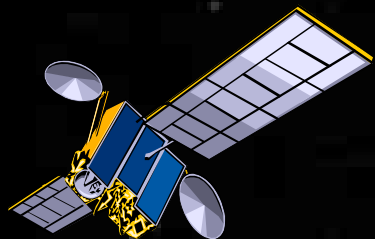
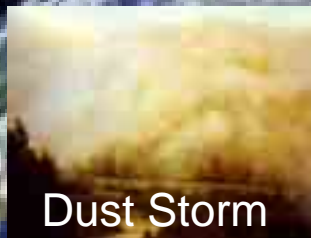


Asia-Pacific Environmental Innovation Strategy (APEIS)

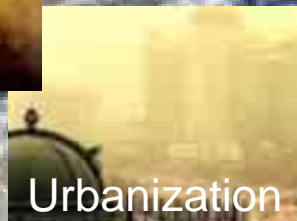
Integrated Environmental Monitoring (IEM)



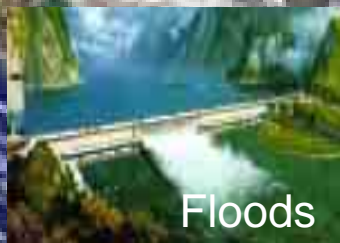
Desertification



Dust Storm



Urbanization



Floods



Over-cultivation



Deforestation

Masataka WATANABE, National Institute for Environmental Studies, Japan

Jiyuan LIU, Institute of Geographical Sciences and Natural Resources Research, CAS

Integrated Monitoring System

Satellite Observation Network

MODIS high-order products

- Land surface temperature
- Land cover / Vegetation indices
- Fires & biomass burning
- Leaf area index / FPAR
- Photosynthesis / NPP

Ecological Observation Network

GIS Data

- Digital maps
- Statistic data
- Other remote sensing data

Ground-truth Measurements

- Meteorological data
- Hydrological data
- Vegetation data
- Soil properties data

Ecological Indices

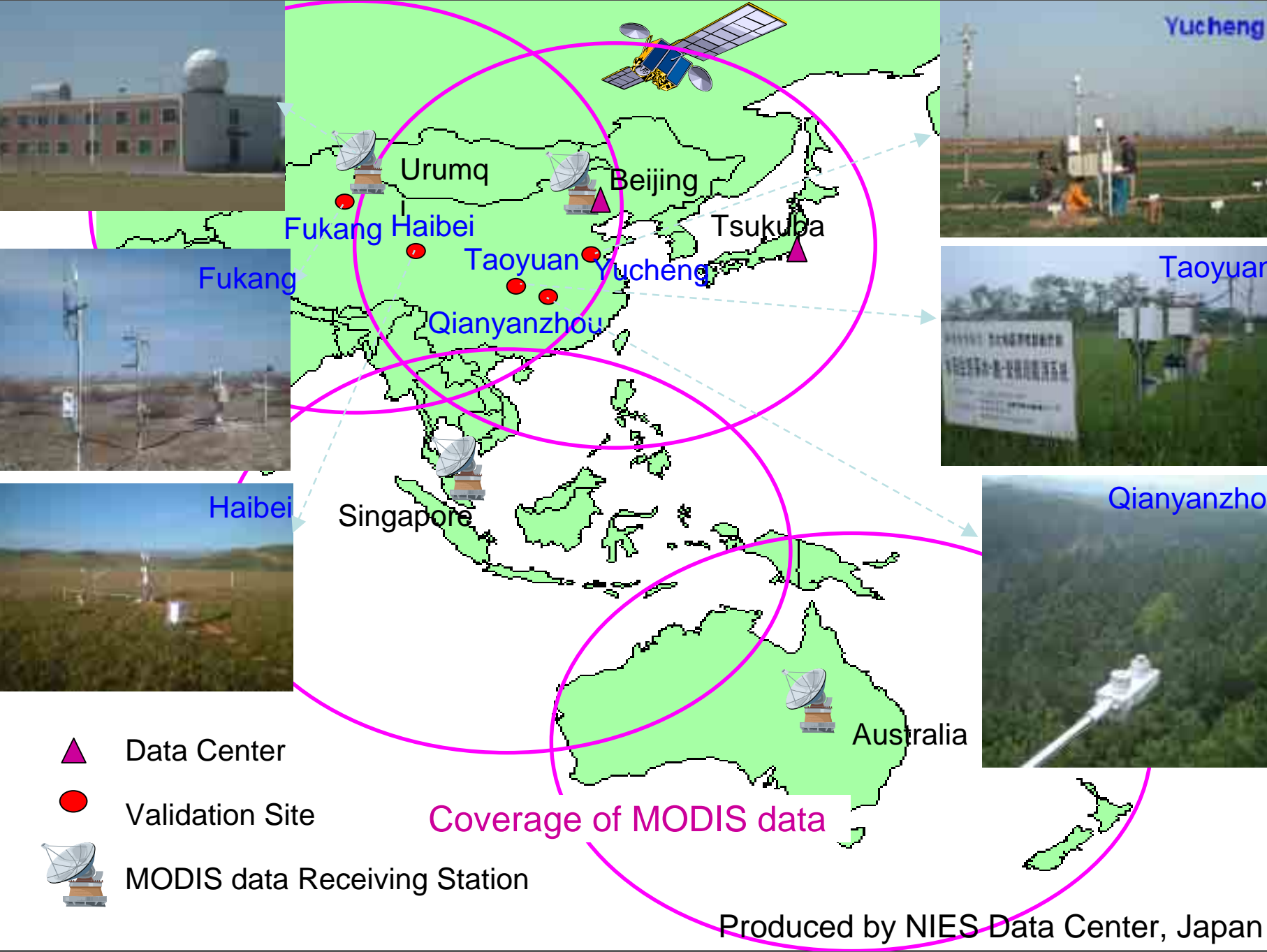
- Water deficit index
- Aridity
- Index of desertification
- Index of dust storm

Integrated Model for Assessment of Ecological Function

- Water resources
- Carbon cycle
- Nutrient cycle
- Food Production and Security
- Disaster Protection

