for international collaboration research projects;
- Conduct joint observation and research on climate and environment;
- Move ahead with climate and environment forecast system and services.

International Cooperation

“One Belt & One Road” Initiative



15th CTWF Forum on Atmospheric Aerosol



- Theme: Atmospheric Aerosol
- Date: September 19-27, 2016
- Venue: Beijing Foreign Experts Building, **Beijing, China.**
- 2016 CTWF international conference is jointly organized by **ICCES, AeroCom and AERO-SAT.**
- Scientific Committee:

Mian Chin (NASA
GSFC)

Stefan Kinne (MPI
Meteorology)

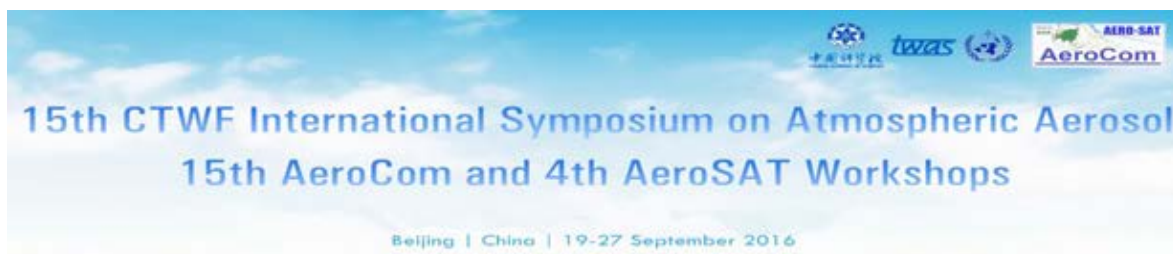
Xiaohong Liu (Univ.
Wyoming)

Michael Schulz
(Norwegian Meteo.
Institute)

Ralph Kahn
(NASA GSFC)

Zhaohui Lin
(IAP/CAS)

Thomas Popp (German
Aerospace Center)



Link to the website: <http://2016ctwf.csp.escience.cn>

Future plan



■ Capacity Building:

- Invite young scientists and senior researchers from collaborative institutes to join short-term visiting programs
 - ✓ Thailand: Chiang Mai University, HAI
 - ✓ Nigeria
 - ✓ Brazil
 - ✓ ...
- Organizing training workshop on atmospheric aerosols
- PIFI Program for PhD students:
 - ✓ 4 applicants, 3 from Pakistan, 1 from Iran
 - ✓ 1 from Pakistan has been granted for the PIFI fellowship

THANK YOU !

Prof. Dr. Zhaohui Lin

Director of ICCES

Email: lzh@mail.iap.ac.cn

<http://www.icces.ac.cn>

