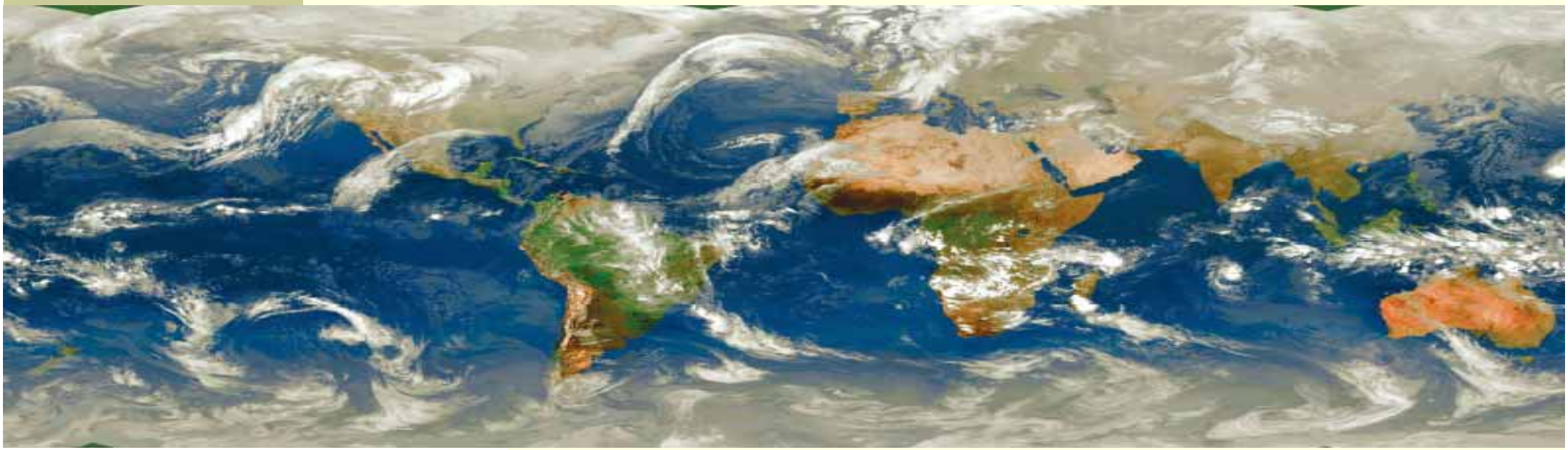
Progress on Earth Observation in China, 2007



GROUP ON EARTH OBSERVATIONS

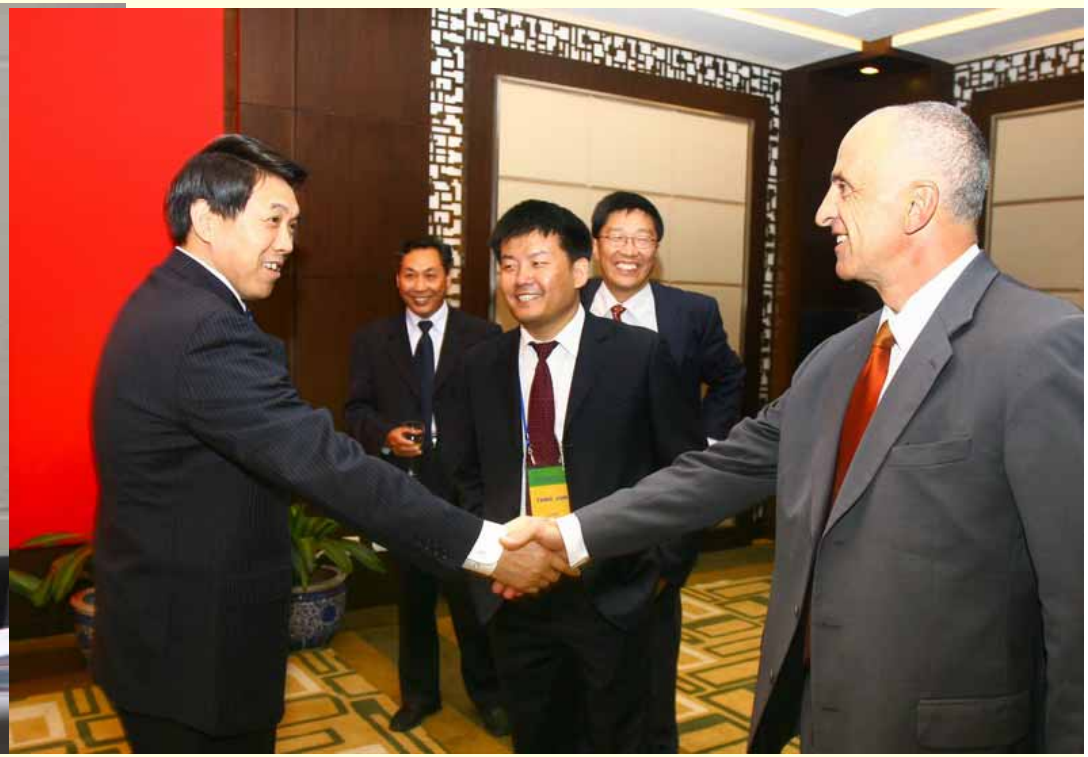
2nd GEOSS AP Symposium, Tokyo, Japan, Apr. 2008

Outline

- Important Role of China in GEO
- GEO Activities in China
- GEOSS Progress in China

I. Important role of China in GEO

China renewed Co-Chair of GEO in Nov. 2007, which is contributed from AP members.

