

# Water Issue in MAIRS in the Aspects of Capacity Building

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# Monsoon Asia Integrated Regional Study (MAIRS)

Chair: FU Congbin

A new initiative of START  
on the request of ESSP

**Key words:**

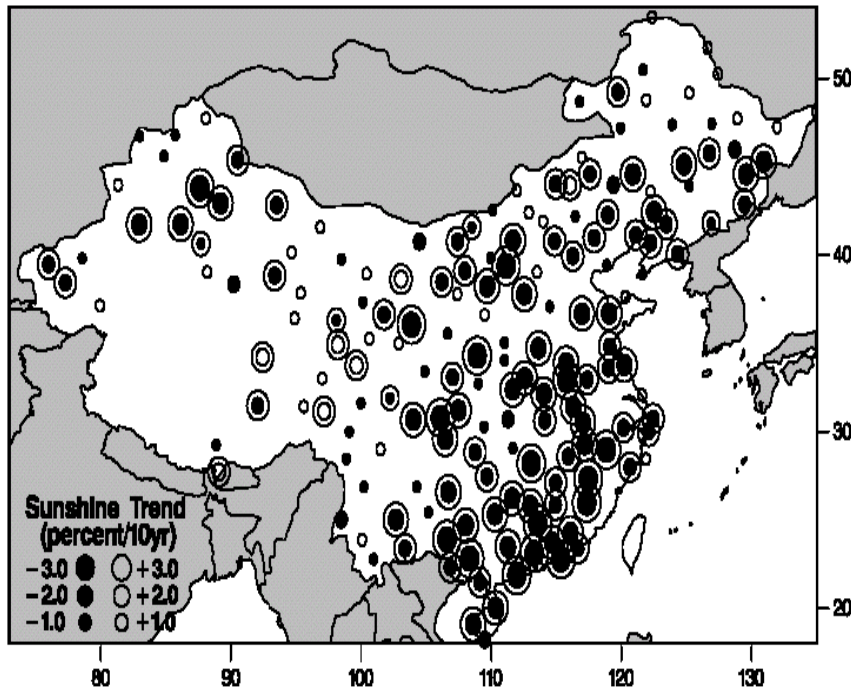
Monsoon Asia  
Integrated study  
Regional study

# Monsoon Asia -- One of the Most Active Human Development Regions

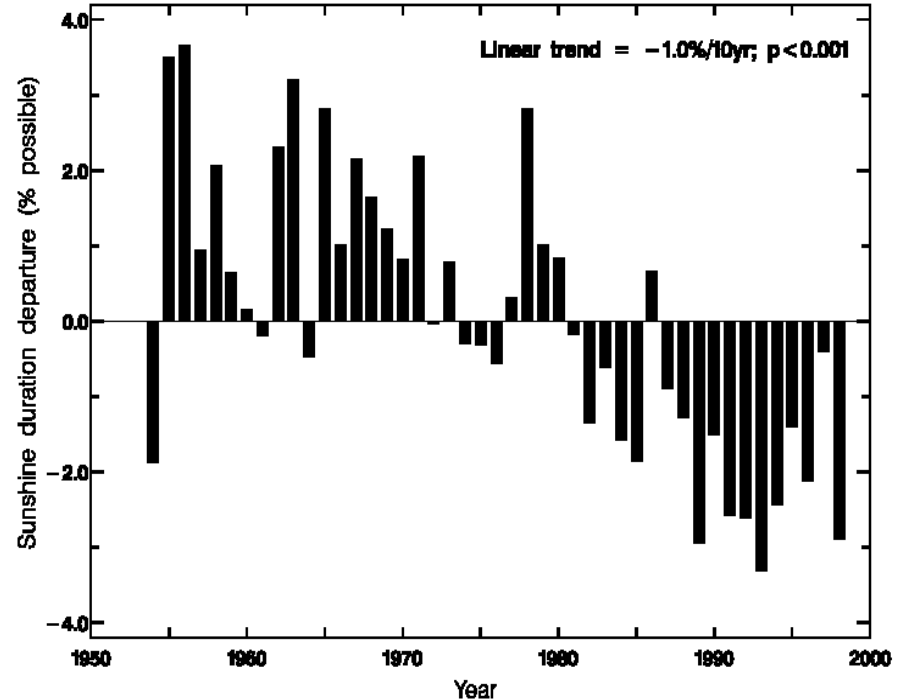
- + Long history of civilization: more than 5000 years
- + More than 57% of world population
- + Most rapid economic development in last decades;
- + Continuous development in the coming decades.