Detection of Ecosystem Vulnerability

Contribution to Policy Making



Desertification and Dust Storm



MODIS Image:
Desertification
Date: 2001/04/13



MODIS Image: **Dust Storm**
Date: 2002/04/01

Urbanization of Pearl River Delta



Produced by Beijing MODIS Station

Fire in East Siberia & East China



Fire near Sumatra



Image taken by CRISP, Singapore
July 4 2001

Fire near Canberra

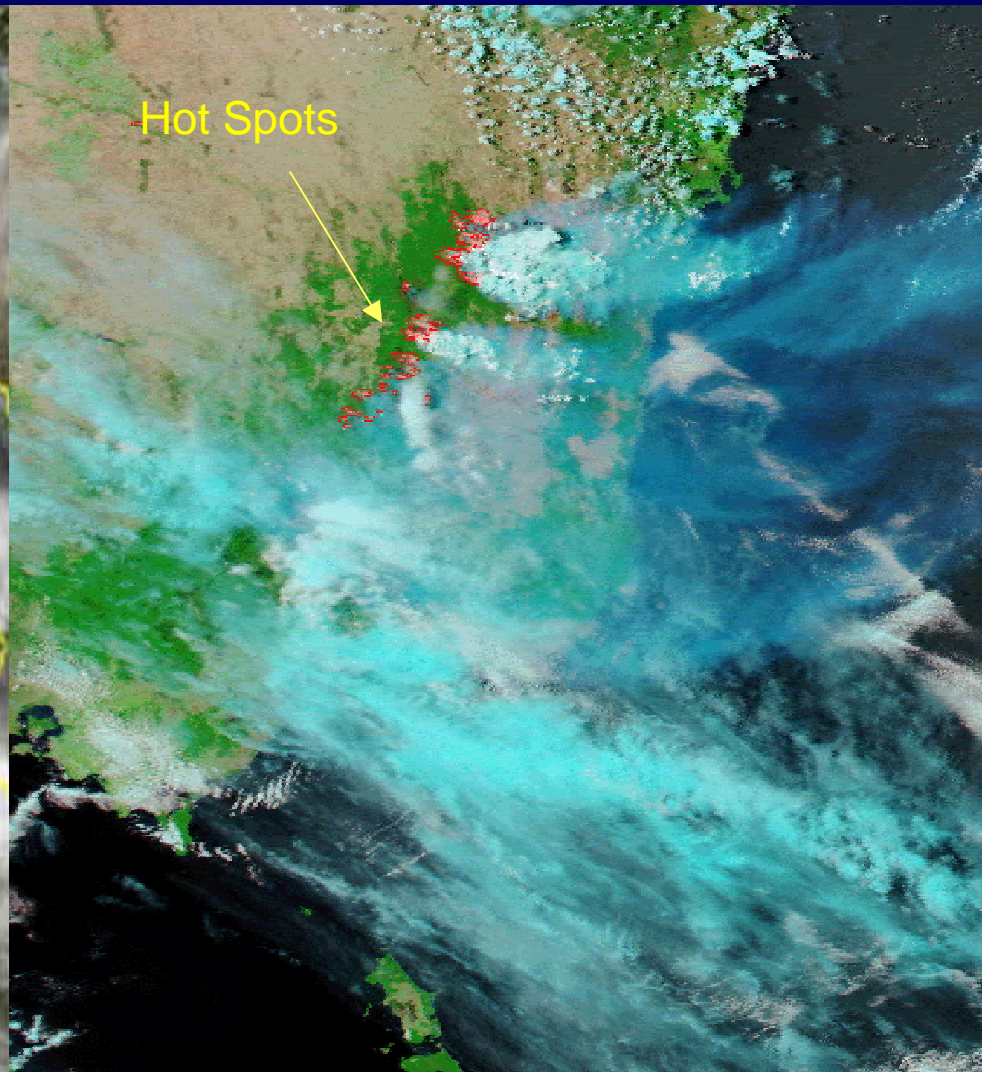


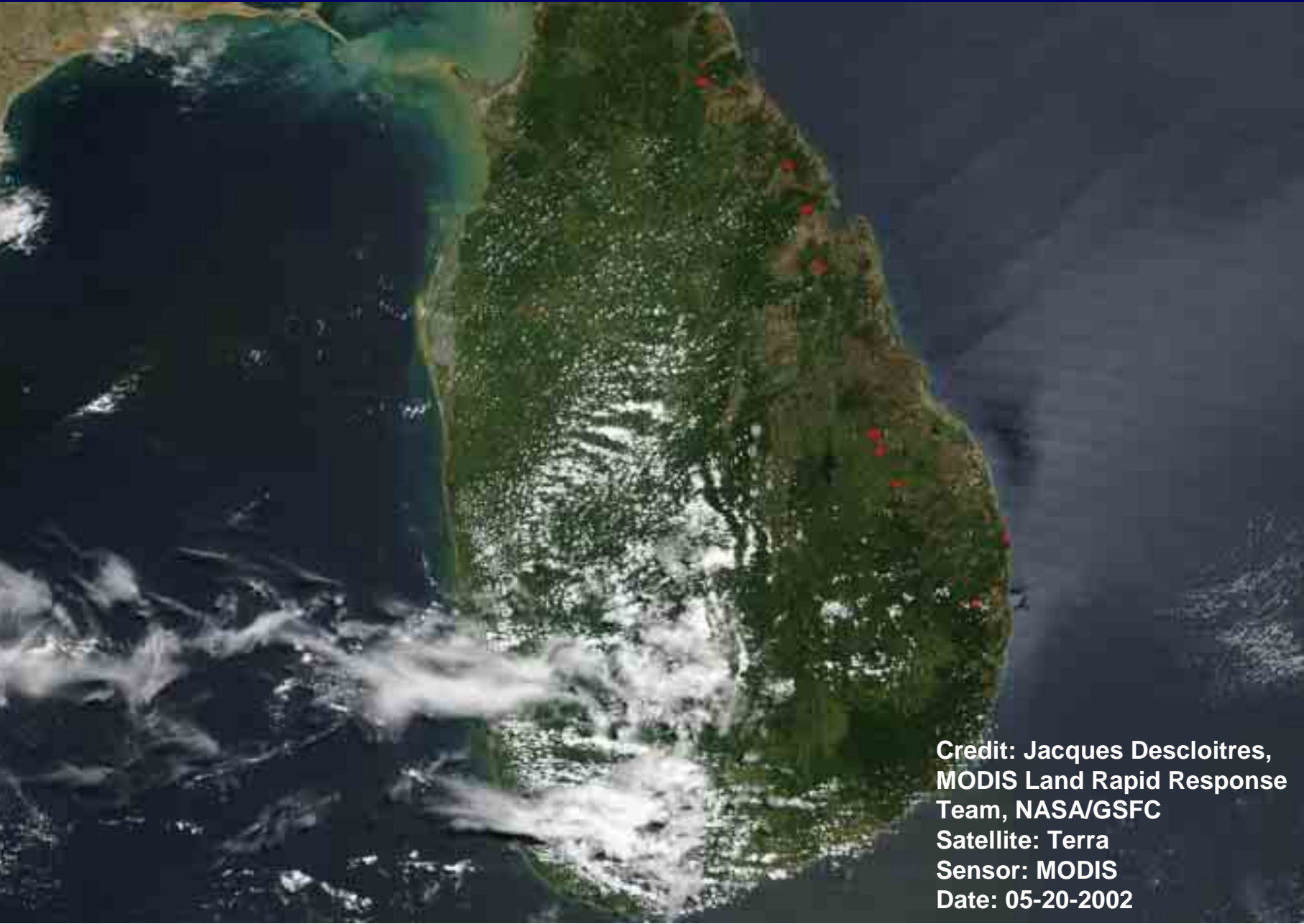
Image taken by CSIRO, Australia
January 18 2003

Floods in Bangladesh

A satellite image of Bangladesh showing extensive flooding. The image displays a complex network of rivers and floodplains, with large areas of land submerged in water. The colors range from dark green for dense vegetation to light green and yellow for flooded areas. The coastline is visible at the bottom, with the dark blue of the Bay of Bengal. The overall scene depicts a significant hydrological event affecting a large portion of the country.

Credit: Jacques Descloitres,
MODIS Rapid Response Team,
NASA/GSFC
Satellite: Terra
Sensor: MODIS
Date: 11-09-2002