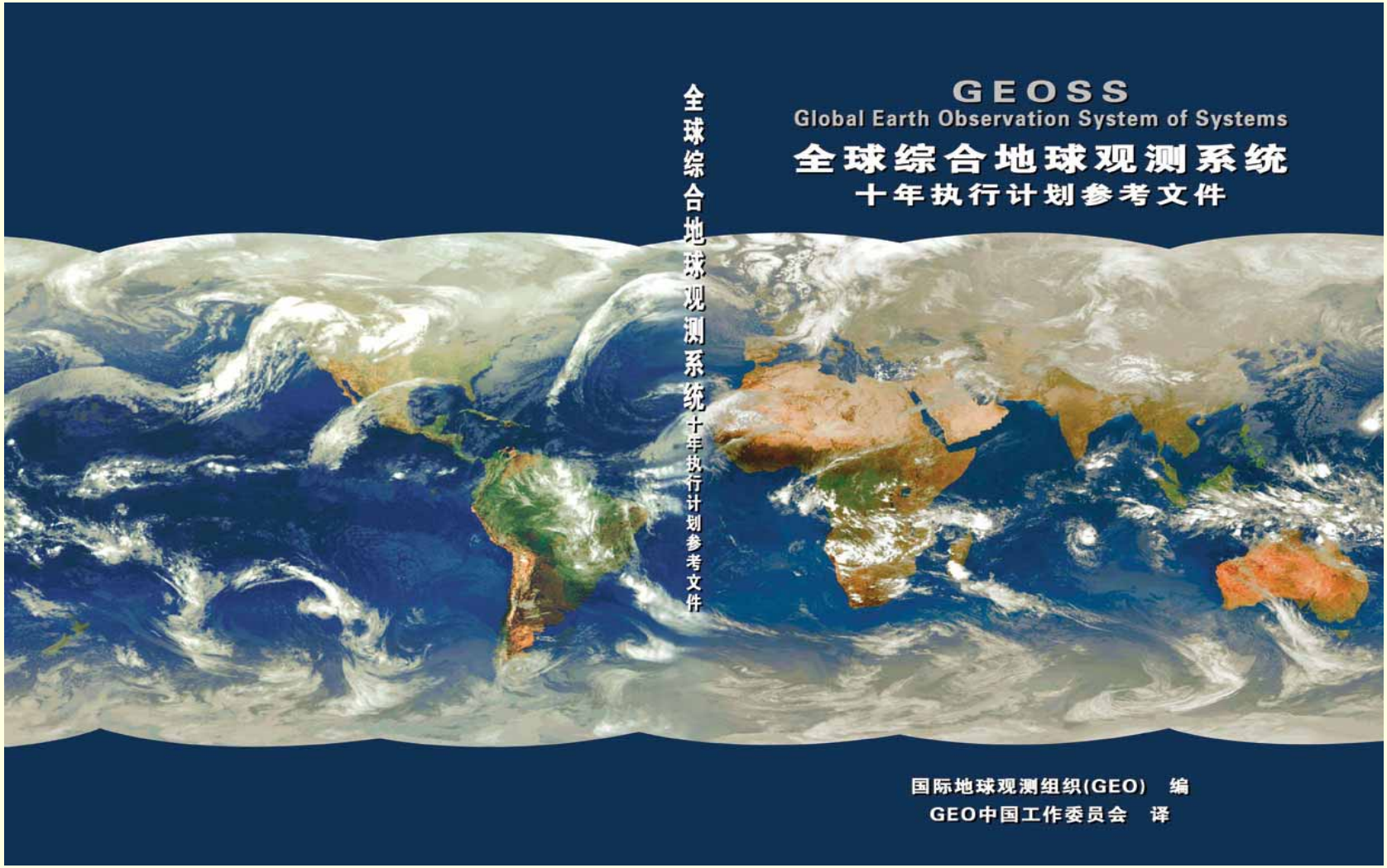


II. GEO Activities in China

- Publish GEOSS Ten-Year Implementation Plan in Chinese version, 2007
- Release China's National Climate Change Programme, Jun. 2007
- Host Asia-Pacific Regional Workshop on GEOSS Information Access, Oct. 2007
- Donation of FENGYUNCast User receptions to Asia Pacific developing countries, Oct. 2007
- Preparation for Providing the Meteorological Service in Support to the Beijing Olympic Games 2008
- Participate in international activities of GEO and GEOSS including GEO Tasks, Working Group, Workshop,2007
- Preparation for the GEO-V plenary session in Beijing, Nov. 2008

GEO Activities in China (1)

- Publish the GEOSS Ten-Year Implementation Plan in Chinese version



GEO Activities in China (2)

Release China's National Climate Change Programme.

China's National Climate Change Programme

Prepared under the Auspices of

National Development and Reform Commission

People's Republic of China

Printed in June 2007

CONTENTS

GEO Activities in China (3)

- Hosted Asia-Pacific Regional Workshop on GEOSS Information Access in Beijing.
- GEO Press Conference in Beijing

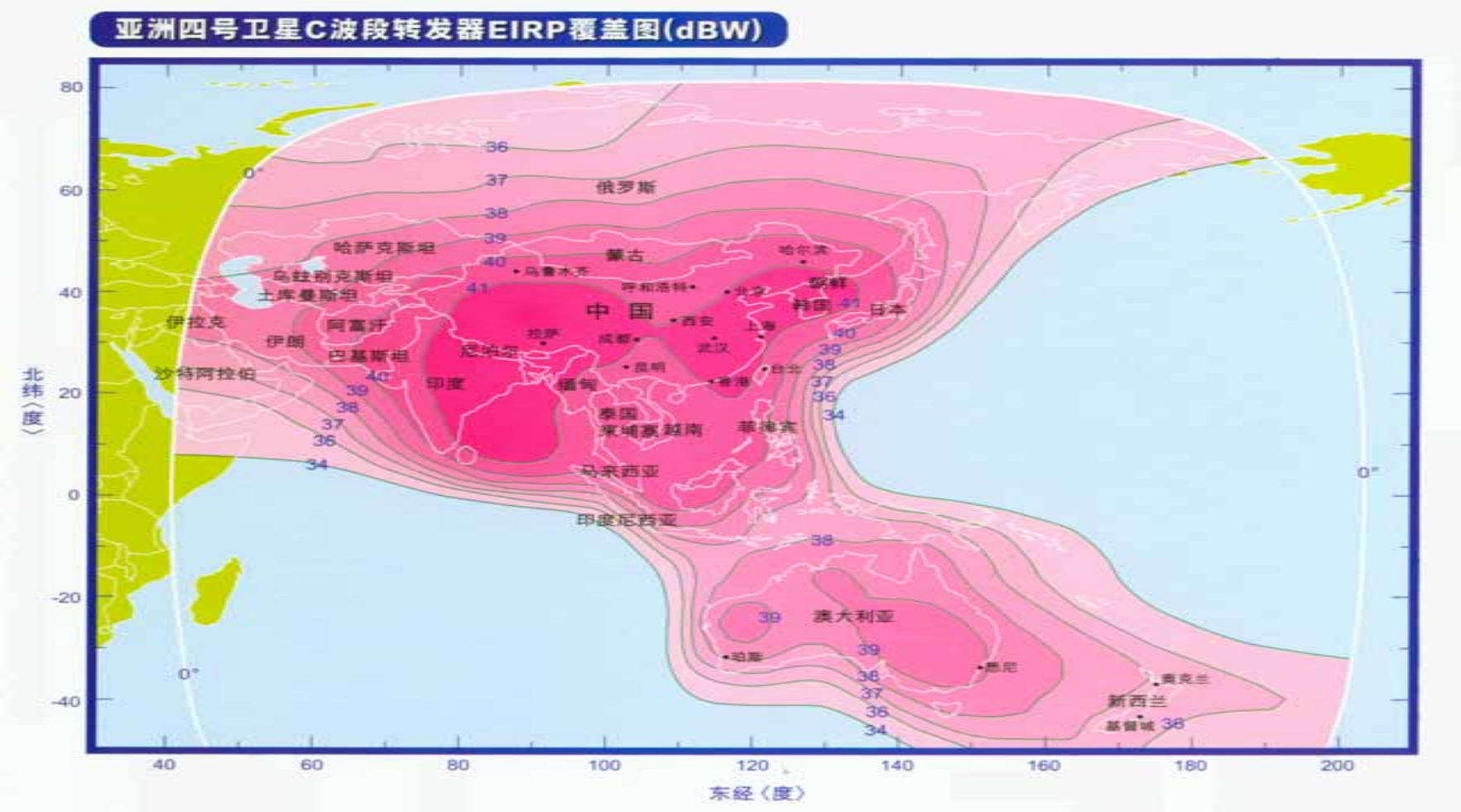
GEO Activities in China (4)

- **In Oct. 2007, another eleven user reception systems of FENGYUNCast donated to eleven countries** (Burma, DPRK North Korea, Kirghizia, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Tajikstan, Uzbekistan, and Viet Nam)
- **a FENGYUNCast user training workshop was held in CMA in Oct.2007.**