- ✚ Most rapidly industrializing & urbanizing part of the world
- ✚ GHG emission is to double in next 20 years, Asia will exceed OECD emission by 2025
- ✚ Asian cities are “the most polluted” in the world, 2x world average in their pollutants

# Change of possible sunshine in past 50 years in China



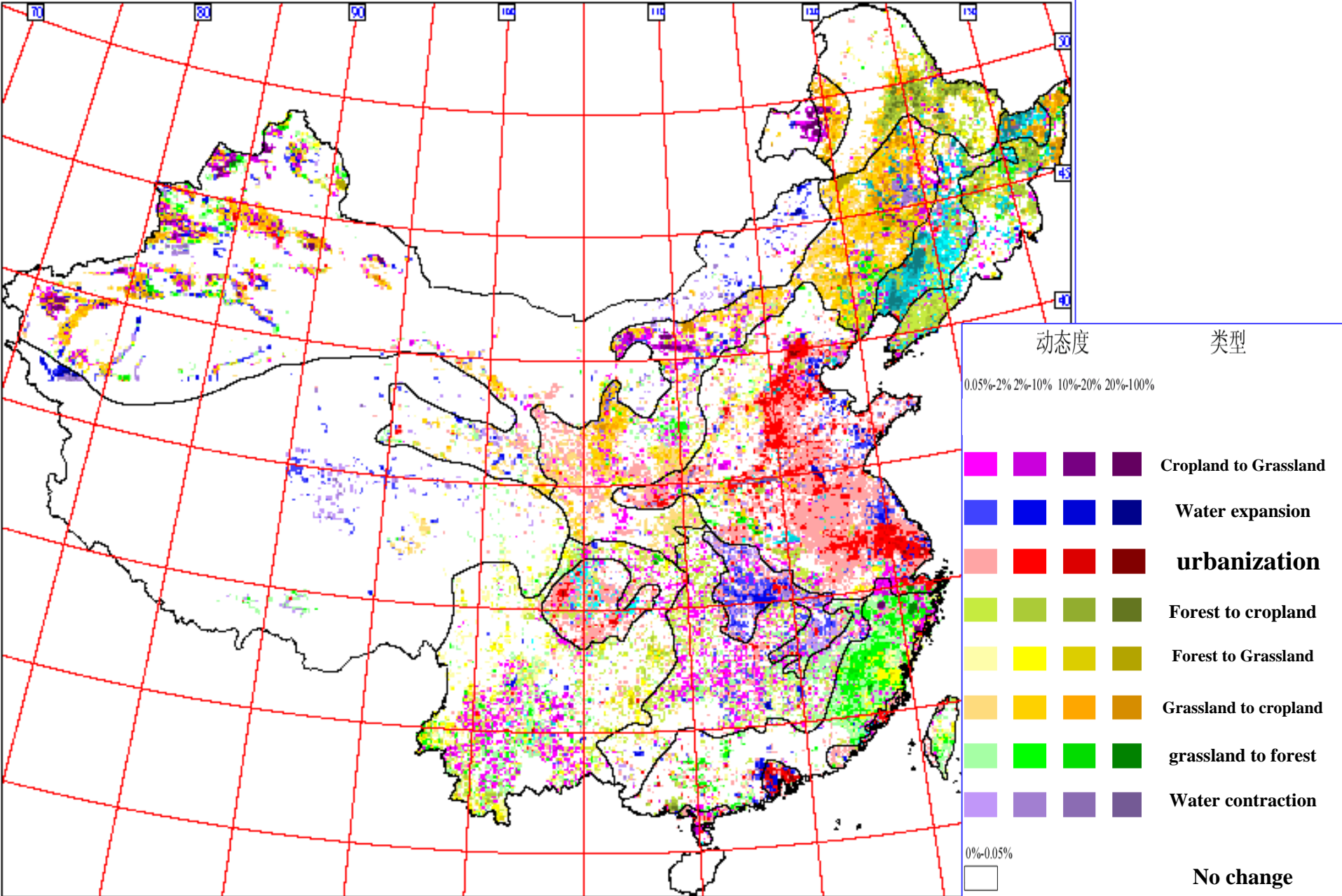
**Figure 1.** Trends in annual mean percentage of possible sunshine for 1954–1998. Station trend indicators with circles around them are significant at the 95% confidence level.