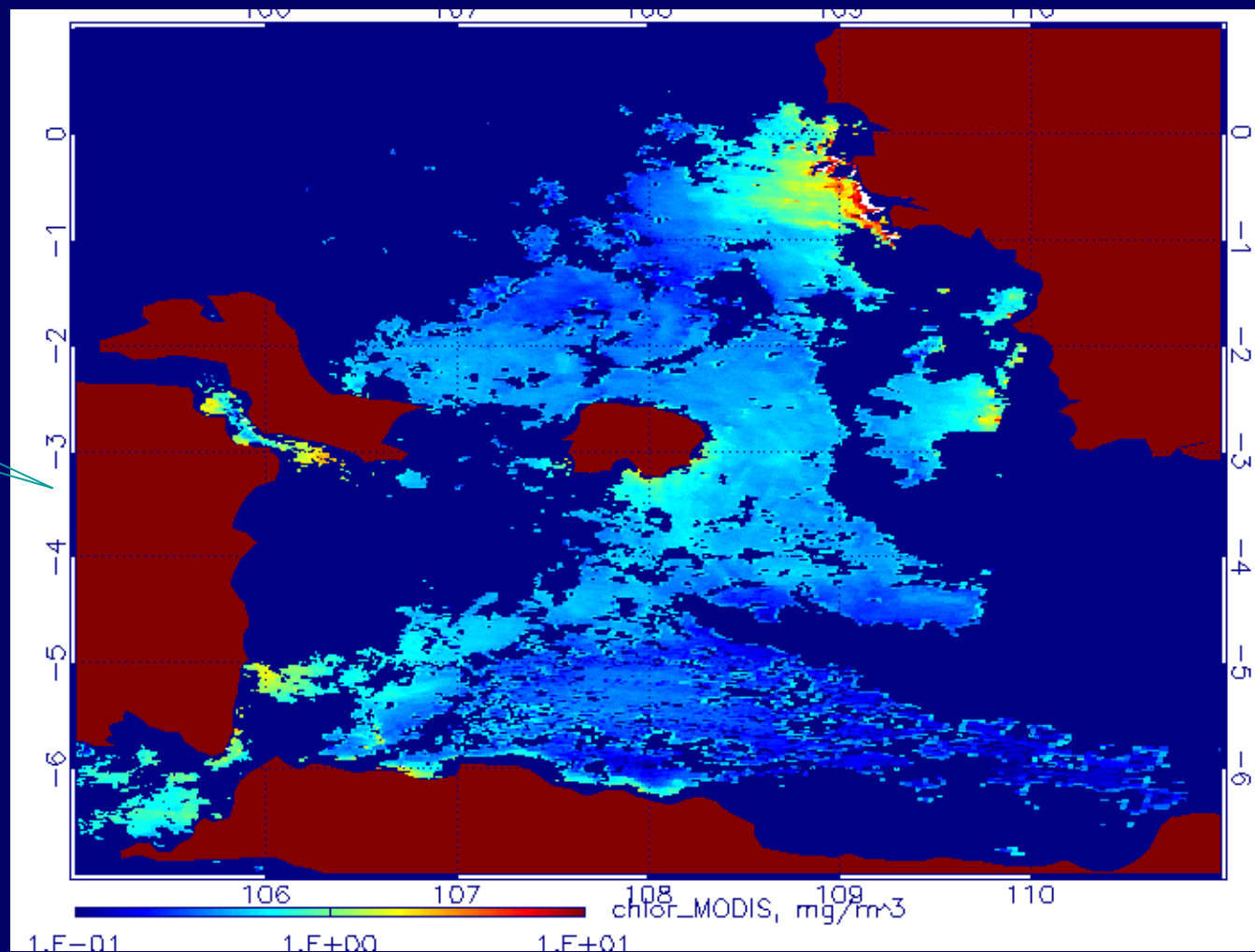
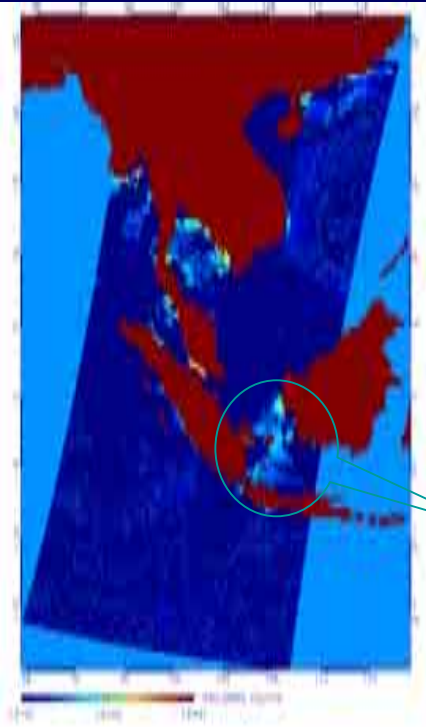
On Sri Lanka, much of the native forests have been cleared



Credit: Jacques Descloitres,
MODIS Land Rapid Response
Team, NASA/GSFC
Satellite: Terra
Sensor: MODIS
Date: 05-20-2002

Chlorophyll Concentration

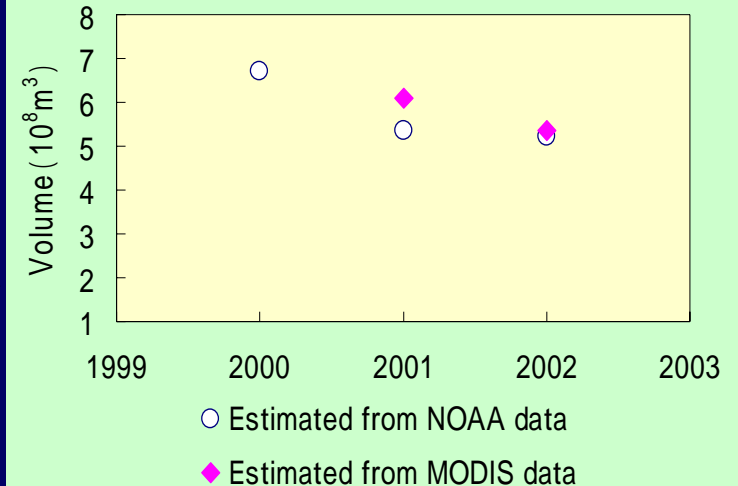
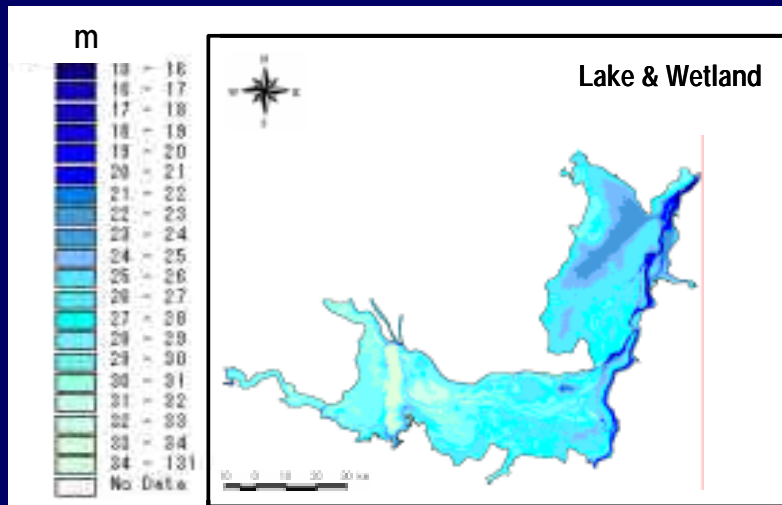
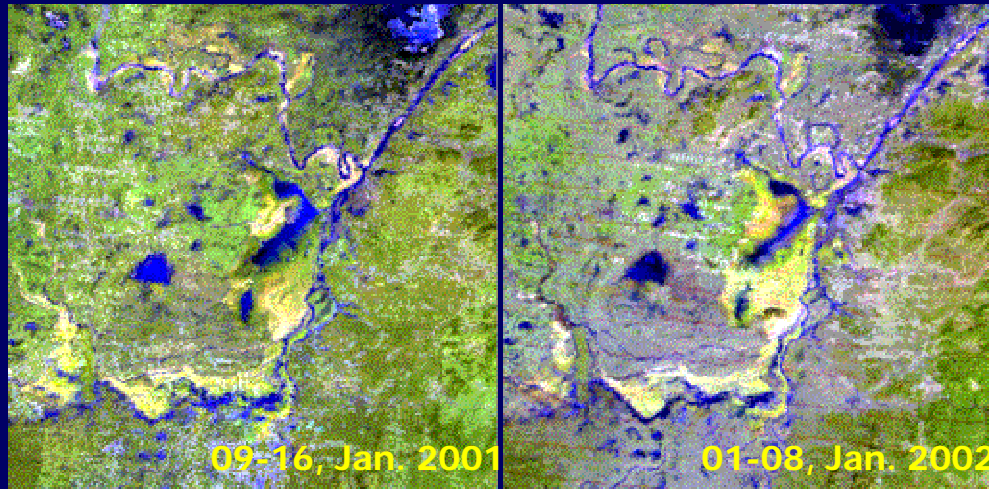
Terra MODIS, 27 March 2003, UTC 03:33