The FENGYUNCast International Users Training was held in CMA in Oct. 200

FENGYUNCast

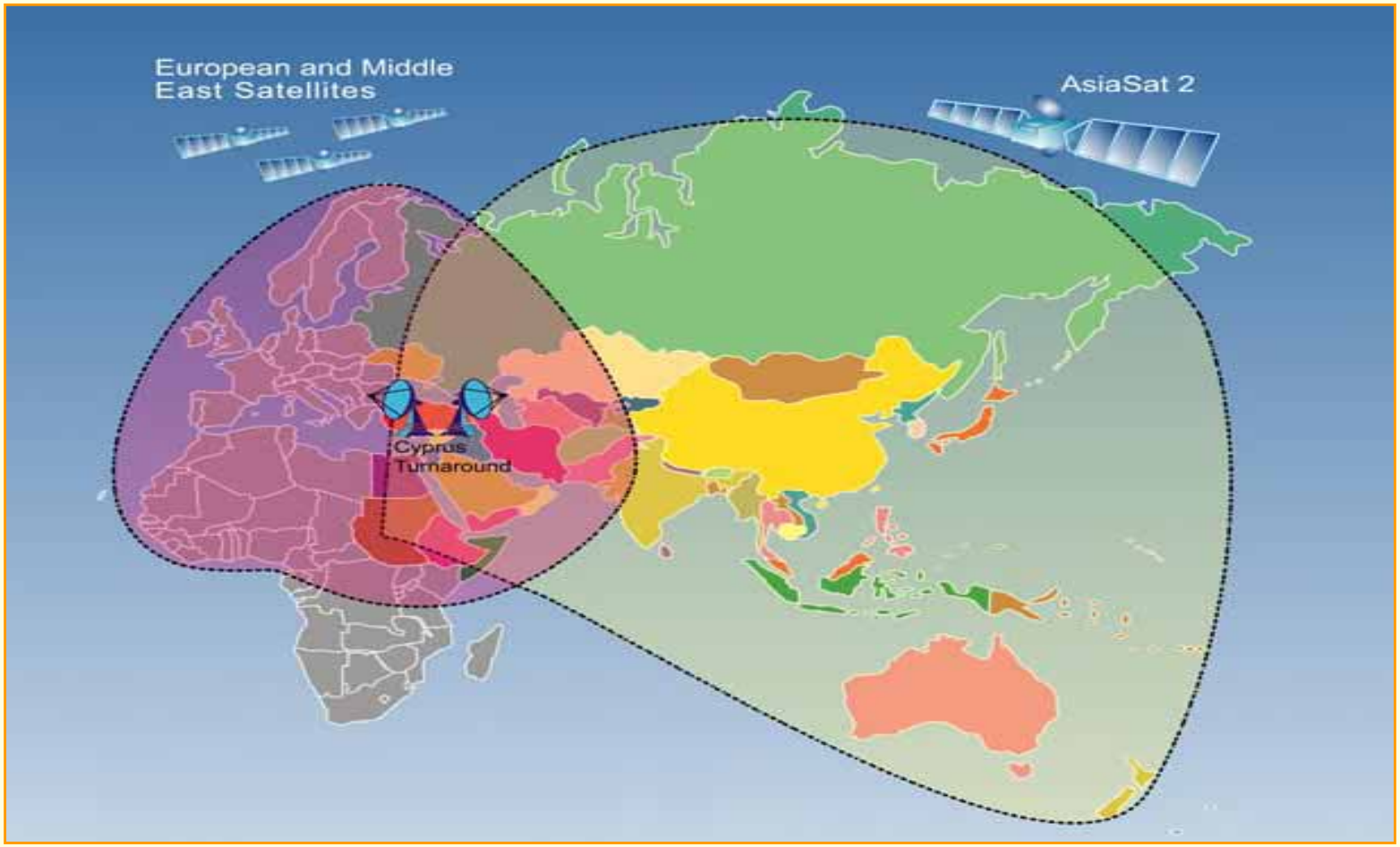
Wider Coverage for AP region Countries.



Asiastar-4 C-band EIRP Coverage

FENGYUNCast

AP Countries are now able to get global Earth observation data through FENGYUNCast.



FENGYUNCast
– important member of GEONETCast

As a regional system under GEONETCast, now the total 17 countries in AP are benefit from **FENGYUNCast**.

FENGYUNCast now constitutes the Asia Pacific region hub of GEONETCast, a near real-time, global delivery system for environmental information . The system obtains Earth observations from the numerous land-, sea-, air- and space-based systems that together constitute GEOSS.

We sincerely hope users' feedback us with valuable comments and suggestions for a better system tomorrow.

GEO Activities in China (5)

2008 Beijing Olympics Task

The **2008 Beijing Olympics** Task team, led by China and WMO, has organized a workshop to draw the lessons from the second system-trial for the **Forecast Demonstration Project of the** (B08FDP).

The FY-2D & FY-2C dual-satellite observations have been implemented, which increases the frequency of earth observation from once every 30 minutes to once every 15 minutes.

The Beijing Olympic Meteorological Service Centre carries out 3-dimensional variational data assimilation, it has set up such operational systems as nowcasting, short-time & short-term weather forecasting with a spatial resolution of 3 kilometers

Two tests of international weather forecast demonstration project (FDP/RDP) were accomplished in 2006 and 2007 respectively

GEO Activities in China (6)

Participate in GEO and GEOSS activities

- GEO Tasks, ExCom Meetings, Plenery Sessions, Working Group, Workshop,……

GEO Activities in China (7)

- **Preparation for the coming the Fifth GEO Plenary Session, which will be held in Beijing Nikko New Century Hotel, Nov., 2008.**

三层中小型多功能厅
DELUXE FUNCTION ROOMS-3F
3階中・小型ファンクションルーム

上海厅 SHANGHAI HALL

广东厅GUANGDONG HALL

南京厅 NANJING HALL

中华厅 ZHONGHUA HALL 中華厅

世纪厅 CENTURY HALL 世紀厅

四川厅 SICHUAN HALL

山东厅 SHANDONG HALL

III. GEOSS Progress in China

1. Earth Observations Satellite Series

- **Meteorological Satellite**, Polar Orbiting satellites FY-1 A,B,C,D, FY-3A and Geostationary satellites FY-2A,B,C,D
- **Oceanic Satellite**: HY-1A, HY-1B
- **Earth Resource Satellites**: CBERS-1, CBERS-2, CBERS-2B
- **Environment and Disaster Reduction Satellite** (2 Optic and 1 SAS)
- **Small Satellites:** Beijing No.1 Satellite (Launched in Oct. 2005)

Meteorological Satellite Program

Polar System

FY
|
1A
1B
1C
1D

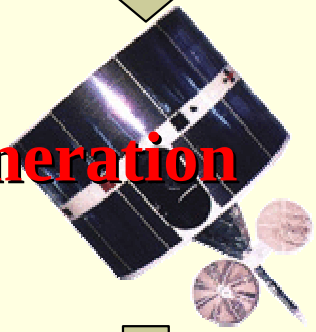
First Generation

FY
|
3A
3B
3C
↓
3H

Second Generation

Geostationary System

First Generation

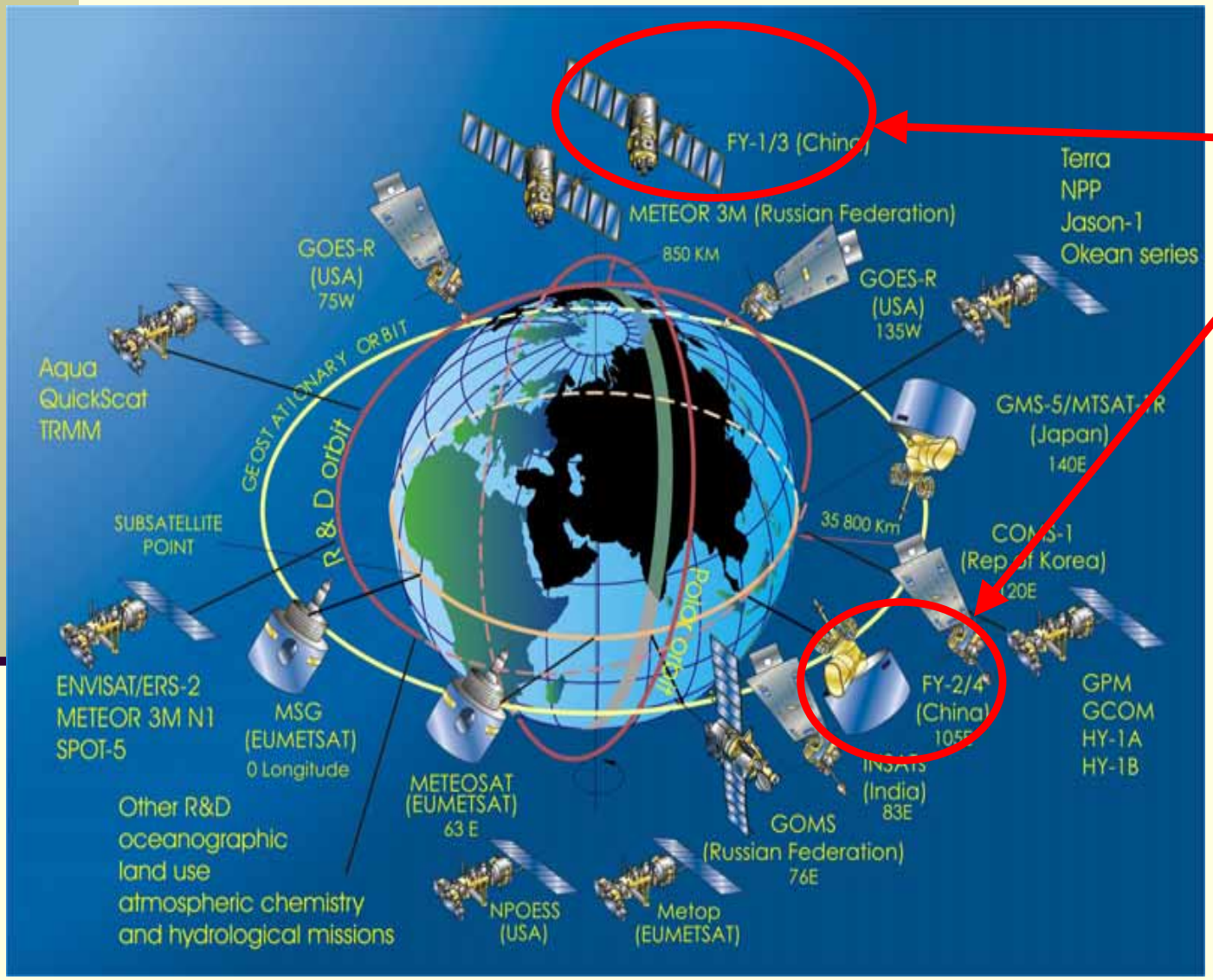


FY
|
2A
2B
2C
2D
2E

Second Generation

FY
|
4

World Weather Watch
- Global Observing System (Space Component)



