

Air-Sea-Land Interaction Programs in China and a Proposal of 'AMY08' cooperation

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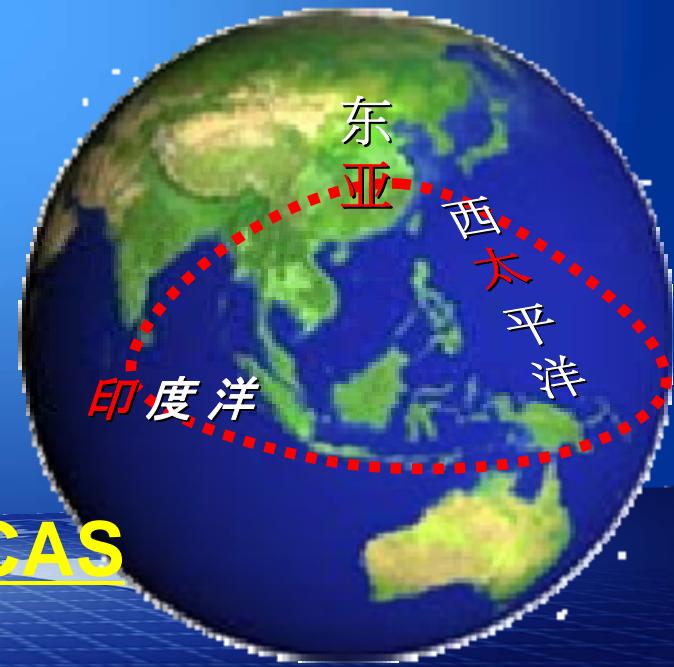
National Climate Center, CMA

On behalf of Prof. Guoxiong Wu, Chief
Scientist of China 973 AIPO program

The National Basic Research Program of China

Ocean-Atmosphere Interaction over
the Joining Area of Asia and Indian-Pacific
Ocean (AIPO) and Its Impact on the Short-
Term Climate Variation in China

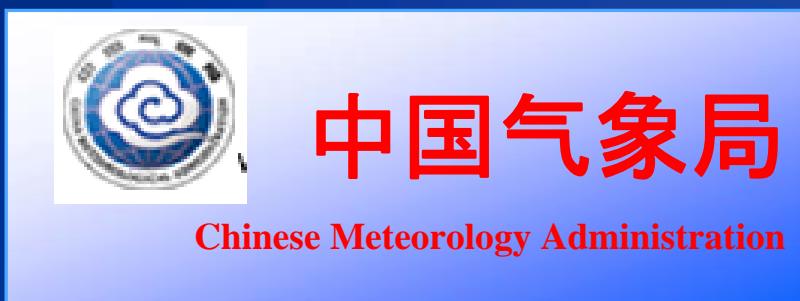
- Period: 2006.09- 2011.09
- Supported by Ministry of
Science and Technology of
China (MOST)
- Adhesive Unit: Institute of
Atmospheric Physics (IAP), CAS



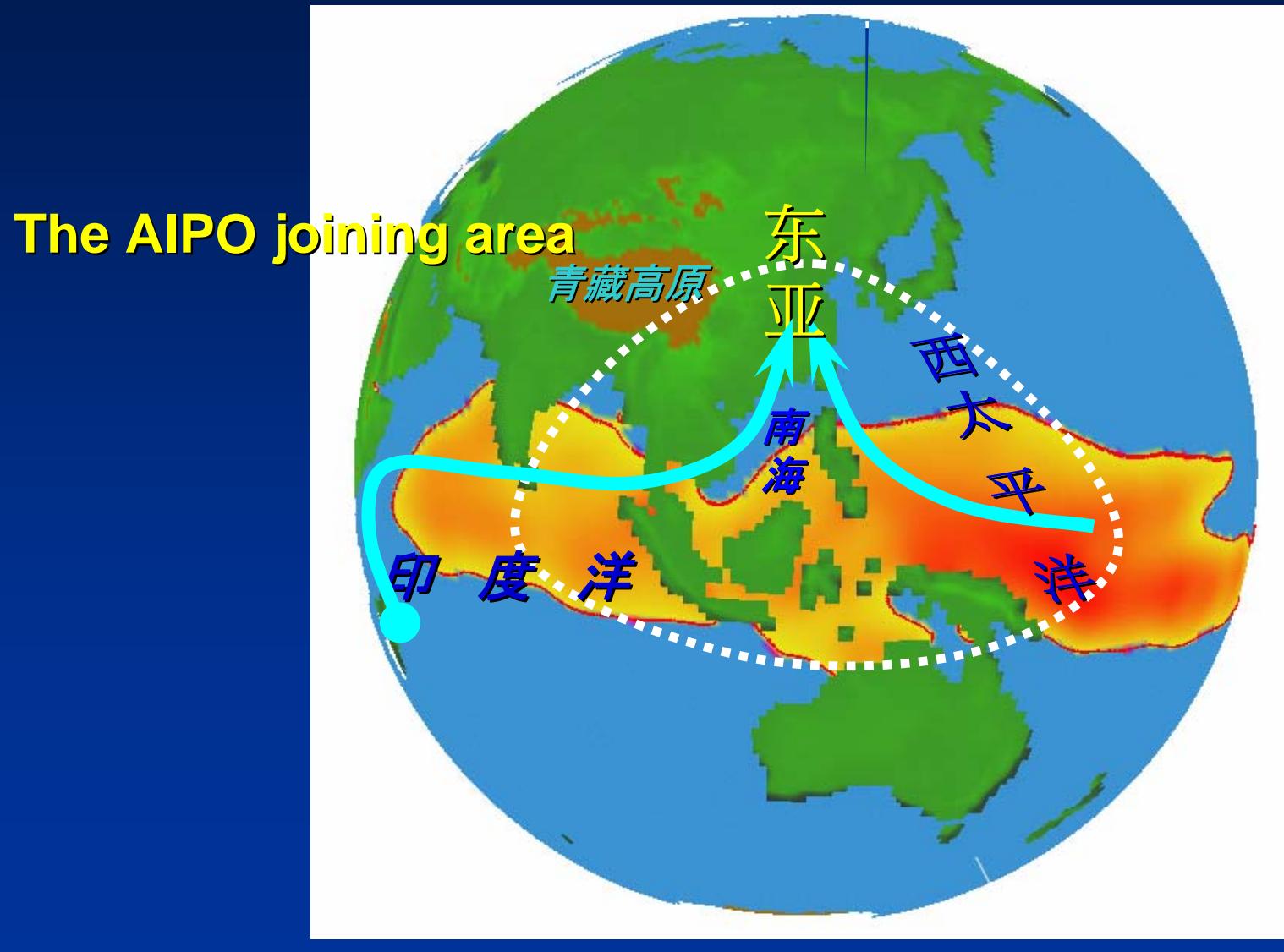
RECOMMENDED BY:



国家自然科学基金
委员会
National Natural Science Foundation
of China

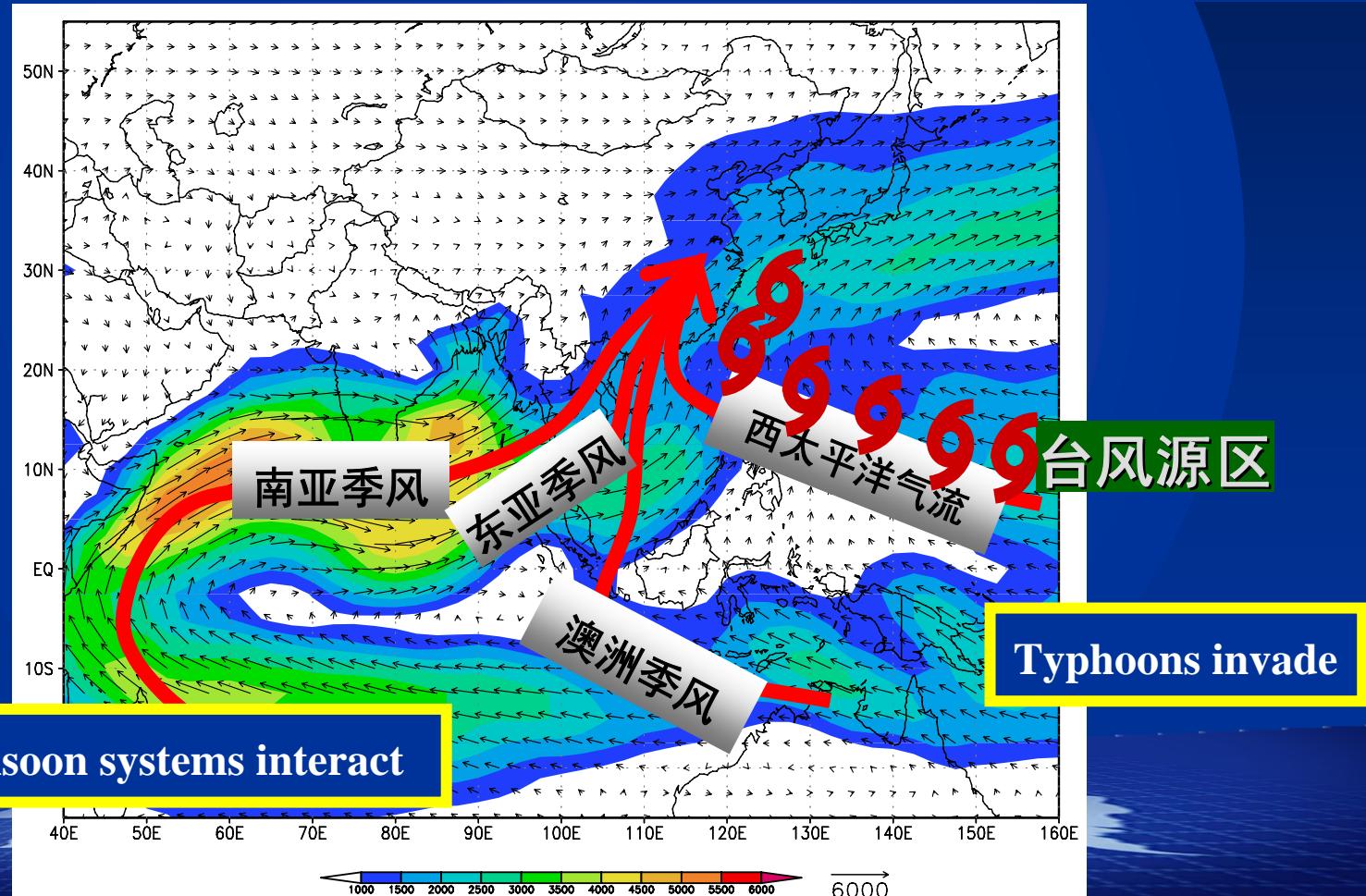


1. 这里有世界上范围最大、海表温度最高的大“暖池”，是全球热带对流最强、水汽含量最多的区域



南亚季风、澳洲季风和东亚季风等三大季风系统在此交辉跌宕，
水汽输送经此交汇后流向亚洲大陆，调控着中国的旱涝灾害。
该区域还是台风源地。

**“亚印太交汇区”海陆气相互作用复杂，
与我国气候变化密切相关**



2. KEY SCIENTIFIC ISSUES

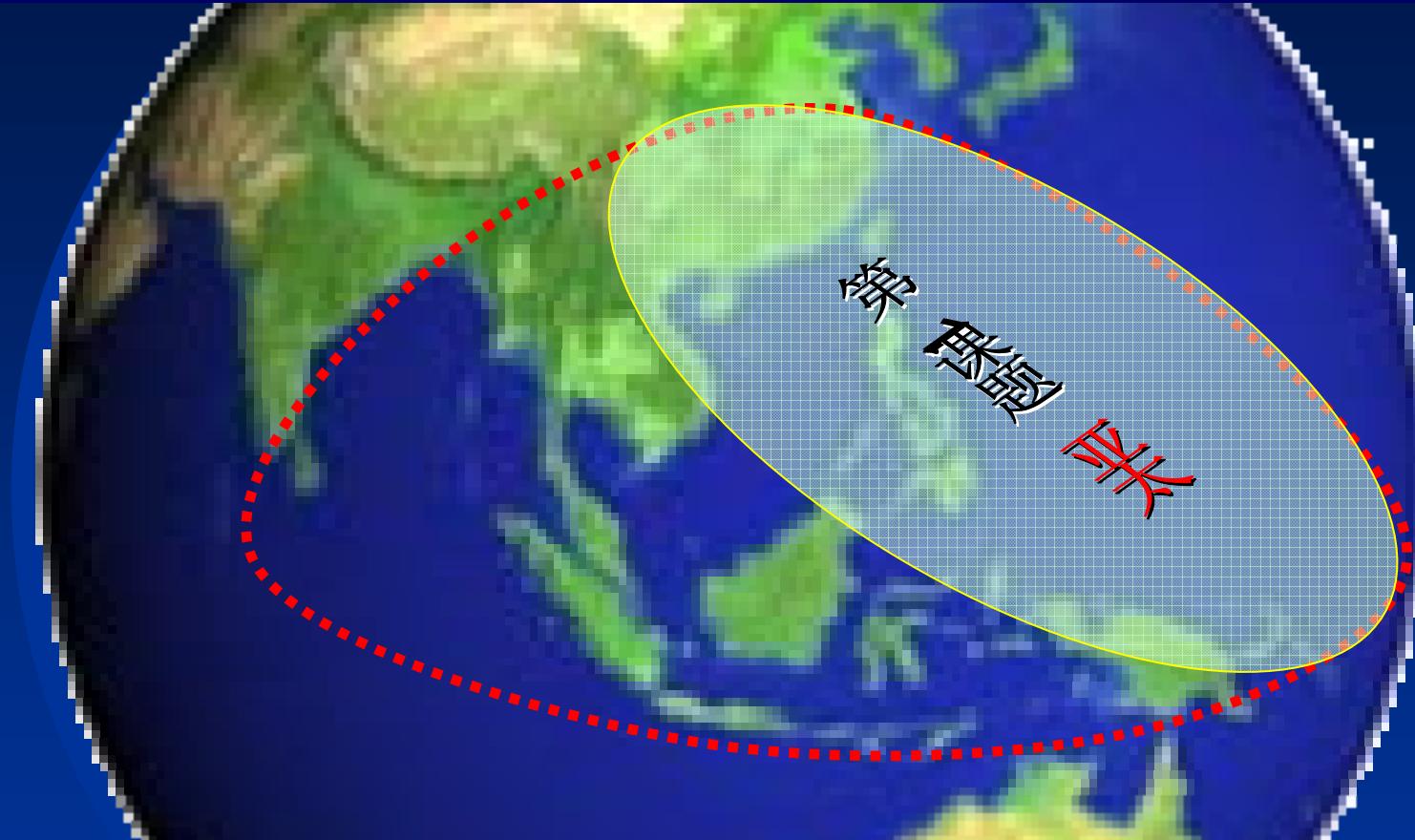
The theme of the program is to identify the characteristics, patterns, and causes of air-sea interactions over the AIPO joining area and the intrinsic mechanisms of their impacts on the short-term climate anomalies over China.



3. SUBPROJECTS

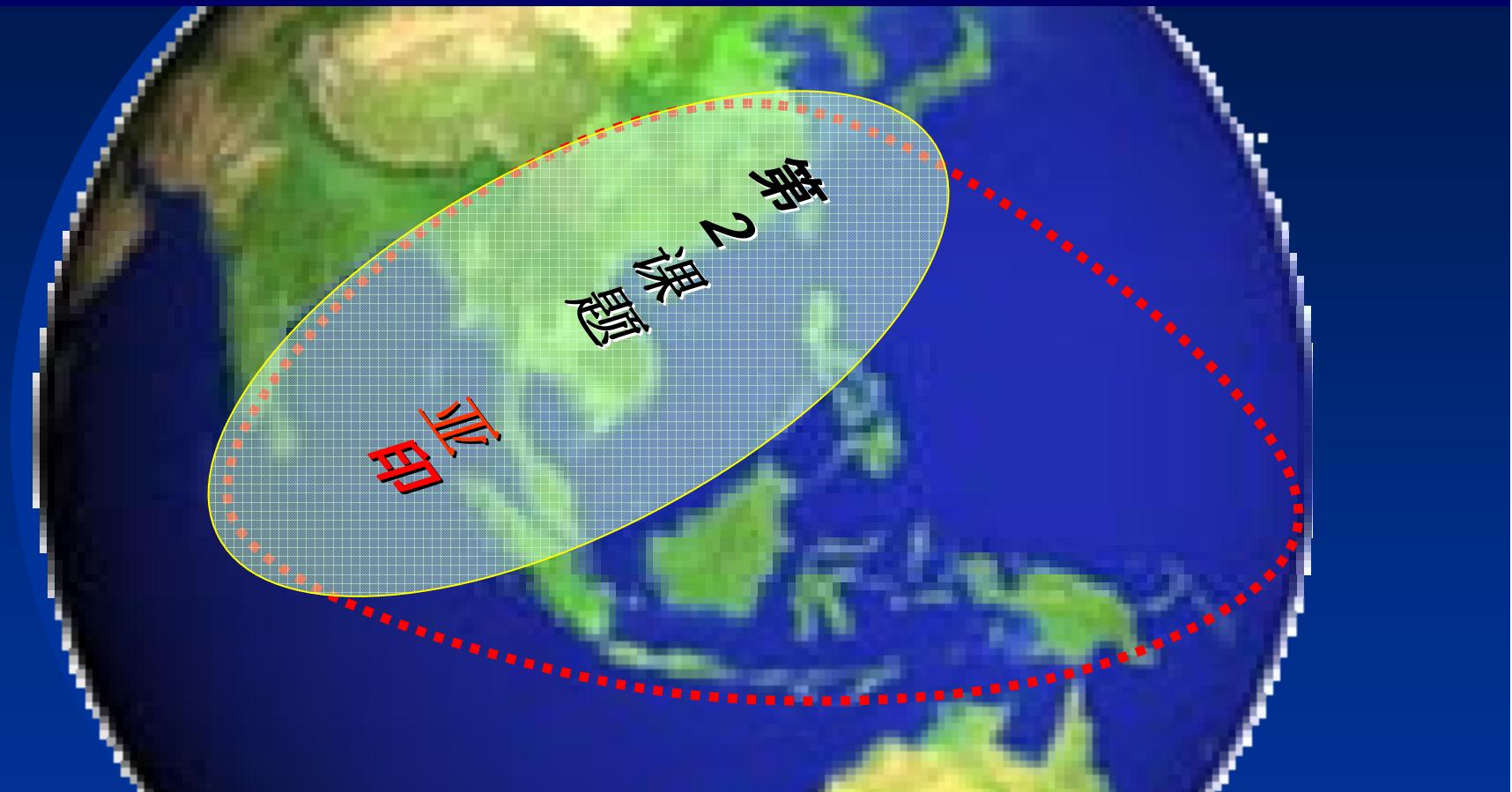
- 1 Western Pacific gyre interaction between tropics and subtropics and its relationship with the western Pacific anticyclone
- 2 Air-sea interaction over the Indian Ocean and its impacts on the Asian monsoon
- 3 Air-sea coupling process over Western Pacific-Eastern Indian Ocean warm pool and its impacts on the climate over China
- 4 Water cycle over Asian Monsoon Area
- 5 Development and improvement of CGCM
- 6 Ocean data assimilation and East Asia climate predictability
- 7 Modulation of air-sea interaction by land-sea thermal contrast