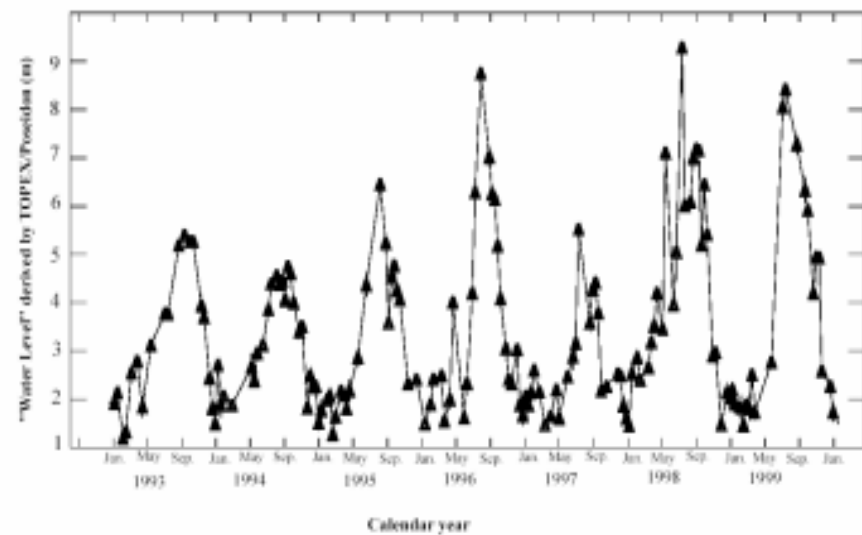


Produced by CRISP, Singapore

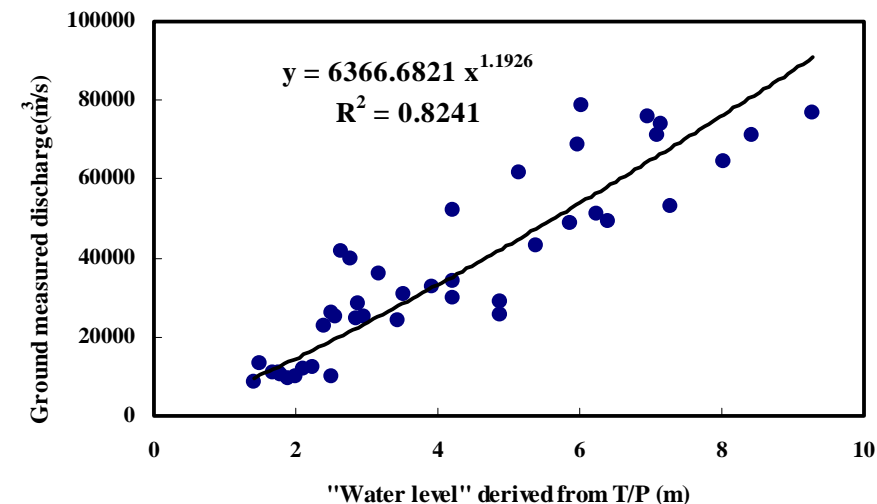
Monitoring Water-body Changes

Changes in Water Area and Volume of East Dongting Lake

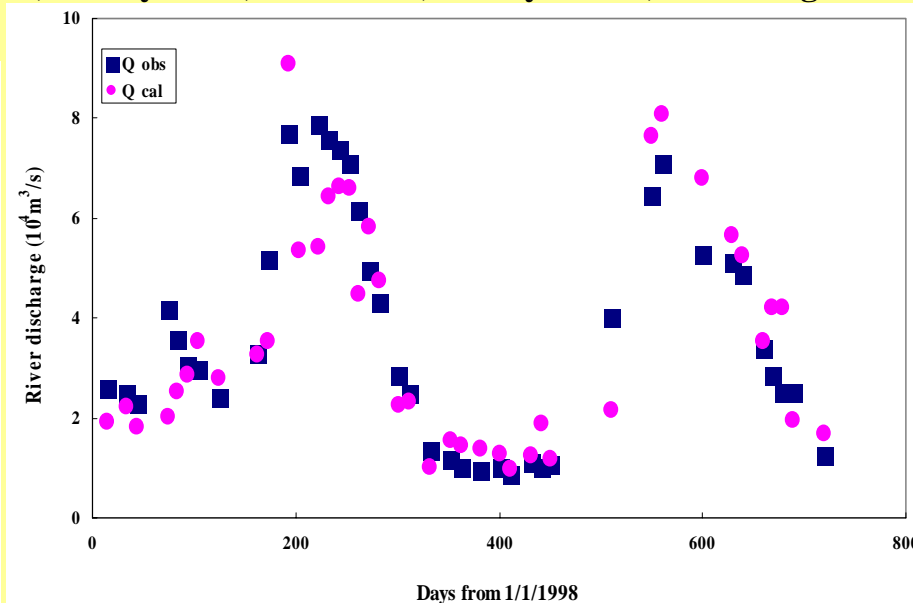




“Water level” derived by TOPEX/Poseidon between 1993 (orbit cycle 11) and 1999 (orbit cycle 267) at Datong St.



Rating curve between TOPEX/Poseidon derived “water level ” and measured discharge at Datong St.

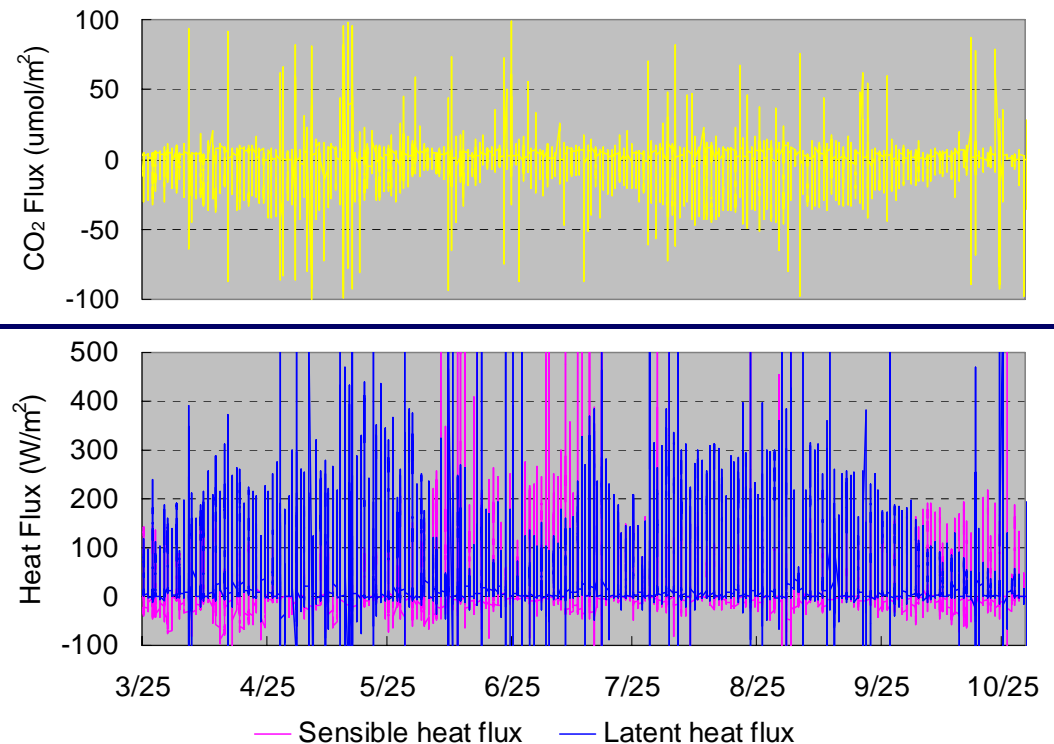


Comparison of estimated and observed discharge at Datong St. in 1998 and 1999 by TOPEX/Poseidon data