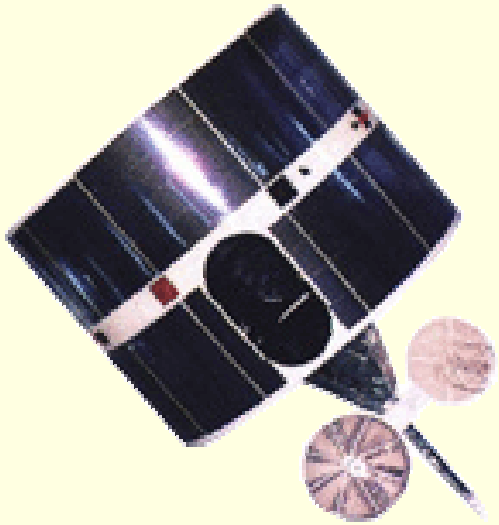
FY-1

FY-2

China Contribution to GEOSS

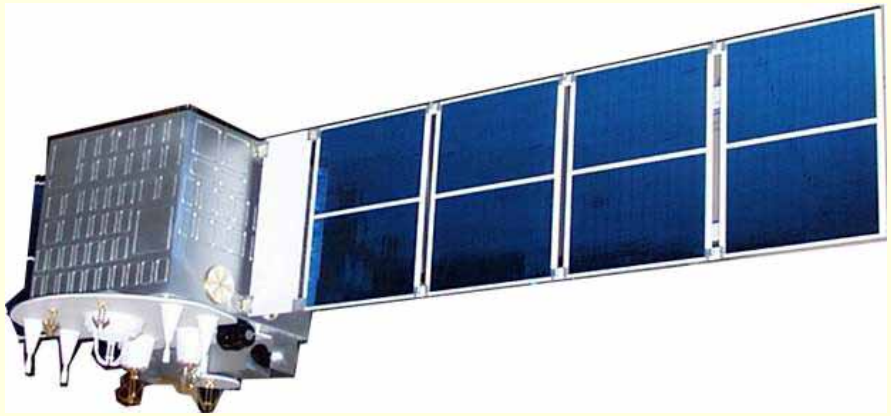
System of dual-satellites by FY2-C/D

- On 8 Dec. 2006, a geostationary meteorological satellite FY-2D was launched successfully.
- The FY-2D & FY-2C dual-satellite observations have been implemented, which increases the frequency of earth observation from once every 30 minutes to once every 15 minutes.



Future of Polar-Orbiting Meteor. Sat.

- FY-3, second generation of polar satellite
  - With both Imaging and Sounding Missions (microwave sensor)
  - Enhanced global observation capability
  - Will be launched in May,2008



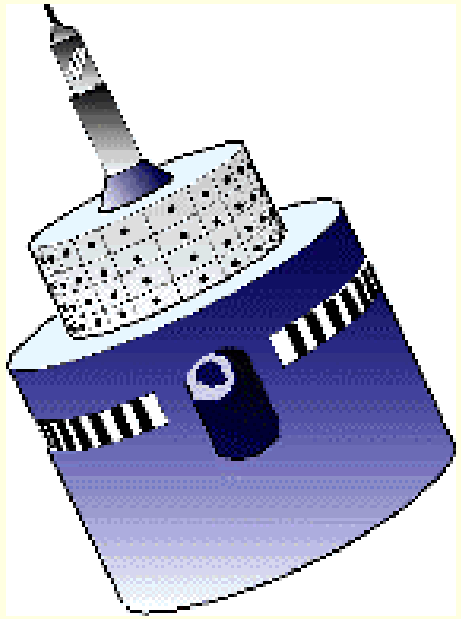
FY-3A is the first satellite of new generation of polar system. The important improvement from the old is 11 payloads onboard. Among those, only the VIRR are inherited from the formal platform. The three sensors in green shadow group together as ATOVS-like for atmospheric sounding; and MERSI is MODIS-like, which can provide aerosol information; and SBUS and TOU are SBUV and TOMS-like, which can provide ozone profile and total ozone amount separately.

Abbreviation	*Instrument Full Name*
VIRR	Visible and InfraRed Radiometer
IRAS	InfraRed Atmospheric Sounder
MWTS	MicroWave Temperature Sounder
MWHS	MicroWave Humidity Sounder
MERSI	MEdium Resolution Spectral Imager
SBUS	Solar Backscatter Ultraviolet Sounder
TOU	Total Ozone Unit
MWRI	Microwave Radiation Imager
SIM	Solar Irradiation Monitor
ERM	Earth Radiation Measurement
SEM	Space Environment Monitor