**Figure 2.** Time series of annual departures in percent of possible sunshine for 1954–1998, averaged over the whole of China.


S. Liu(2004)

**How about the change of radiation budget?**

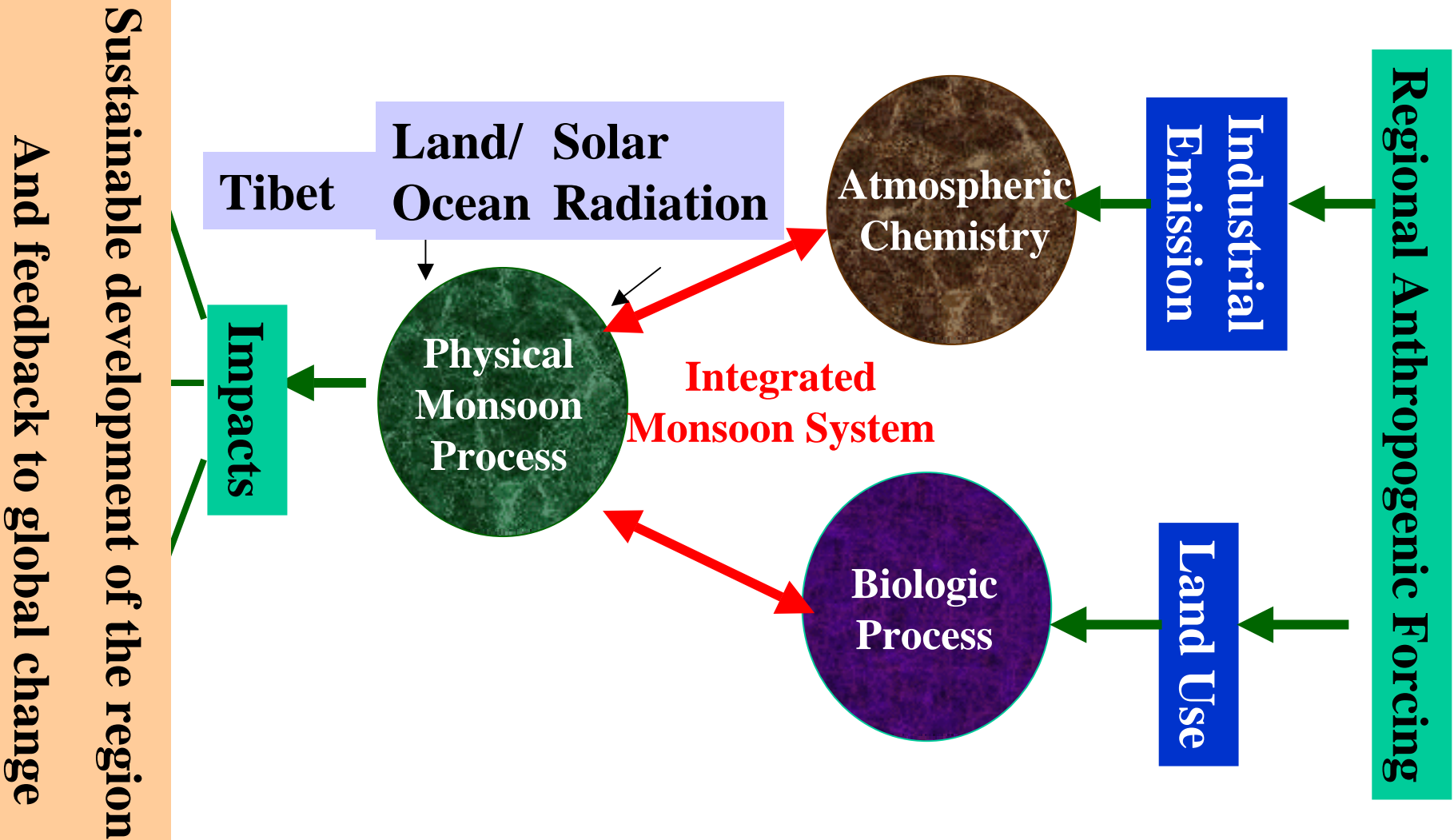


Land-use changes in China from 1990 to 2000, Liu et al (2004)

# Central Scientific Theme of MAIRS

 Interaction between human activities and monsoon system (Human-Monsoon System), and their linkages with Earth System dynamics.