Ground-truth Ecological Observation Network

Water, heat and carbon fluxes at Yucheng observed by APEIS-FLUX network

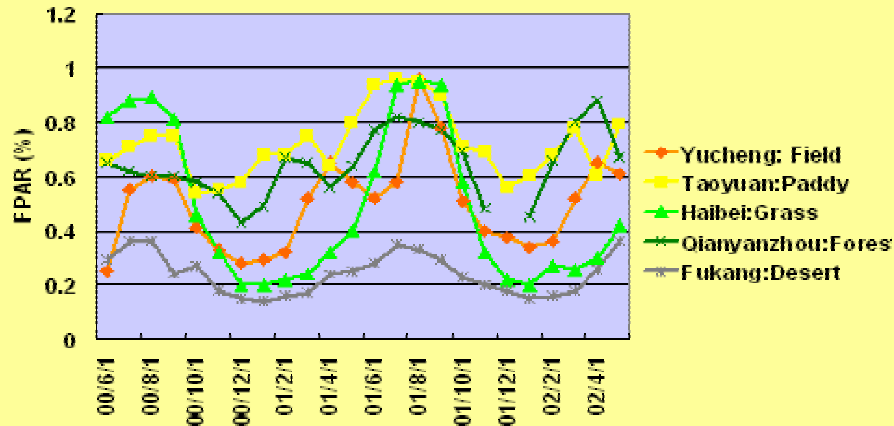
← Wheat → ← Corn →



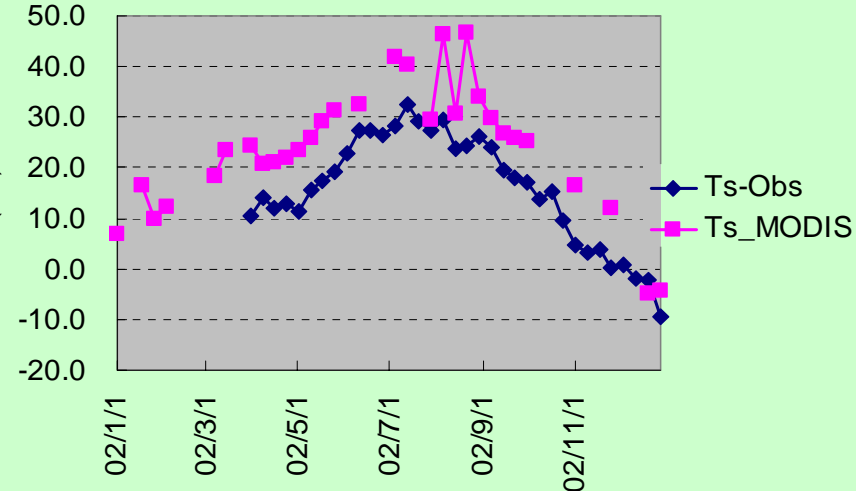
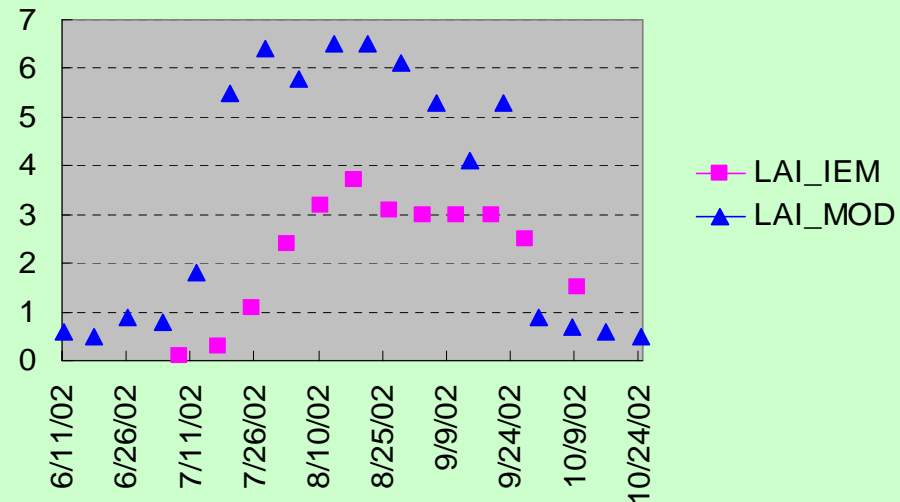
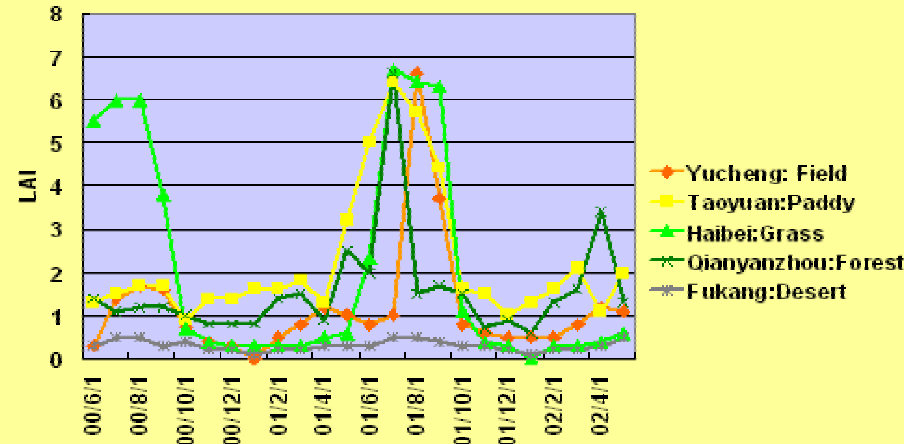
Produced by NIES Data Center, Japan

Validation of MODIS High-order products by observations of APEIS-FLUX network

Fraction of Photosynthetically Active Radiation absorbed by vegetation canopies (FPAR) derived from MODIS Data



Leaf Area Index (LAI) derived from MODIS Data



MODIS Data Processing System



Level 0,1

Level 2

Level 3

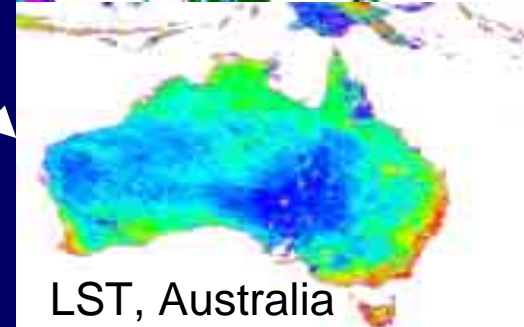
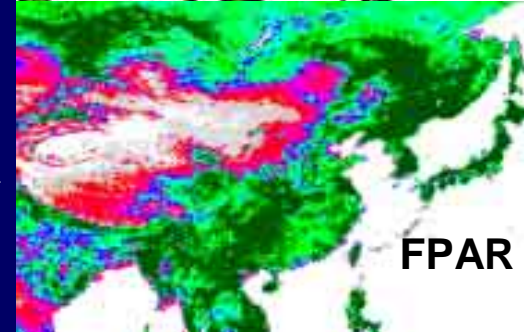
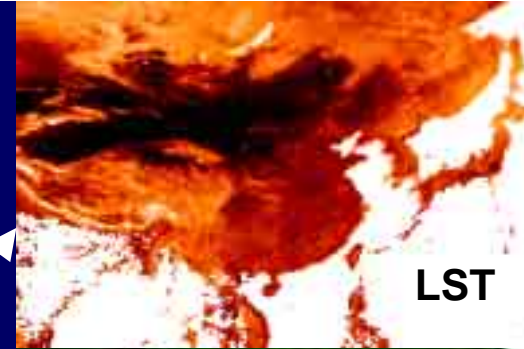
Level 4

Surface Reflectance
Thermal Anomalies
Land Cover/ Land Cover Change
Land Surface Temperature (LST)

Vegetation Indices (NDVI & EVI)
Albedo16-day L3
Vegetation Cover Conversion

Leaf Area Index & FPAR
Photosynthesis and NPP

Integrated Model for Land-surface
Process, Ecosystem function, and
Crop Production