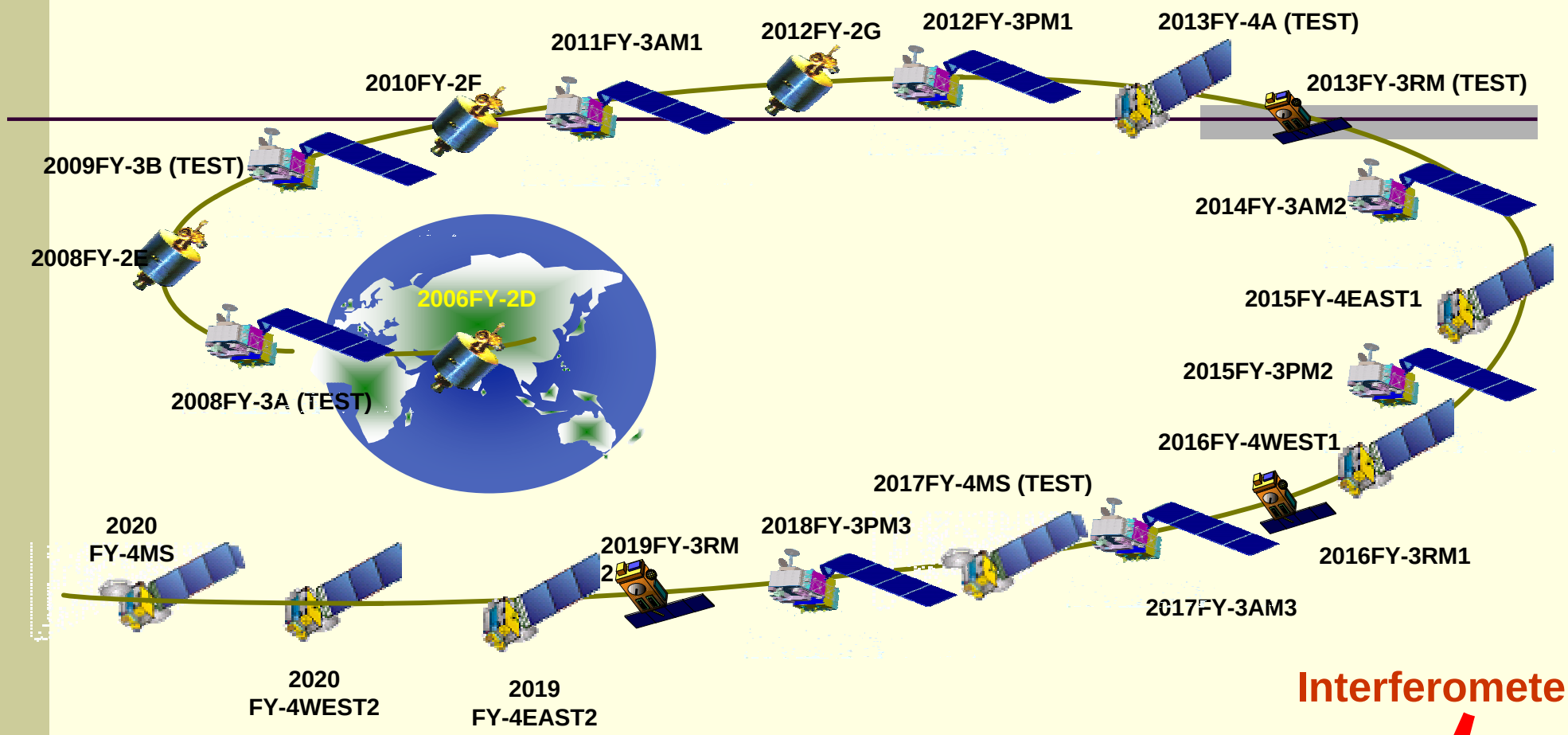
Payloads onboard on FY-3A

Future of Geostationary. Meteor. Sat.

- Development of **FY-4** (Second generation of Geostationary Meteorological Satellite Series)
  - More powerful imagers
  - Sounding capability
  - Data Collection Platforms



Tentative Schedule for Future FY Series



Interferometer

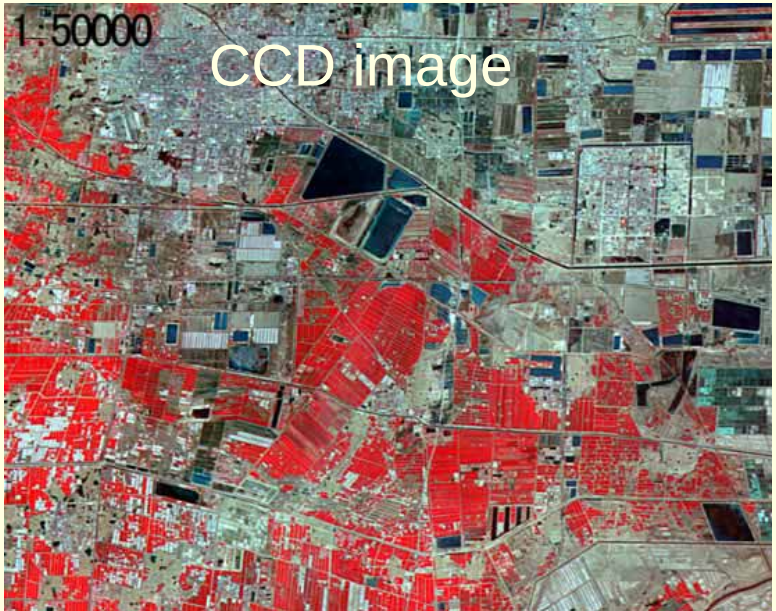
Mission	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	.....
FY1	▲A		▲B									▲C			▲D														
FY2										▲A			▲B				▲C			▲D		▲E							
FY3																					▲A		▲B				▲C		
FY4																												▲A	

Oceanic Satellites in China

- HY-1A satellite was used for the detection of ocean color and temperature scanner with 10 bands and CCD imaging apparatus.
- HY-1B satellite was launched in Apr. **2007.**
- HY-2 satellite onboard microwave sensors is in the stage of development.
- HY-3 satellite will carry both optical and microwave sensors.
- HY-1, HY-2 and HY-3 will form space-based China ocean observations system.

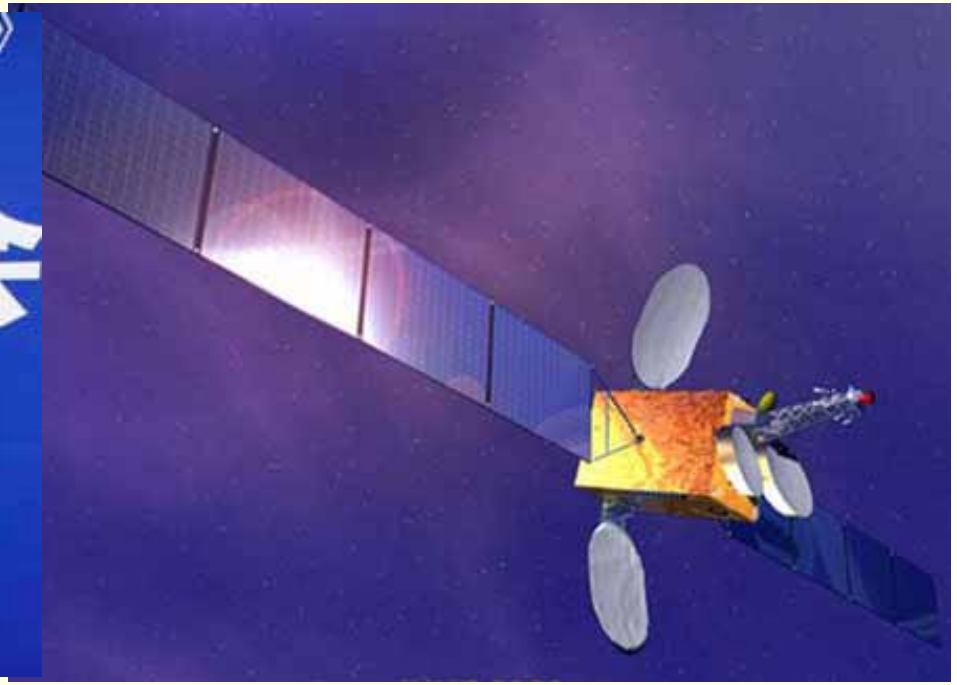
Earth Resources Satellites in China

- China-Brazil Earth Resource Satellite (CBERS) was jointly developed by China and Brazil, which initiated the first space high-tech cooperation between two developing countries.
- CBERS 01 was successfully launched in Oct. 1999.
- CBERS 02 was successfully launched in Oct. 2003.
- CBERS 02B was successfully launched in Sep. **2007**



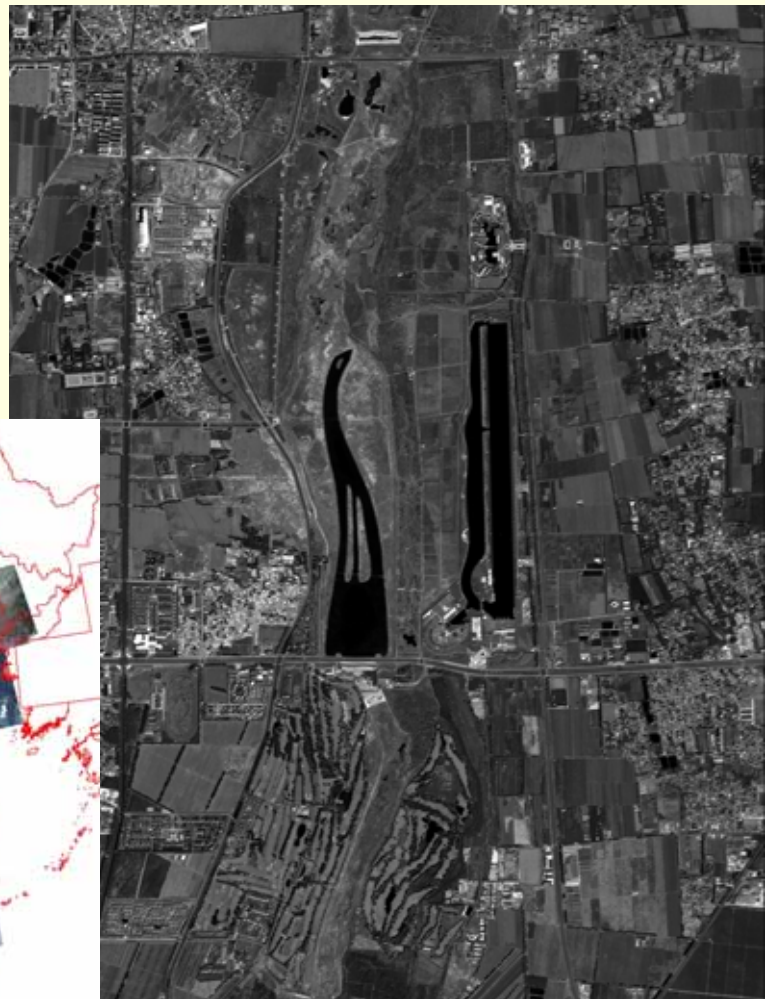
Environment and Disaster Reduction Satellite

- Environment and Disaster Reduction Satellite (2 Optic and 1 SAS) will be launched in 2008.