# Integrated Asian Monsoon System

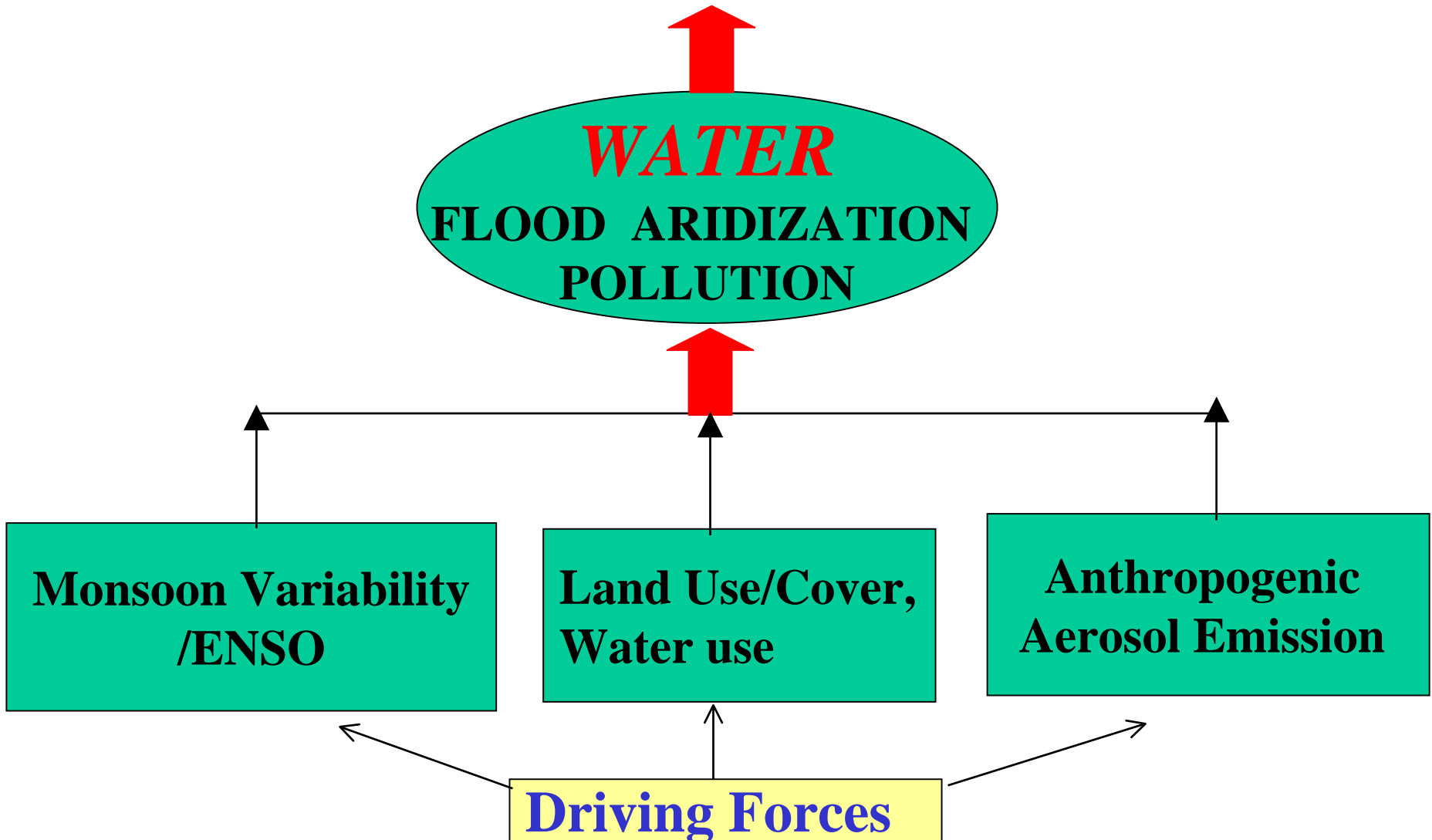




# Long-term Objectives of MAIRS

- # To better understand how human activities in the region are interacting with and altering natural variability of atmospheric, terrestrial and marine components of the monsoon system;
- # To contribute to the provision of a sound scientific basis for sustainable development of monsoon Asia;
- # To develop a predictive capacity of estimating changes in global-regional linkages in the earth system and to project the future consequences of such changes.