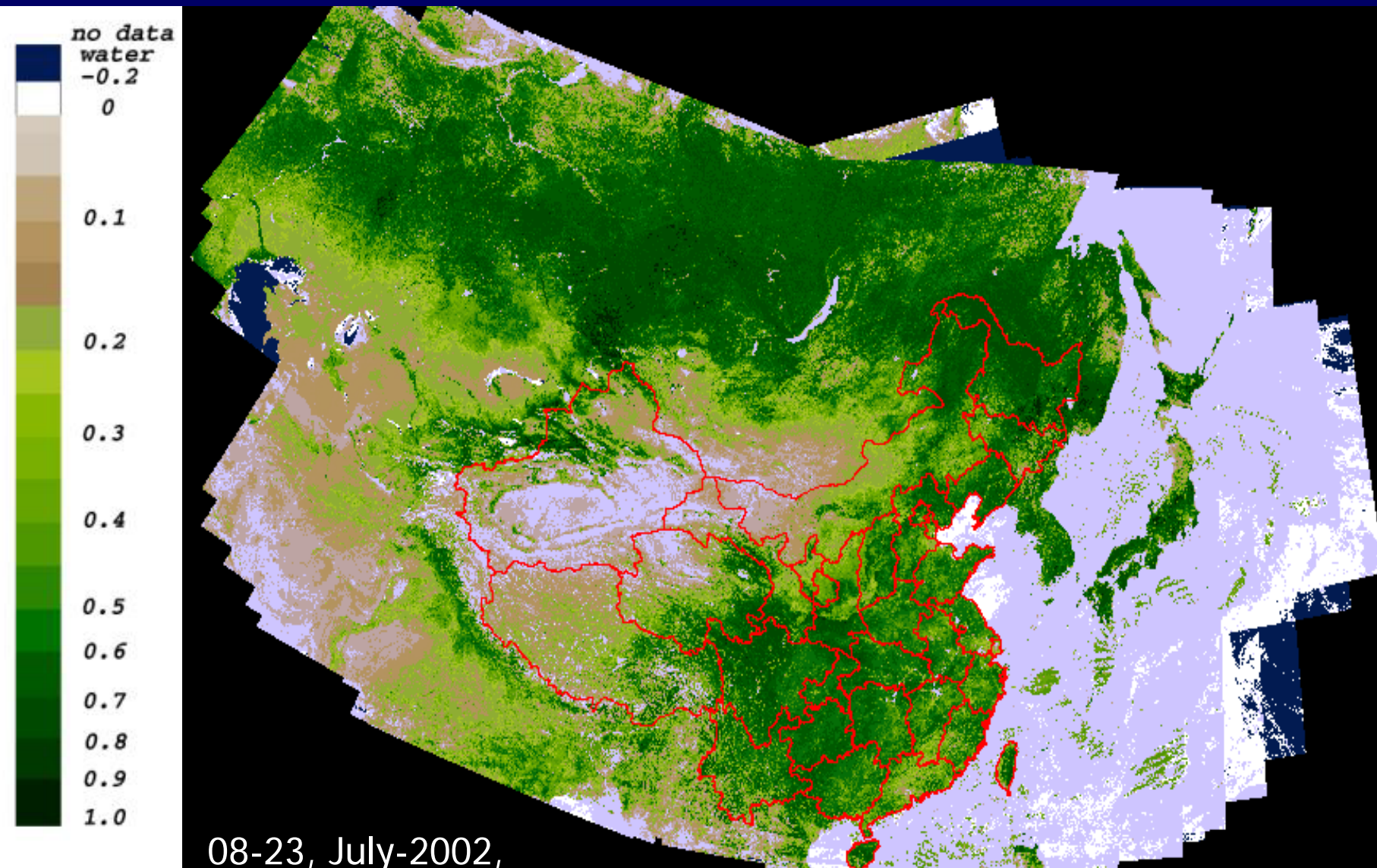


Seasonal Change of Vegetation in 2002, Mongolia

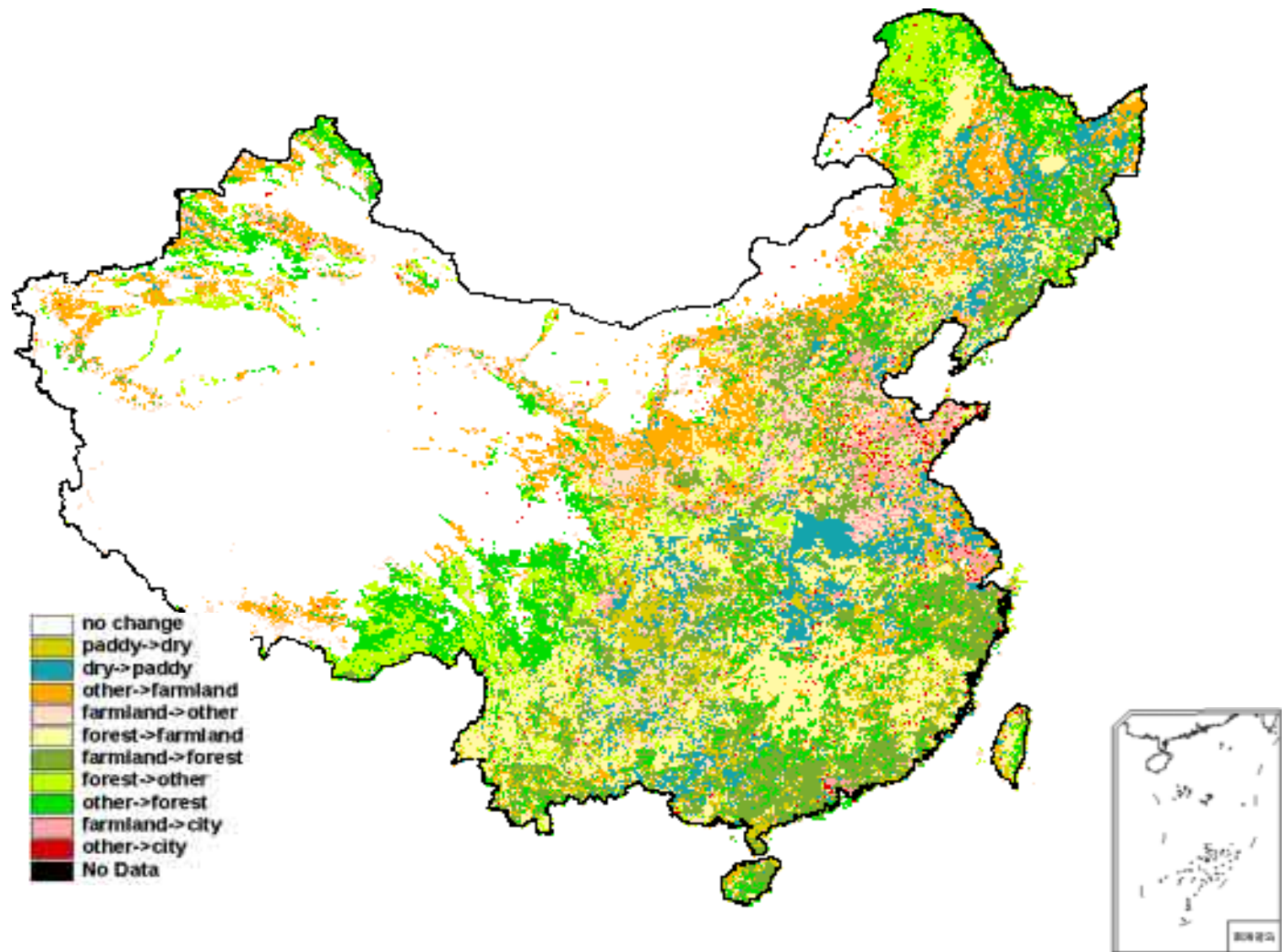


Produced based on NASA's products by NIES Data Center, Japan

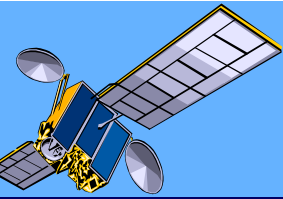
NDVI Coverage of Beijing and Urumqi stations