Beijing No.1 Satellite

- **Small Satellites:** Beijing No.1 Satellite (Launched in Oct. 2005), provide good products for Olympic games in 2008.



GEOSS Progress in China (2)

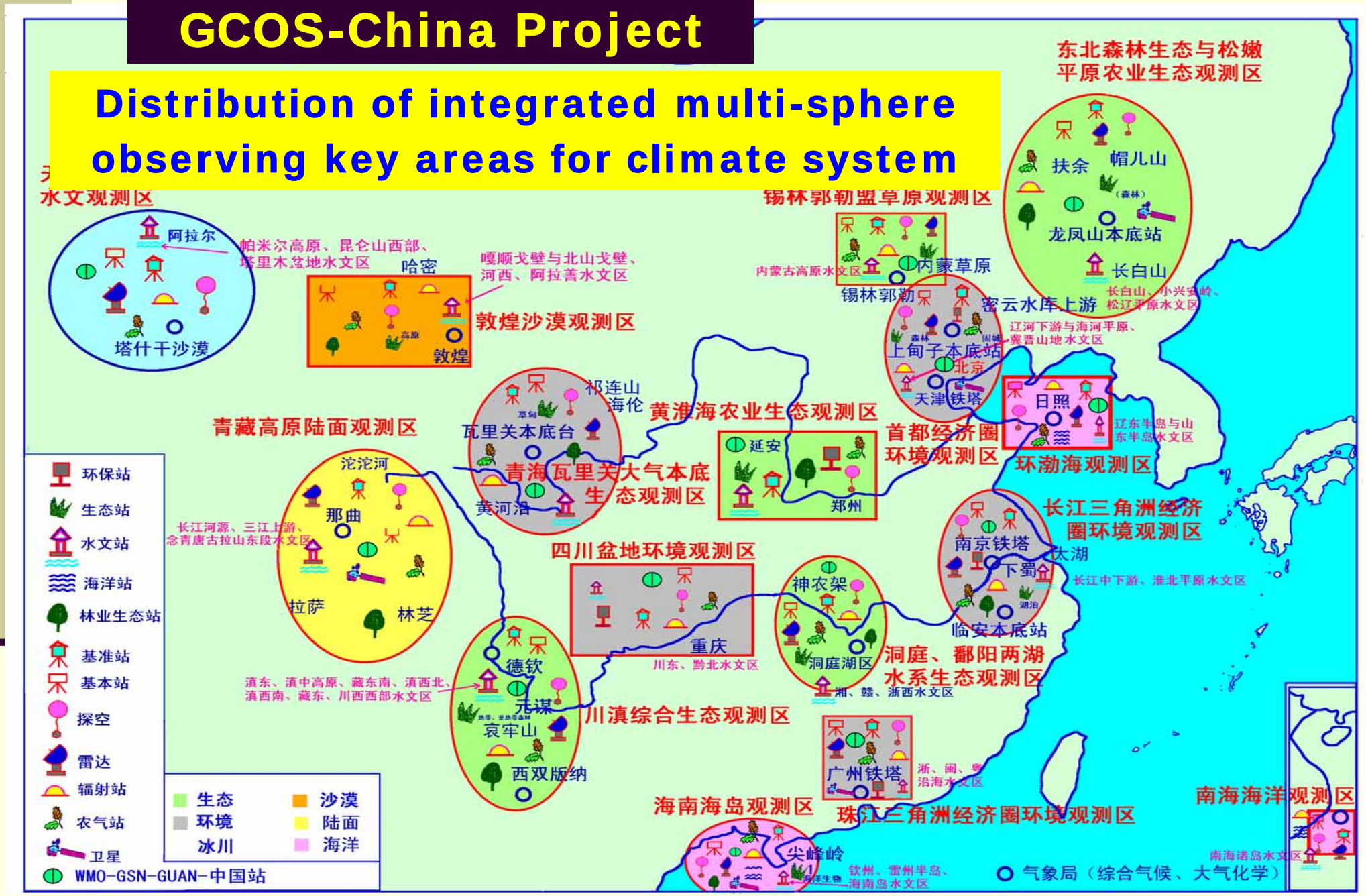
2. Network for in-situ Observations

- National Meteorological Observation Network
- Digital Earthquake Observations Network
- National Ocean Observations Network
- CERN (China Ecology Research Network)
- CFERN (China Forest Ecology Research Network)
- ……

In-situ Observation Network in China

GCOS-China Project

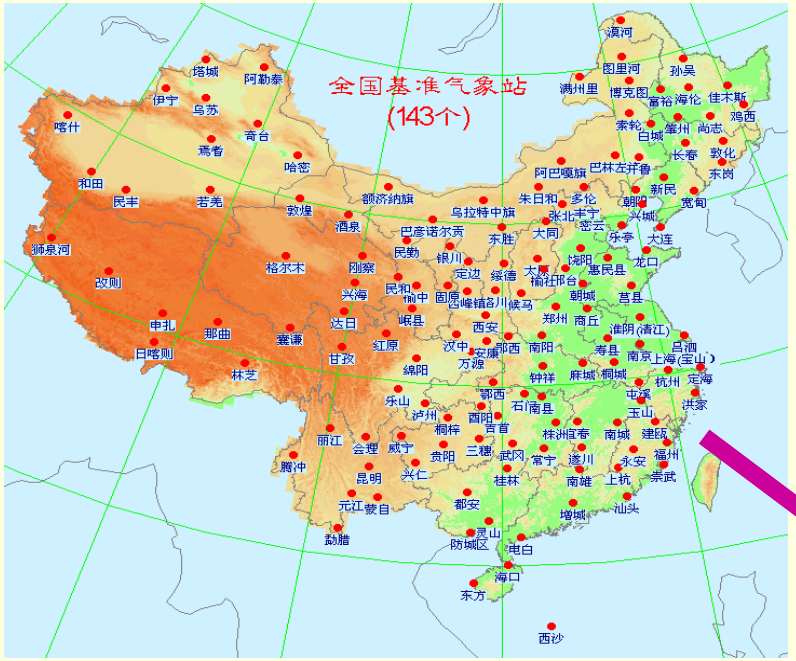
Distribution of integrated multi-sphere observing key areas for climate system