# Sustainable Development of Asian region

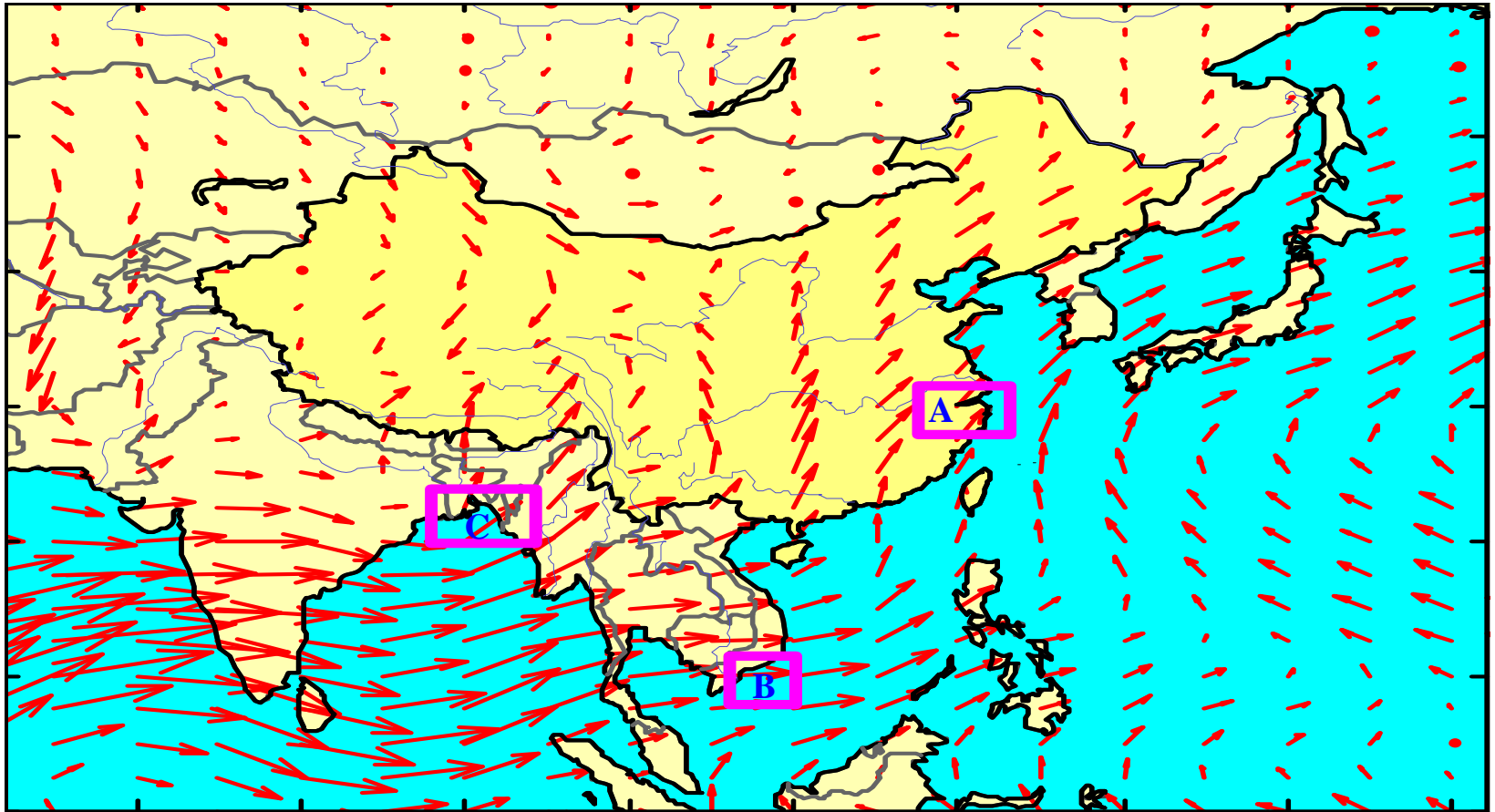


# A proposal on enhanced observation experiments of monsoon-human interaction process

## Objectives

- Understanding the interaction between human activities (mainly the industry emission of aerosols, land use/cover change) and monsoon climate