1st subproject: Western Pacific gyre interaction between tropics and subtropics and its relationship with the western Pacific anticyclone



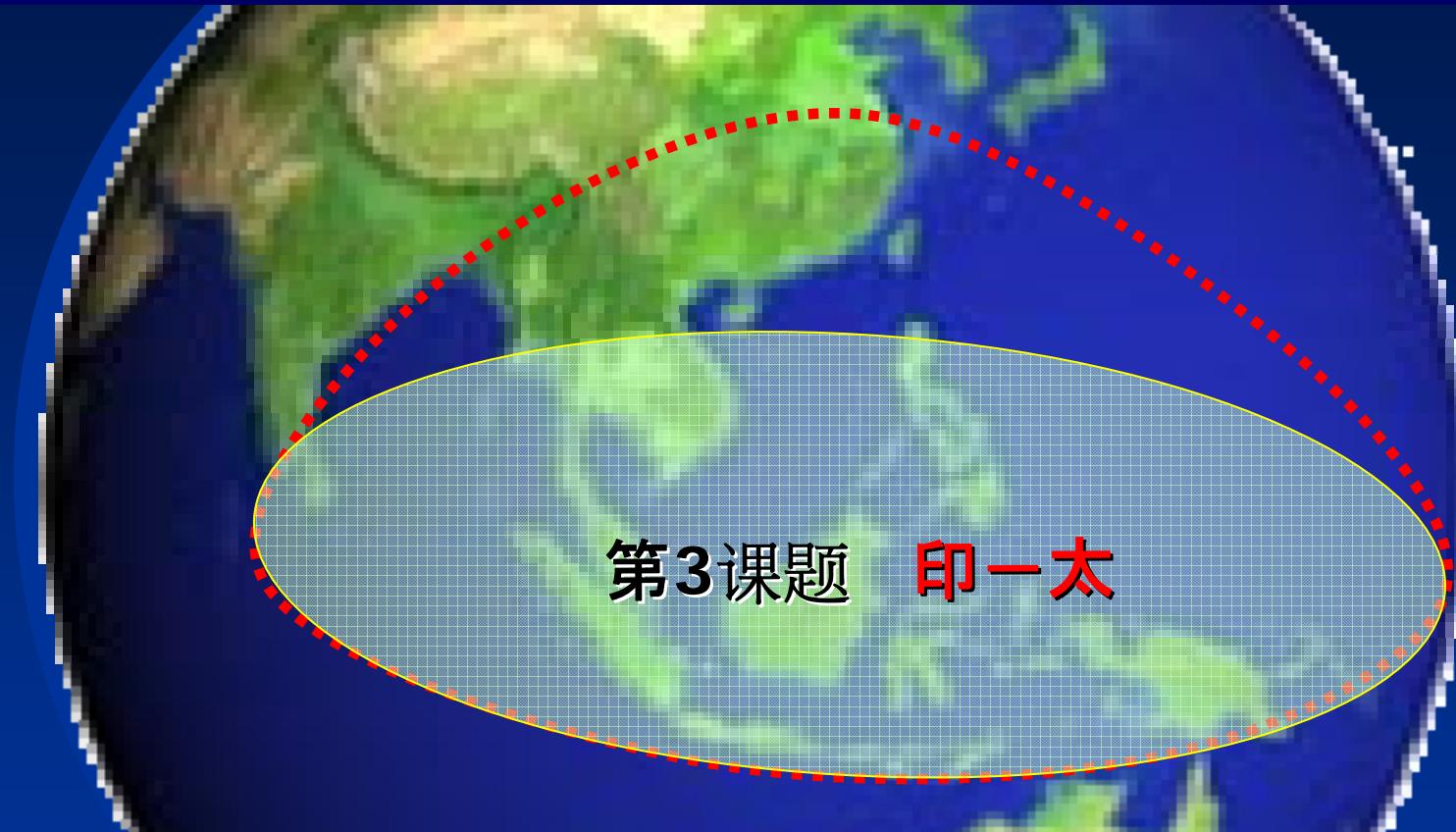
研究西太平洋，特别是黑潮的热量经向分配过程，太平洋热带-副热带流涡与副热带高压的相互作用，以及海气耦合对台风强度、频数和路径的年际变率的影响。

2nd subproject: Air-sea interaction over the Indian Ocean and its impacts on the Asian monsoon



研究印度洋海气相互作用对亚洲季风及其准两年变化的影响，
青藏高原与印度洋热力差异对东亚季风的影响

3rd subproject: Air-sea coupling process over Western Pacific-Eastern Indian Ocean warm pool and its impacts on the climate over China



研究暖池演变过程、特征与年际气候异常的关系，印度洋纬向模和ENSO的耦合，以及季节内振荡（ISO）对我国气候的影响及其机理。

4th subproject: Water cycle over the AIPO Area



5th subproject: Development and improvement of OGCM

评估现有耦合气候模式的基础上，探索新一代大洋环流模式发展的途径，
提高耦合模式在“亚印太交匯区”的模
拟能力，并为本项目研究提供数值试
验平台。



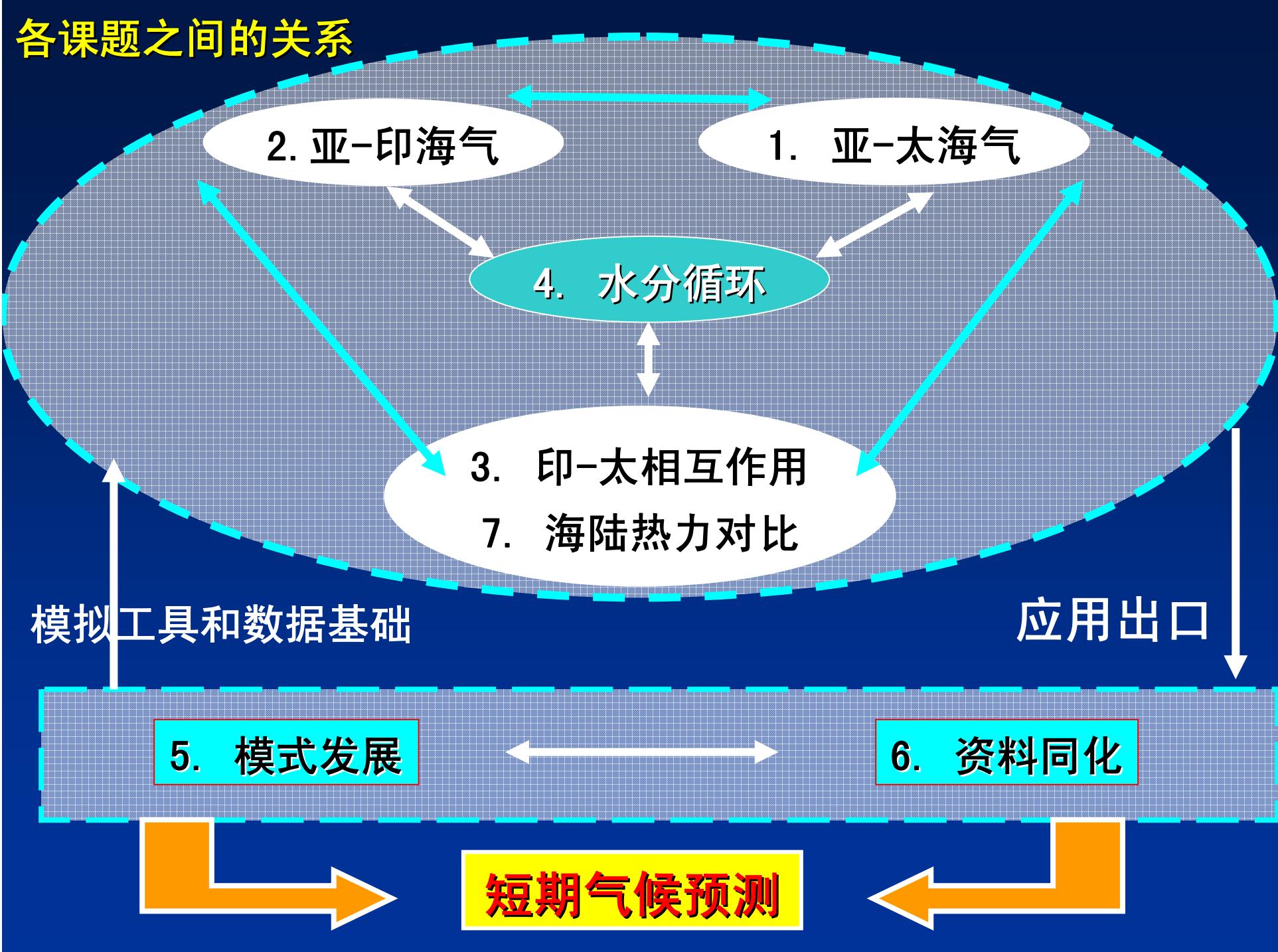
6th subproject: Ocean data assimilation and East Asia climate predictability