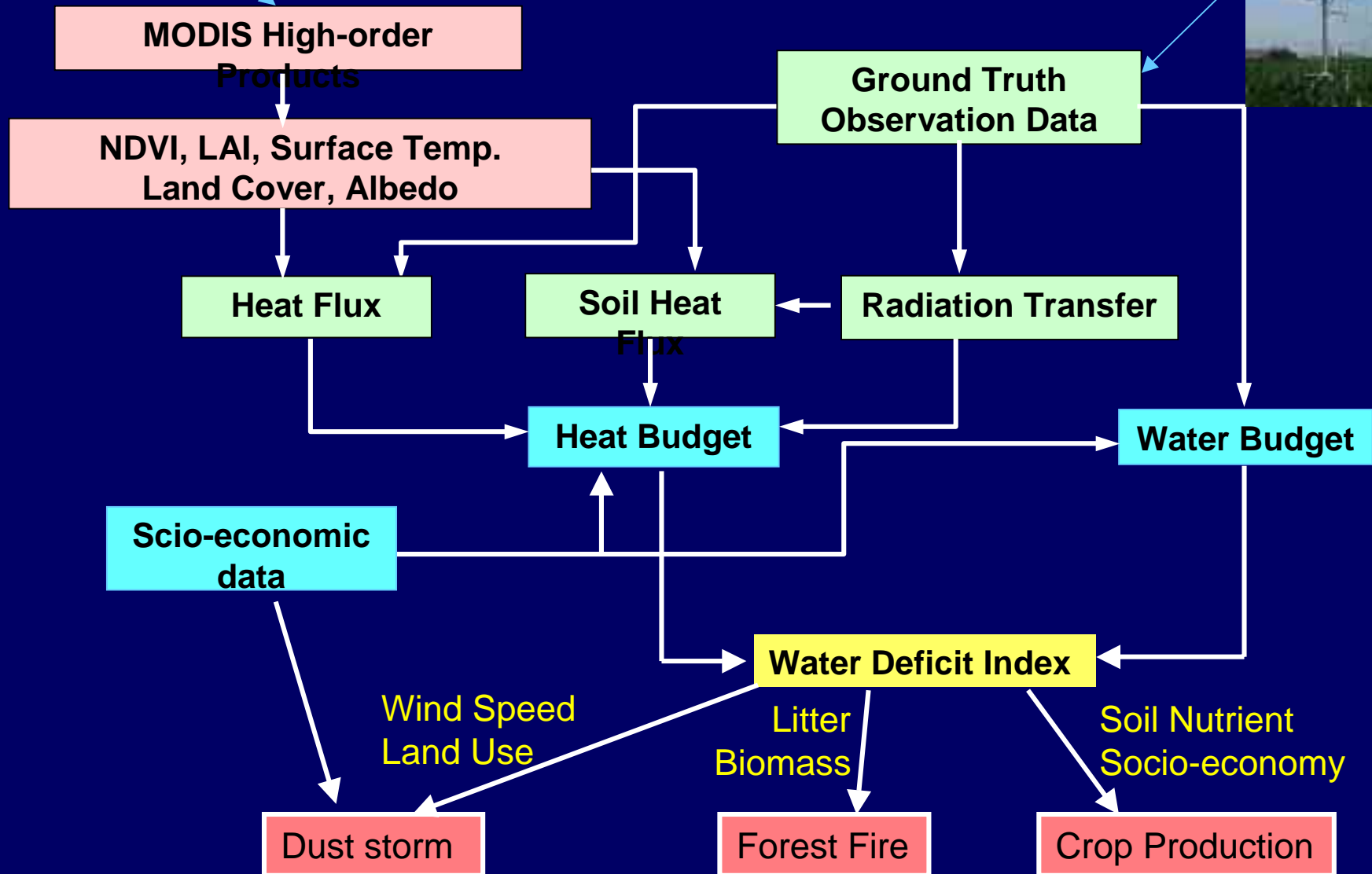
Land Use Change During Last Ten Years in China



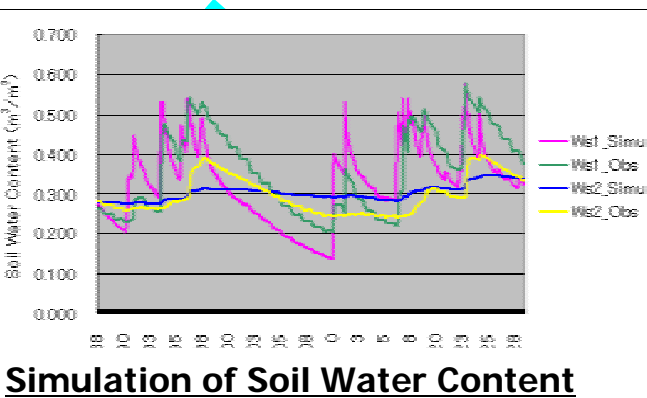
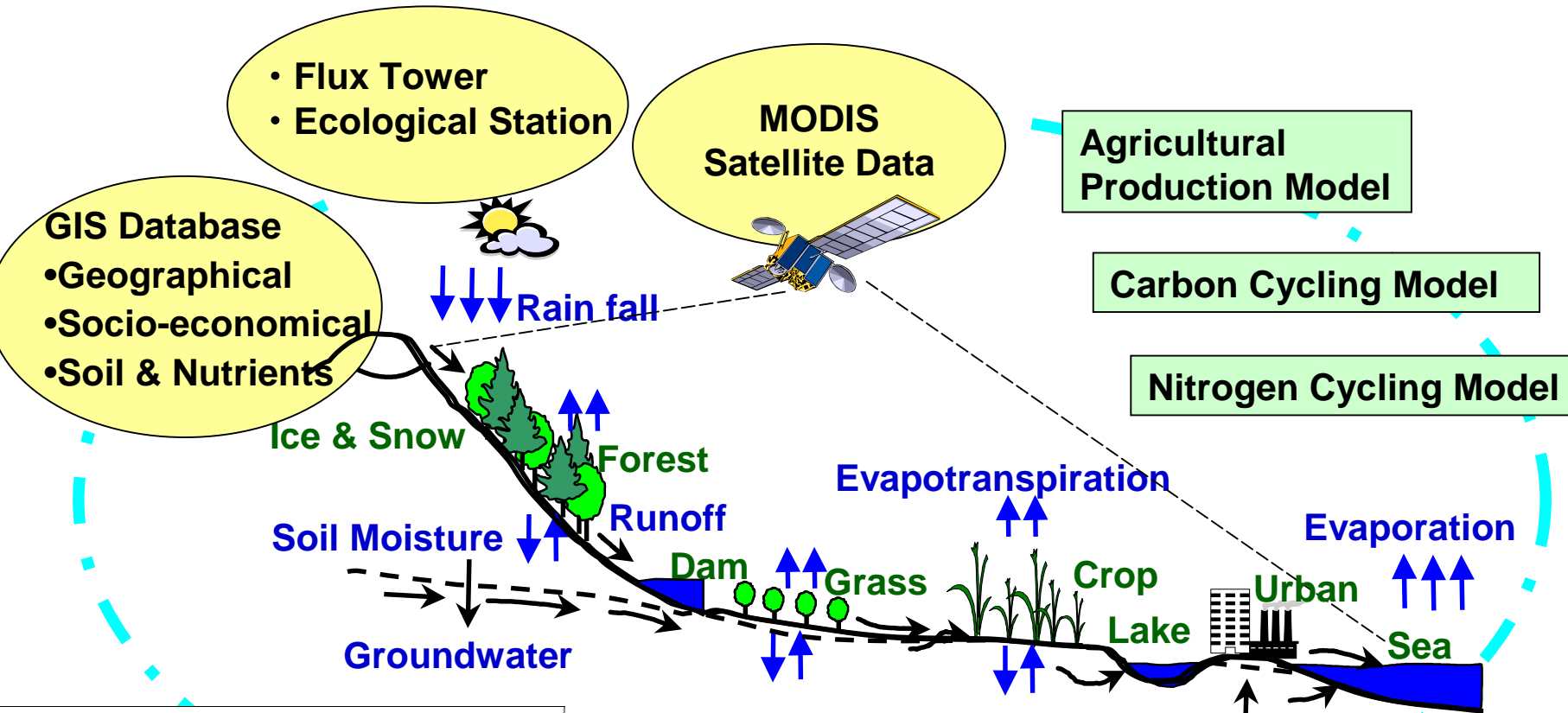
Produced by Beijing Data Center, China