# Schematic Map of Enhanced Observation and Experiments



Delta regions of A: Yangtze River; B: Mekong River; C: Ganges River

# Enhanced observation and experiments

## Regions:

- Yangtze River Delta
- Mekong River delta
- Ganges River delta

## Reasons: most active human development

1. the **population** density is highest among the region;
2. the development of economy and society is **most rapidly**;
3. rapid increase of **consumption** of various kind of natural resources, such as the energy resources, water resources;
4. rapid increase of **emissions** of various kinds of green house gases, aerosols and other pollutants into air, water and soil;
5. the large scale human-induced **land cover** changes.

# Main components of observation

- **Enhanced meteorological observation**  
for monitoring the behaviors of Monsoon system, including surface climate and atmospheric circulation, etc. ;
- **Atmospheric chemical observation**  
for monitoring the changes of atmospheric composition , including green house gases and various kind of aerosols;
- **Land surface fluxes measurement**  
for understanding land/ocean-atmospheric interaction processes, including water, heat, CO<sub>2</sub> and other materials;

# Main components of observation

- **Land cover/use observation**  
monitoring the human-induced changes of land and vegetation cover/use;
- **water system observation**  
monitoring the human-induced changes of water cycle and water quality;
- **Remote sensing observation** from satellite and airplane, etc.

# Capacity building

- ✦ Strong international collaboration and cooperation will be needed, especially among the Asian countries
- ✦ Human dimension will be taken more account in MAIRS project. It will be a big challenge for both earth scientists and socioeconomic scientists.
- ✦ Development of a data management system
- ✦ Accessibility of data from various sources  
improvement of infrastructure
- ✦ Capability of scientists from developing countries to benefit from and contribute to the system.



# STATUS of MAIRS IPO

- + Approved by ESSP in June of 2003;
- + Will be located in the same building as the START TEA Center, Institute of Atmospheric physics(IAP), Chinese Academic of Sciences(CAS), Beijing;
- + Will be supported by CAS for 10 years, along with other partners;
- + Call for application of IPO director and other staff has received 11 applicants;
- + 2 Staff, Dr. Ailikun, Deputy Director of IPO, and Ms. Yang Ying, Information Officer of IPO, have been appointed.

- ✦ We have lead to the possibility of Japanese scientist working in the MAIRS IPO as an expert in field observation planning;
- ✦ The formal opening of MAIRS IPO will be scheduled during 2005

# Future actions of MAIRS

- ✦ Accomplish the rapid assessment of each sub-region of Monsoon Asia in 2006;
- ✦ Formally opening of MAIRS IPO in CAS, Beijing in 2005;
- ✦ Formally formation of MAIRS SSC in 2005;
- ✦ Presentation of MAIRS Science Plan in next Open Conference of Global Change Science (2007)

- # A workshop about human dimension of monsoon Asia jointly with IHDP(late 2005 or early 2006)
- # A joint workshop on regional integrated study with iLEAPS(early 2006?)
- # Advanced Training Institutes of regional modeling for monsoon Asia jointly with Pacific Research Center?
- # A Joint workshop with GAME/GEWEX and CEOP on MAIRS observation system?

# Time-Table of MAIRS

		<b>Rapid Assessment Project(RAP) for East Asia</b>	2003
	<b>MAIRS interim SSC meeting</b>		2004
			2005
<b>Scooping workshops on MAIRS data/observation system; modeling system and human dimension</b>	<b>MAIRS IPO open, formal MAIRS SSC,</b>		2006
	<b>RAP for South Asia and Southeast Asia</b>		
			2007
<b>MAIRS Science plan presenting at next Open Conference of global change science</b>			
<b>Initiate one or two pilot projects on water and anthropogenic aerosols</b>			2008-2009