发展一个高分辨率的“亚印太交汇区”海洋资料变分同化系统，建成一套高质量的“亚印太交汇区”海洋再分析资料，为国内外相关研究和业务部门提供数据基础。探索改进ENSO和季风预报的新途径。

7th subproject: Modulation of air-sea interaction by land-sea thermal contrast

揭示亚洲大陆—印度洋—澳大利亚海陆热力差异变化对印度洋海气相互作用的调控过程与相关机制；亚洲大陆—西太平洋海陆热力差异变化对西太平洋海气相互作用的调控过程与相关机制。





Project Budget

科 目	金额（万元）
人员费	195
设备费	900
管理费	190
国际合作交流费	300
课题其它相关费	2215
合 计	3800
Approval	3500

CAS Program

This year Chinese Academy of Science will organize another program which is mainly GEWEX oriented. Its research will focus on the water and energy cycle in Asia as well as the interaction between monsoon and aerosol and their impacts on the Asian Monsoon variability.



Proposal

❖ Asian Monsoon Year in 2008 --AMY08

- ❖ China- 973AIPO
- ❖ India- CTCZ
- ❖ Japan- MAHASRI
- ❖ Australia
- ❖ AAMP/CLIVAR
- ❖ South Korea-I.S.Kang

Supplementary observation experiments

科学1号



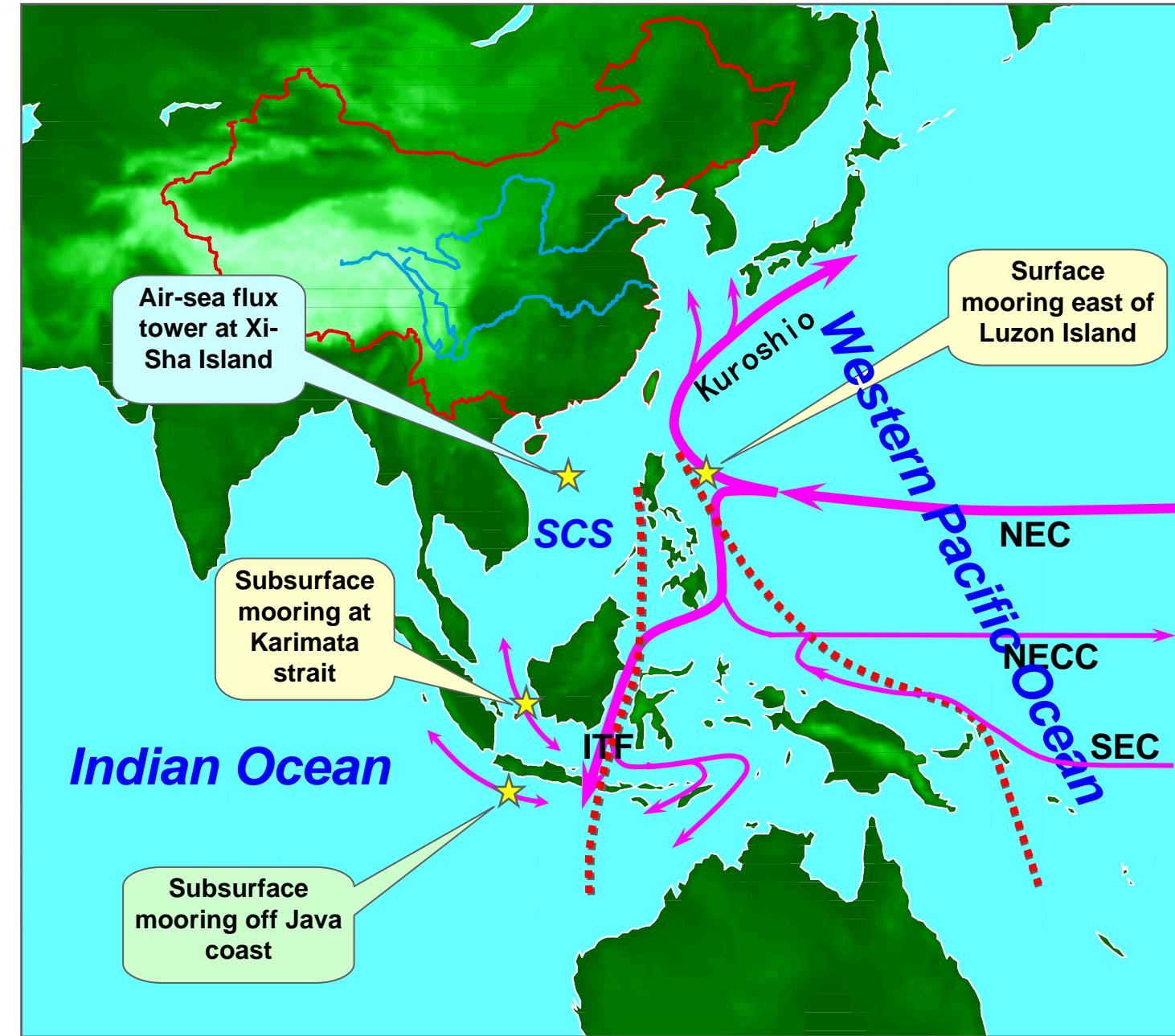
“大洋一号”海上作业示意图



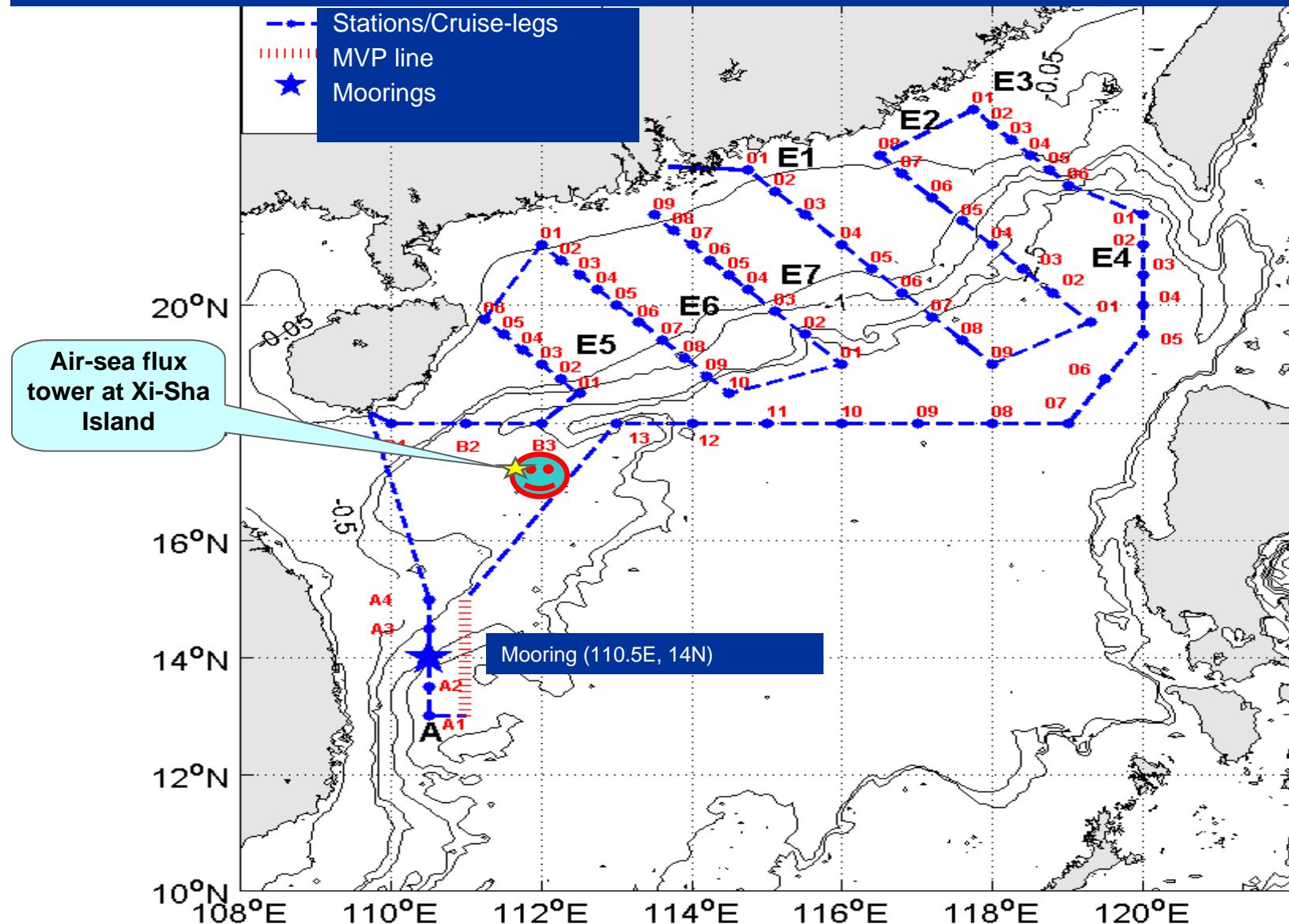
实验3号



Schematic observation plan of atmosphere-ocean interaction at the Asia-Indo-Pacific Region



Observation stations of the Northern SCS cruise



18°N断面观测：对18°N向东延伸，并在开放航次期间同步实施定点浮标或潜标观测(3–4个航次)

**A Proposal to the
Chinese Academy of Sciences
under the 3rd Innovation Campaign**

**Energy and Water Cycle
over the East Asian Monsoon Area
and Their Impacts on
Disasterous Weather and Climate**





1. 青藏高原的能量和水分循环对我国和全球气候的影响

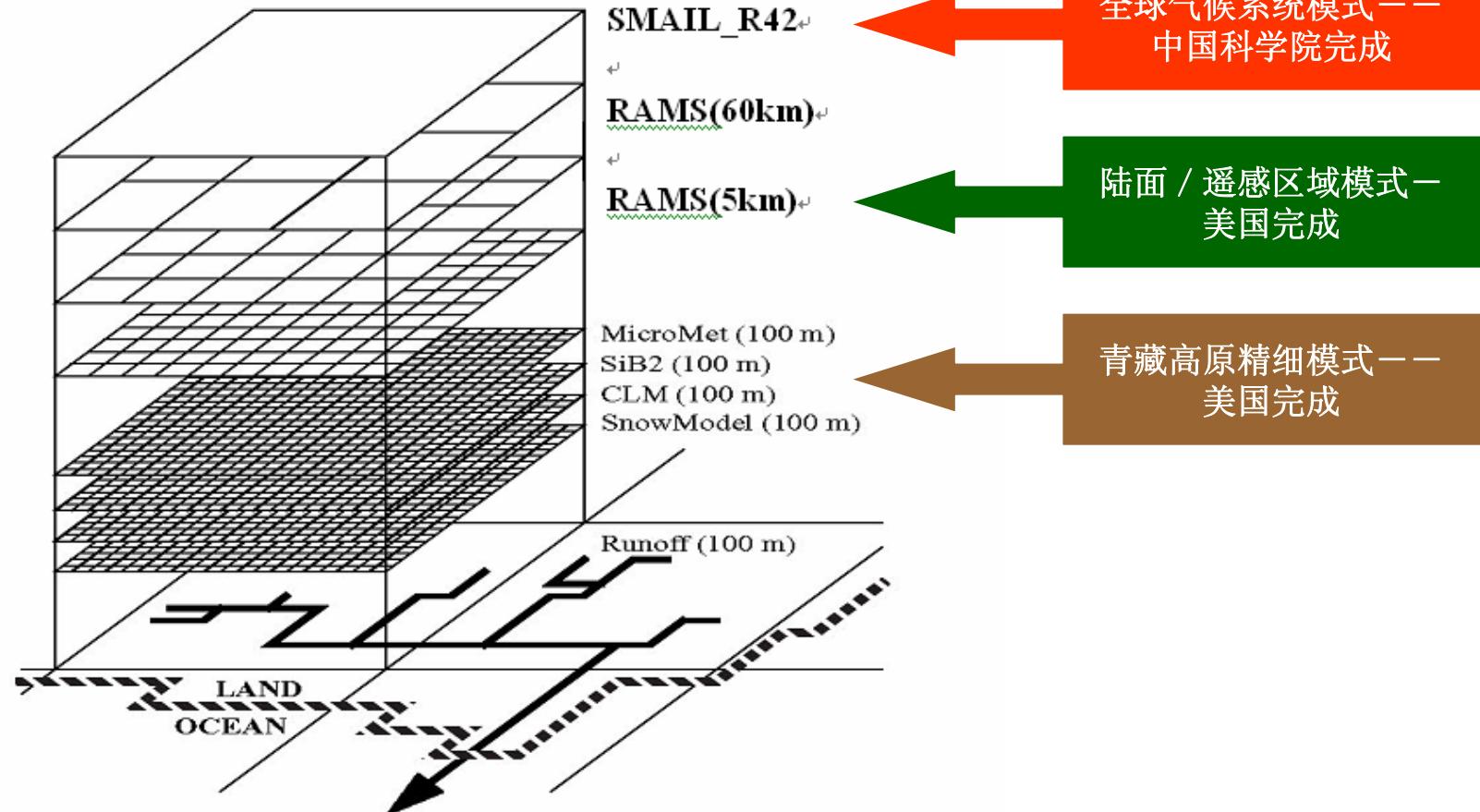
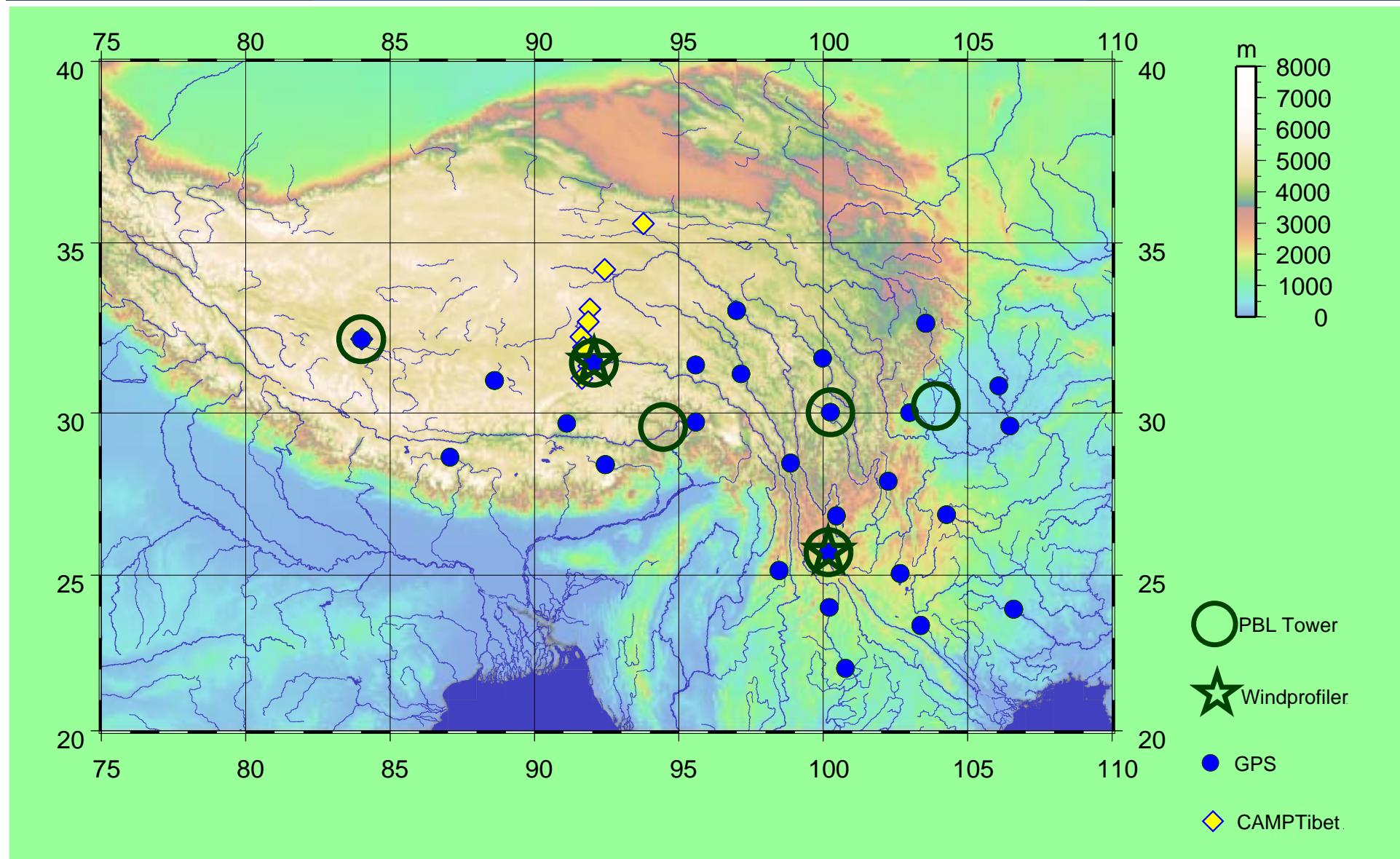
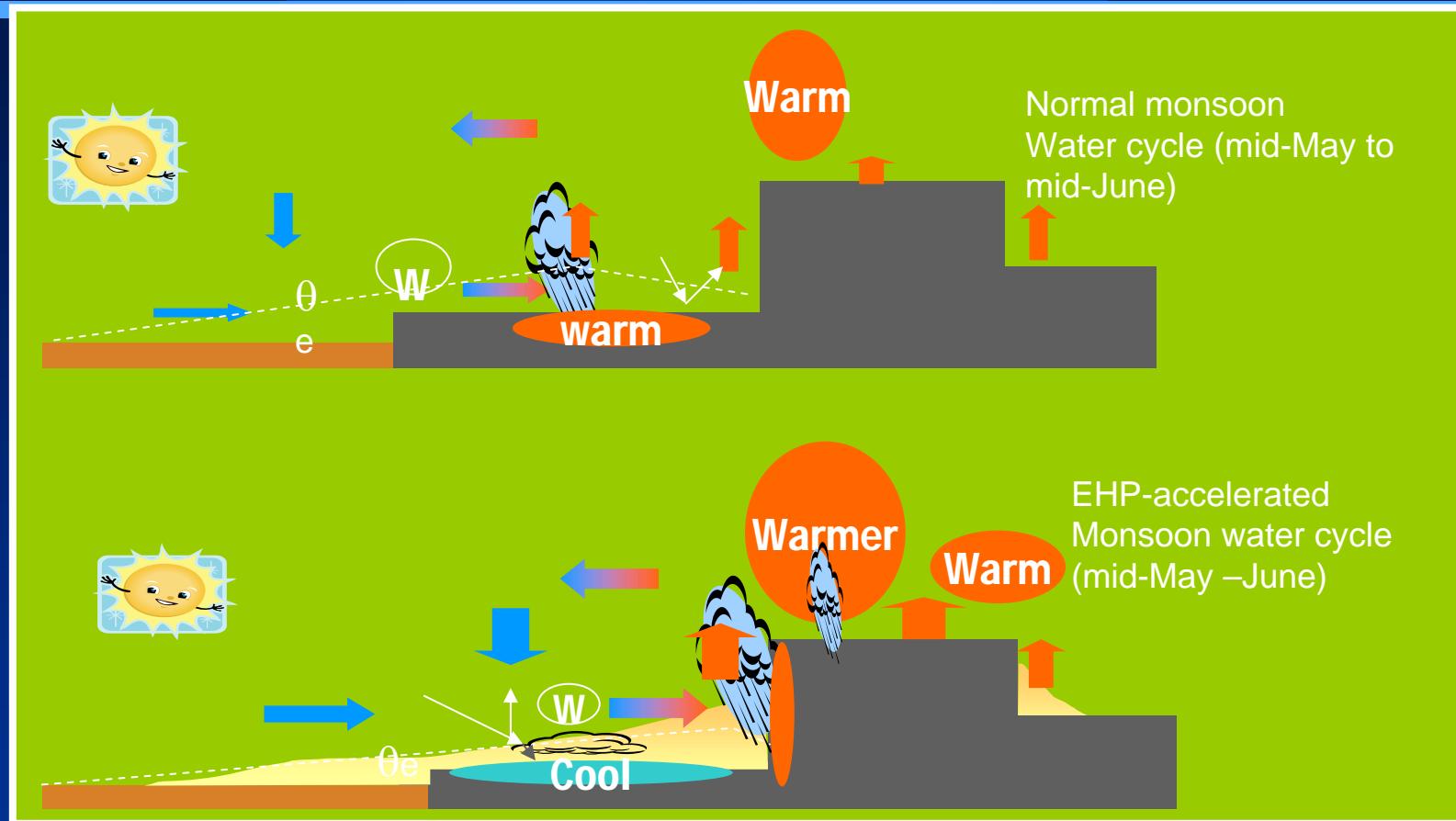