APPLICATION OF ECOLOGICAL INDICES

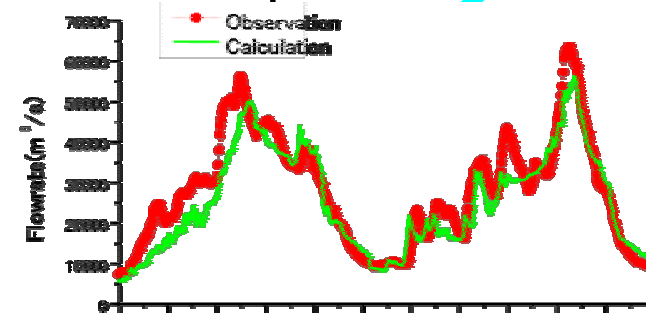


Catchment-based Integrated Model



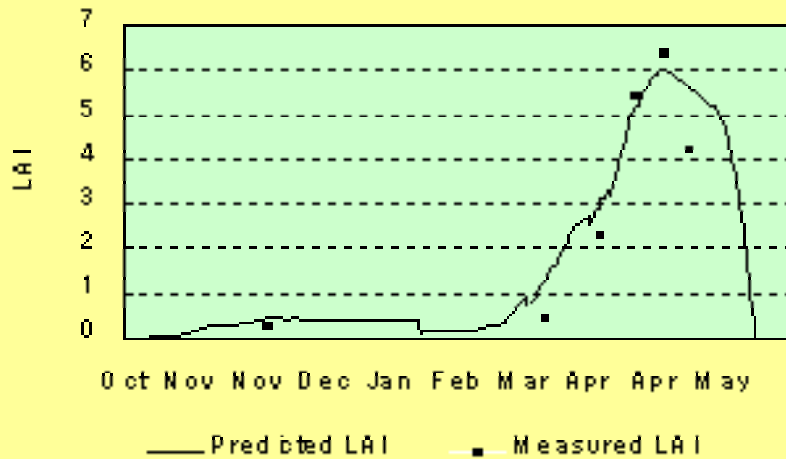
Water Cycling Model

- Discharge
- Soil Moisture
- Runoff and Flood
- Desertification
- Dust Storm

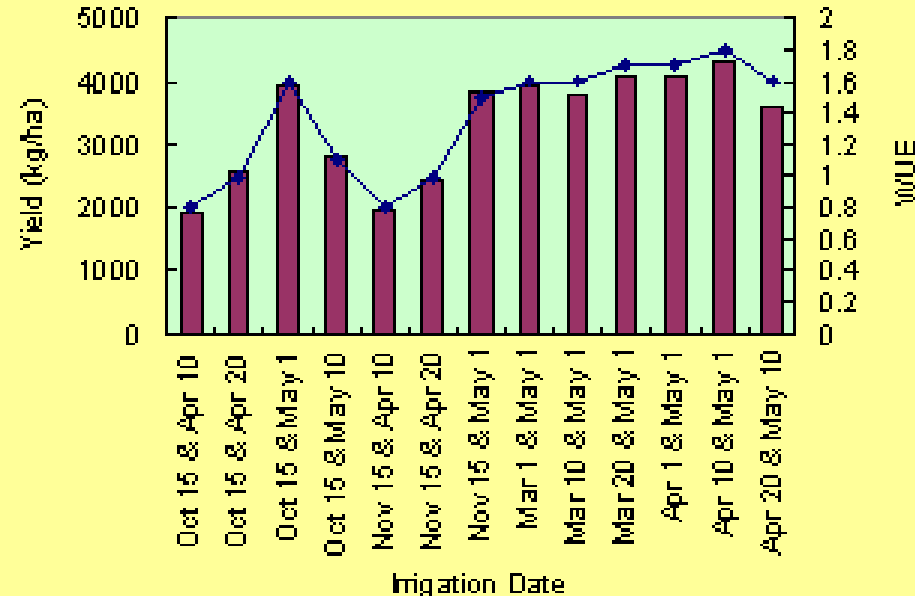
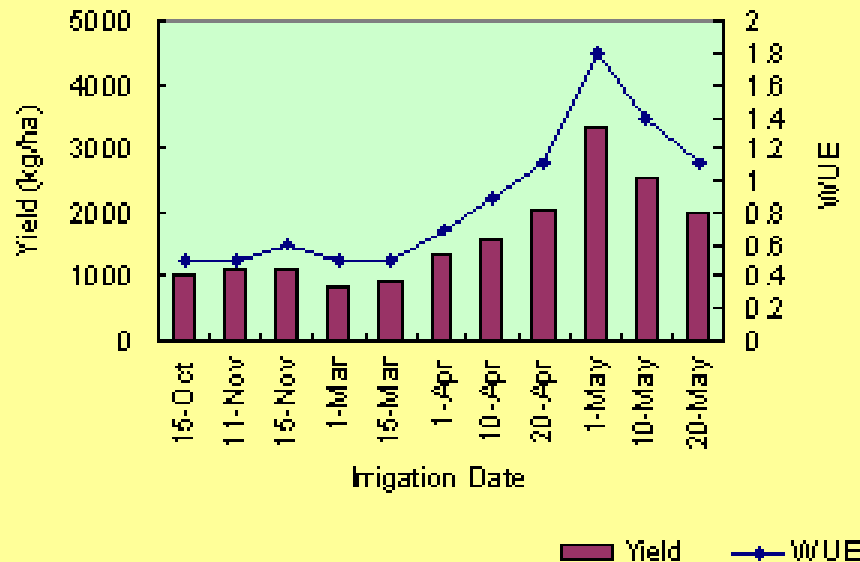


Simulation of Changjiang River Discharge

Simulation of Irrigation Schedule and Water Use Efficiency (Contribute to Agricultural Water Use Policy)



Main items	Simulation	Measurement
Yield (kg/ha)	6608	6330
Weight per grain (g)	0.029	0.029
Grain number (grain/m ²)	22488	21828
Grains per ear	38	38
Maximum LAI	6.1	6.4



APEIS Capacity Building Workshop on Integrated Environmental Monitoring of Asia-Pacific Region

20-21 September 2002, Beijing, China



Workshop on Sustainable Environmental Management of Catchment Ecosystem in Asia-Pacific Region

25-26 November 2002, United Nations University, Tokyo

UNU



Workshop on Sustainable Environmental Management of Catchment Ecosystem in Asia-Pacific Region, 25-26 Nov. 2002, UNU, Tokyo

Message from IEM

1. Large scale environmental degradation in Asia-Pacific Region caused by climate change and human activities can be detected by MODIS Network
2. Environmental degradation in terms of area, frequency and degree in Asia-Pacific Region are found to be much severer than predicted.
3. Most environmental degradations are related with water issues, such as desertification, floods, drought, dust storm, forest fire, water shortage, water pollution, etc.
4. Catchment-based environmental management is essential for sustainable development. IEM is contributing to the Task Force of Integrated River Basin Management in China Council for International Cooperation on Environment and Development (CCICED).
5. Establishment of regional information system communicating with decision makers in Asia-Pacific Region is proposed.

Participation Organization:

National Institute for Environmental Studies (NIES), Japan
Institute for Geographical Sciences and Natural Resources Research (IGSNRR),
Chinese Academy of Science (CAS), China
National University of Singapore (NUS), Singapore
Commonwealth Scientific & Industrial Research Organization (CSIRO), Australia
Chinese Ecosystem Research Network (CERN), China
Xinjiang Institute of Ecology and Geography (XIEG), CAS, China
Institute of Subtropical Agriculture (ISA), CAS, China
Northwest Plateau Institute of Biology (NPIB), CAS, China

Web sites :

<http://www.ecoasia.org/APEIS>
http://www.nies.go.jp/basin/index_e.html