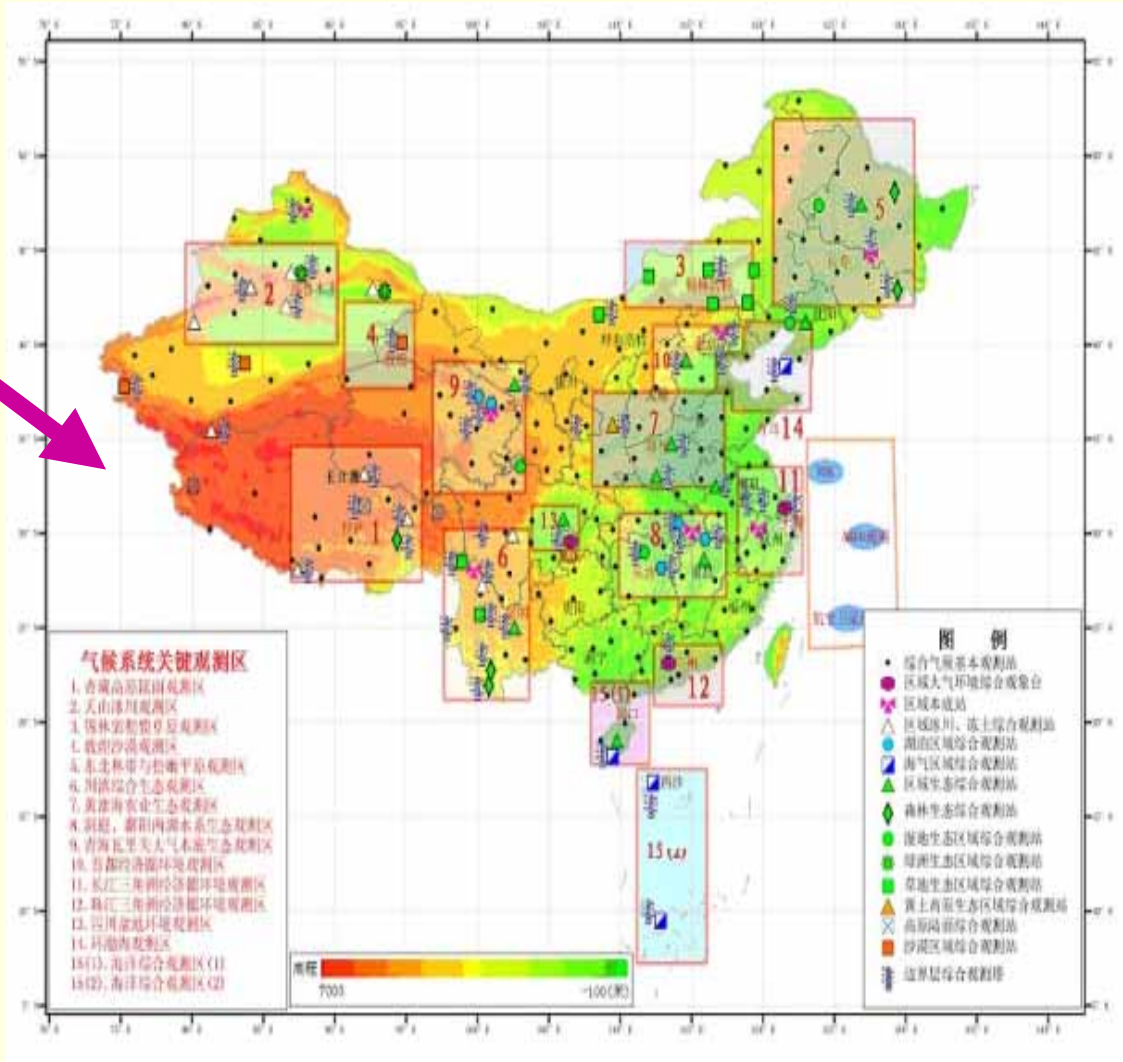


Meteorological Observation system

- National Climate Monitoring Network
- National Synoptic Observation Network
- National Specialized Meteorological Observation Network
- Regional Meteorological Observation Network.

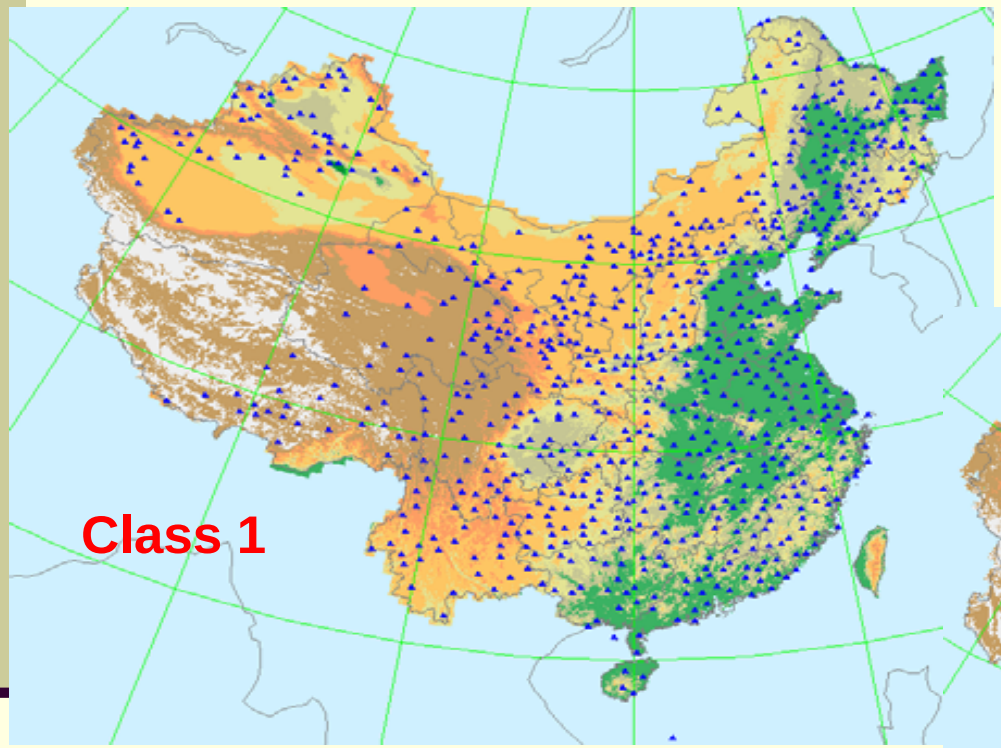
National Climatological Observatories: 260