图1全球气候模式与青藏高原区域气候模式以及陆面过程模式嵌套结构示意图.

China-Japan Cooperative Project On Weather Disaster Reduction



The Elevated Heat Pump (EHP) hypothesis (Lau et al. 2006)



EHP postulates: a) an advance of the rainy season in northern India/Nepal region in May-June
b) In July-August, the increased convection spreads from the foothills of the Himalayas to central India, resulting in an intensification of the Indian monsoon.

2. Indian projects



Indian Monsoon Field Experiments and plans in the Indo-Gangetic Plains

P. Sanjeeva Rao, B.D. Acharya and D. R. Sikka*

**Earth System Science Division
Department of Science and Technology
Technology Bhawan, New Delhi-110 016, India.
❖ 40, Mausam Vihar, New Delhi-110051, India.**

- ❖ Acknowledgements : All participating Scientists in Monsoon Field Campaigns**

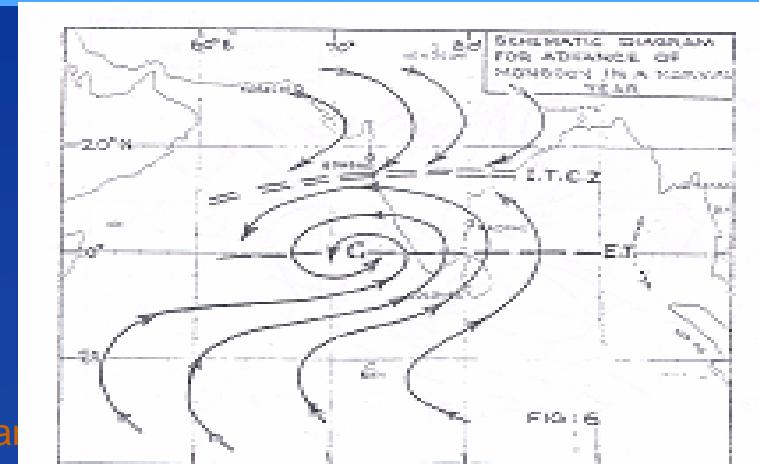
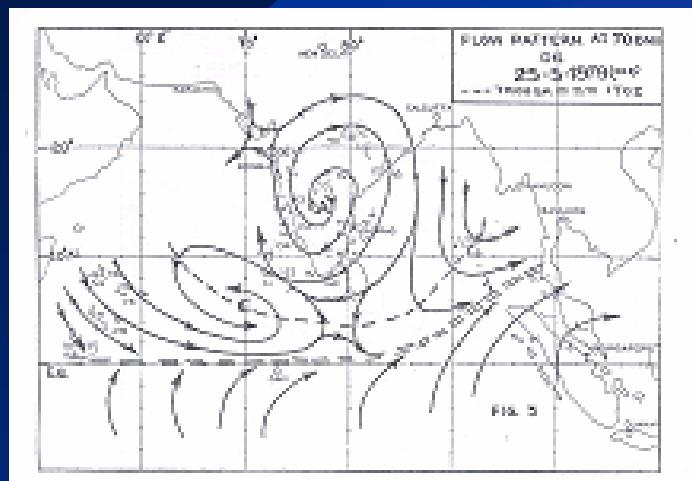
**Dr. CBS Dutt, ISRO-GBP, Bangalore
Dr. K. Niranjan, Andhra University, Visakhapatnam
Dr. N. Singh, IITM, Pune.**



*Continental Tropical
Convergence Zone (CTCZ)
as a component of
coupled Land-Ocean-
Biosphere-Atmosphere
System 2007-2010*



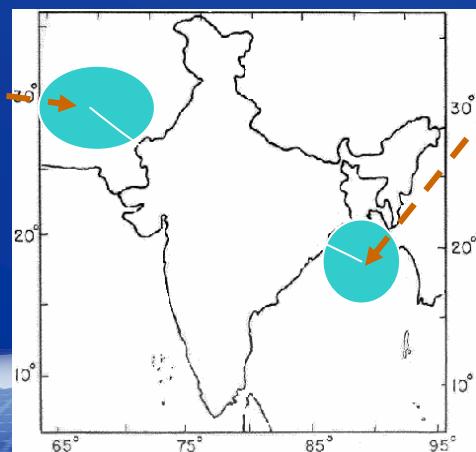
- During northern summer, the oceanic TCZ migrates seasonally over Indian sub-continent



- The monsoon trough is controlled by two centers of lows

Seasonal low

At western end over
Pakistan and adjoining
area



Transient disturbances

Form over the Head Bay
region and move across the
trough.

日本 Project title

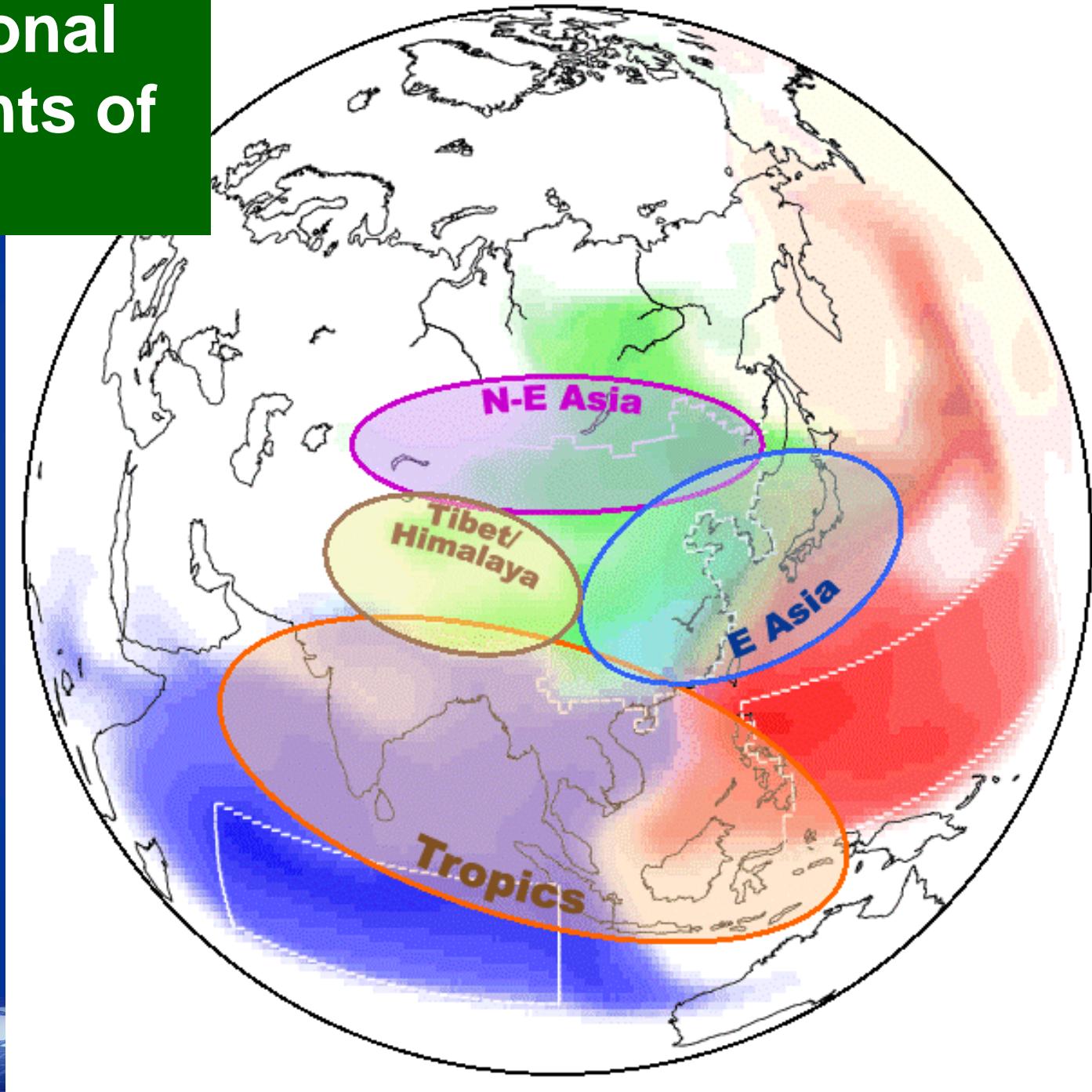
MAHASRI

Monsoon Asia Hydro-Atmosphere Scientific Research and
Prediction Initiative

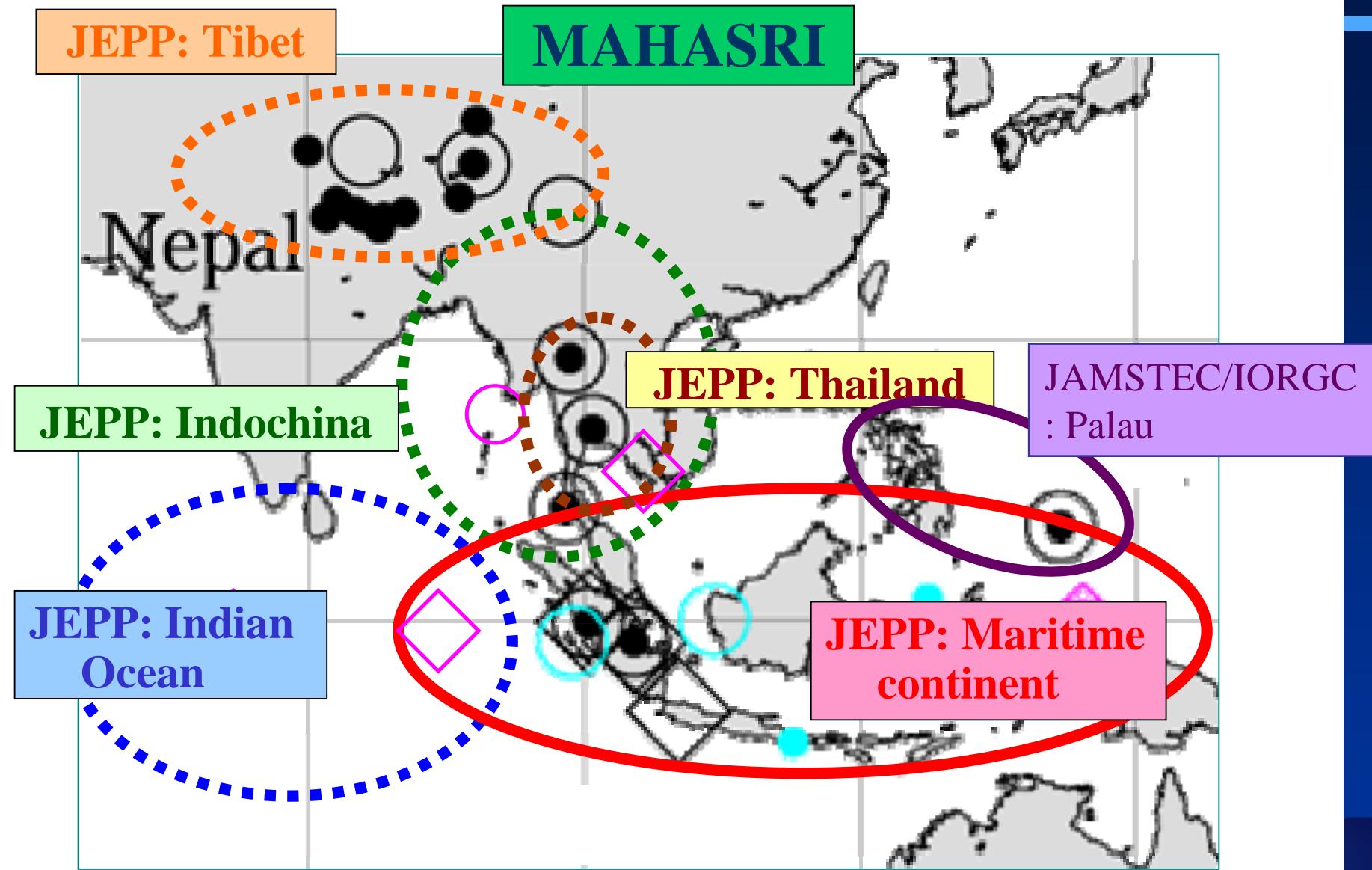
(Cf. MAHA=Great, Sri=Saint in Sanskrit)

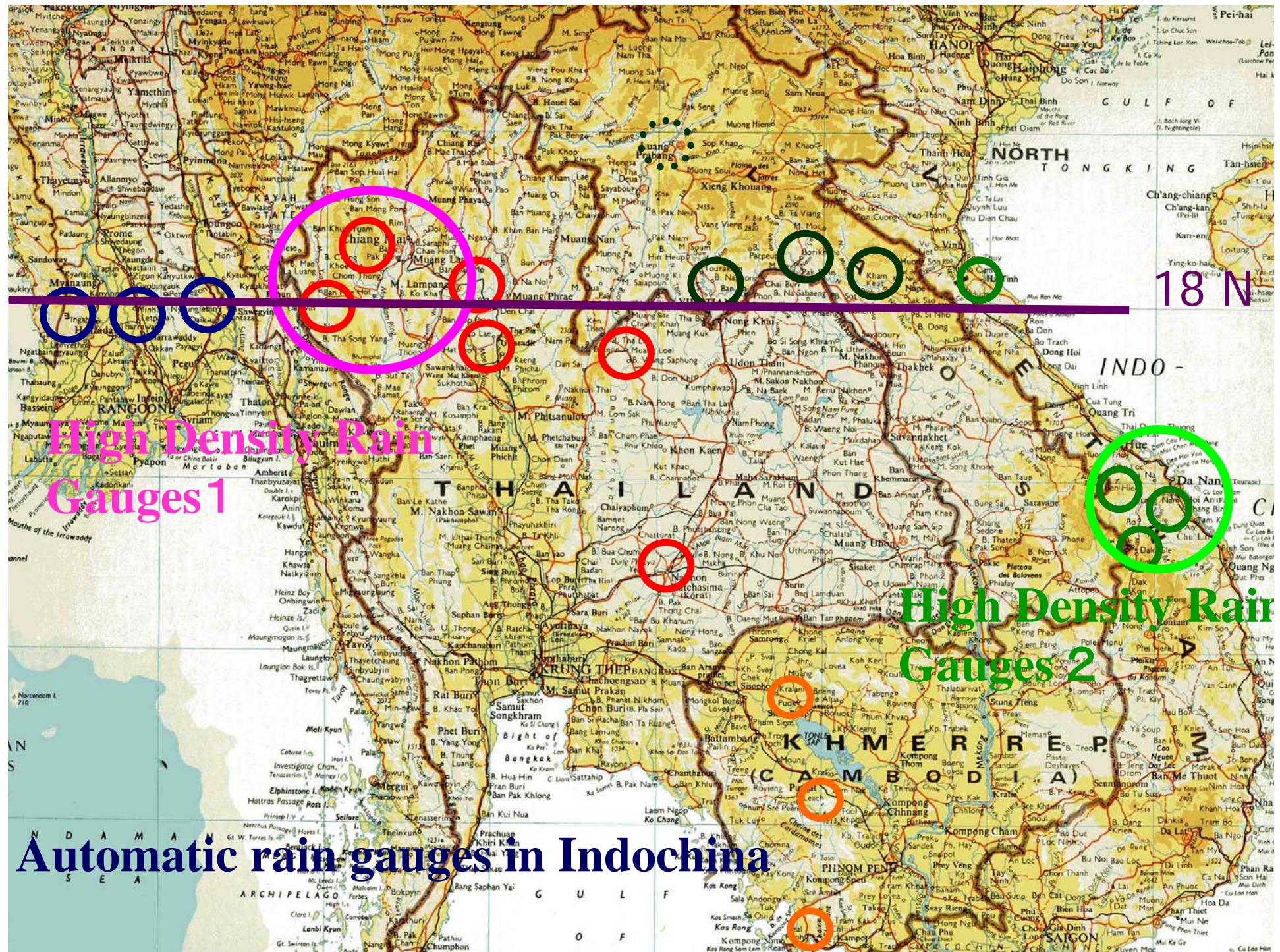


Four Regional Components of MAHASRI



MAHASRI and related Japanese Projects (JEPP)



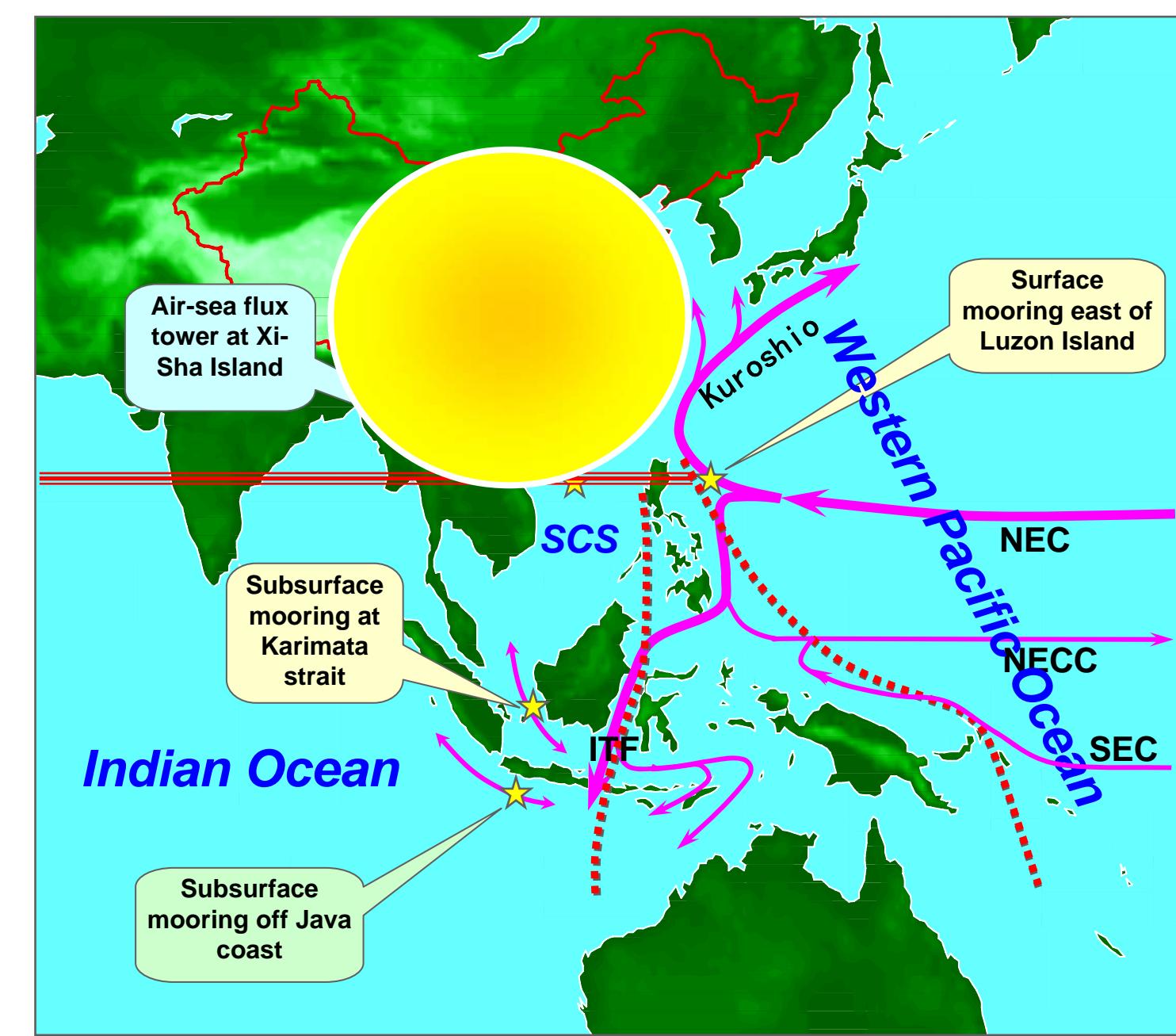


Proposal

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Schematic observation plan of atmosphere-ocean interaction at the Asia-Indo-Pacific Region



Response from John Church-WCRP Chairman

- ❖ Congratulations again on the research grant
 - It was exciting to hear about the work that you are planning with Japan and India and hopefully Australia on the Australian Asian Monsoon. More broadly, planning has started on a WCRP/THORPEX “Year of Tropical Convection” for 2008. We need to make sure your plans are linked to the broader plans so that the maximum benefit is gained. ... If we can link all of this together it will not only be good for the science but good for WCRP visibility and profile.



*January 5, 2006: The U.N. General Assembly, meeting in New York, proclaimed the year 2008 to be the U.N. International Year of Planet Earth. The Year's activities will span the three years 2007-2009 (www.yearofplanetearth.org/proclamation.htm).



YEAR OF COORDINATED OBSERVING, MODELING AND FORECASTING: ADDRESSING THE CHALLENGE OF ORGANIZED TROPICAL CONVECTION

This proposed activity arose out of a recommendation by the THORPEX/WCRP/ICTP Workshop on Organisation and Maintenance of Tropical Convection and the MJO, held in Trieste in March 2006. It was presented at the WCRP/CLIVAR SSG Meeting in Buenos Aires in April 2006.

Based on positive feedback from the WCRP Director and the SSG, the SSG asked that the proposal be developed in cooperation with THORPEX, GEWEX, CEOP, AAMP, WOAP, WMP, etc.

If implemented in 2008, this initiative could be a WCRP contribution to the UN Year of Planet Earth* and compliment IPY.

YEAR OF COORDINATED OBSERVING, MODELING AND FORECASTING OF THE TROPICS



Forecast
Simulate
Assimilate

ERRORS

Improve
Model, ICs,
Methods

Compare
With
Observations

diurnal cycle, synoptic systems,
intraseasonal, annual cycle, mean,
mesoscale-to-planetary scale organization

通过进行亚洲季风年(AMY08)/国际季风年 (IMY08)

- ❖ 深化对亚洲季风区海陆气相互作用过程的认识
- ❖ 改善季风预测
- ❖ 加强与国际合作
- ❖ 培养一批活跃在国际前沿的年轻大气科学家
- ❖

Thank You !

Acknowledgment:

Prof. P. Sanjeeva Rao

Prof. Jun Matsumoto