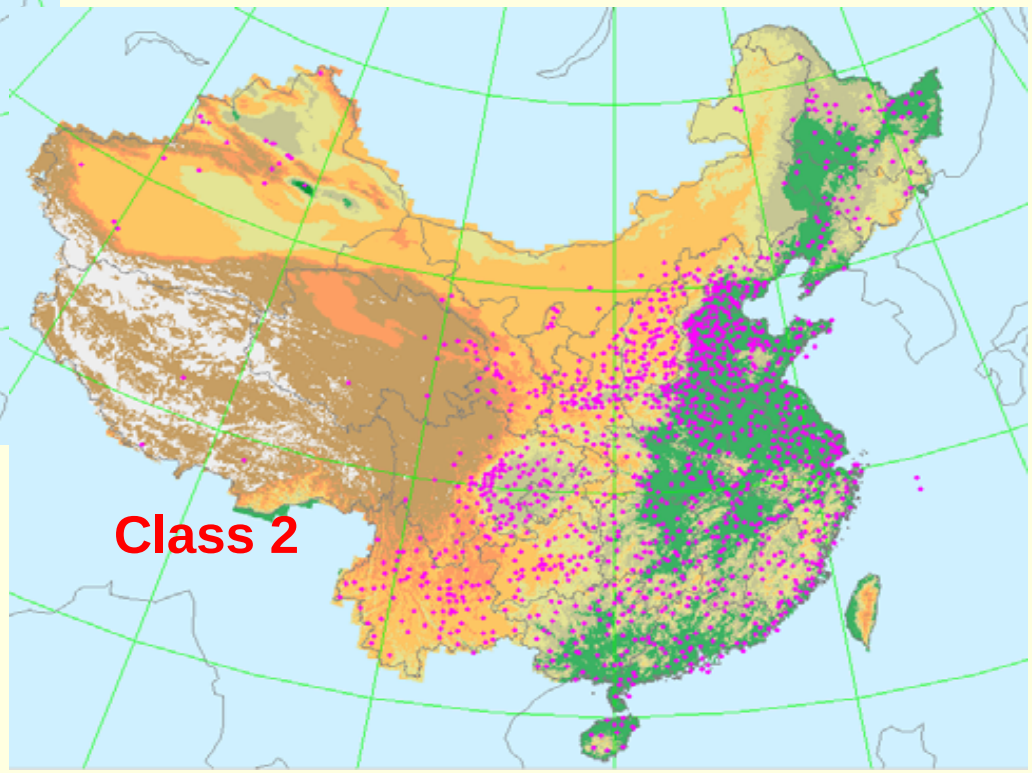




National Meteorological Observation Stations: 2400

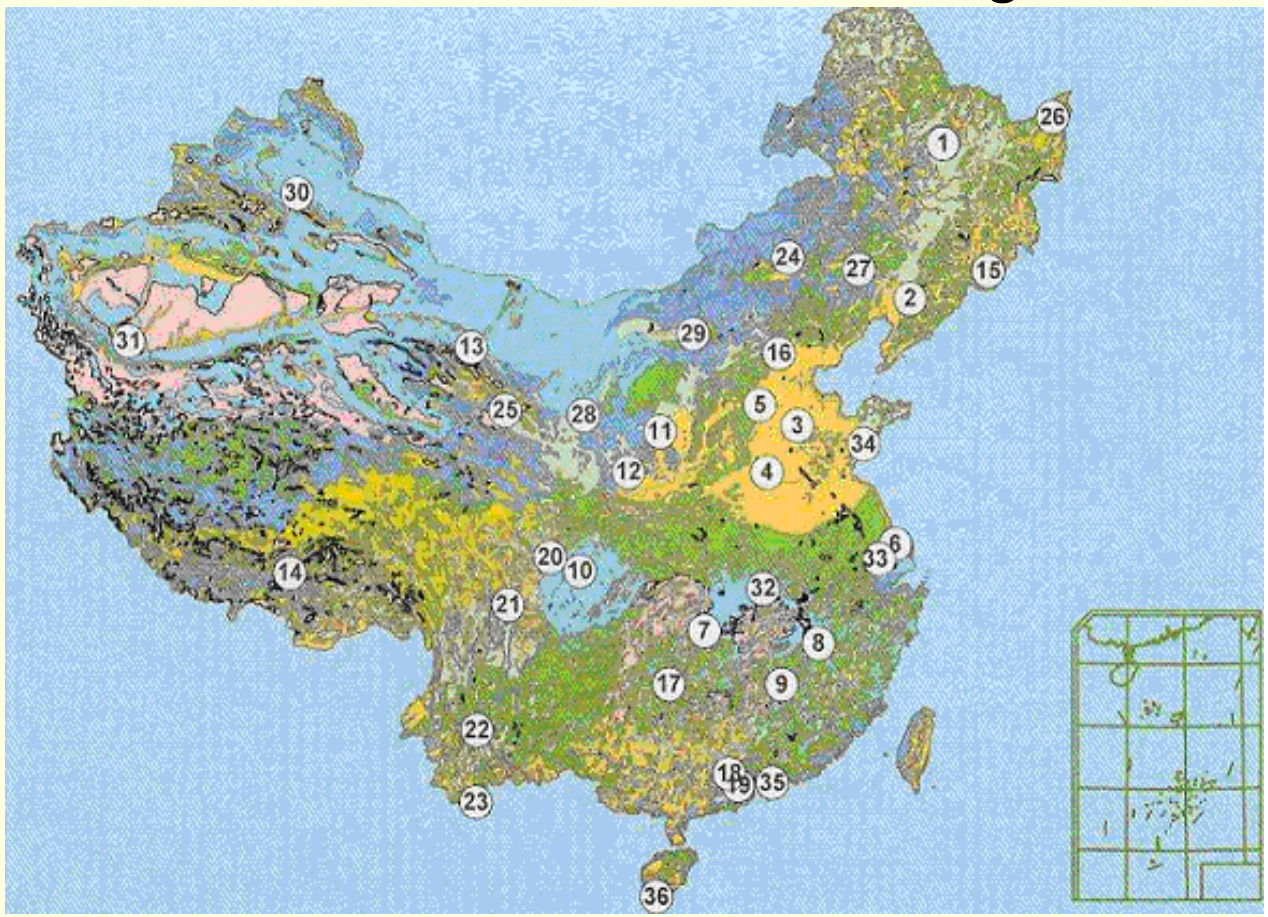
Average space resolutions is about 60 km.





CERN (China Ecology Research Network)

- CERN has been operating by Chinese Academy of Sciences since 1988.
- CERN included 36 in-situ stations which are focusing on the agriculture, forest, grassland, wetland, desert, lake and ocean observations.



CFERN (China Forest Ecological Research Network)

- CFERN has been operating by the Ministry of Forest since 1992.
- CFERN included 14 in-situ stations which are focusing on the forest eco-system structure and function observations.

Integrated Observation Systems over several sectors

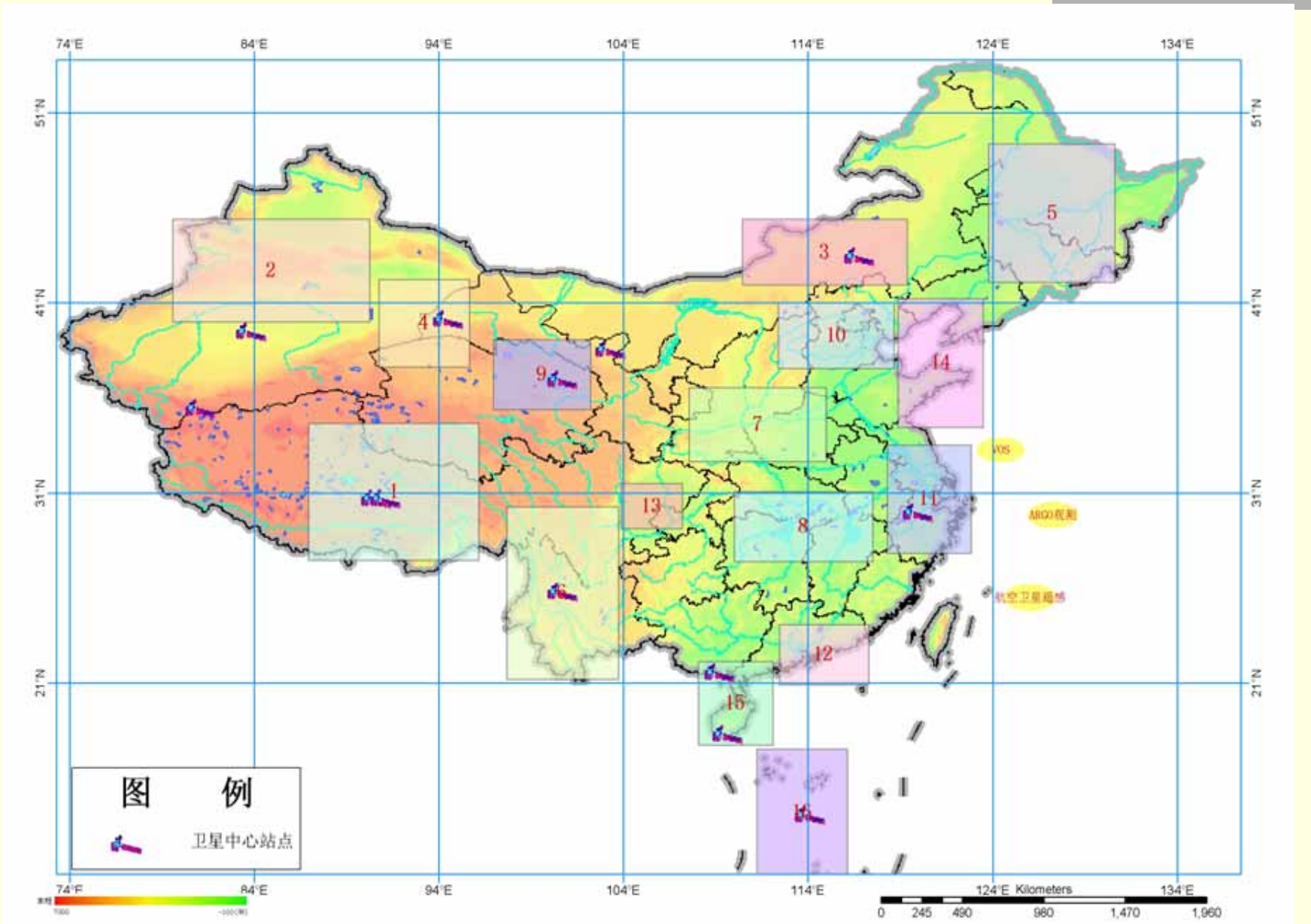
- China Climate Observations System
- China Atmospherical Chemistry Observations System
- China Oceanic Observations System
- China Water Cycle Observations System
- China Carbon Cycle Observations System

Radiometric calibration site for satellite sensors in China (land and water body)

Dunhuang Gobi Desert

Lake Qinghai

Future of ground calibration sites for earth observation satellites



GEOSS Progress in China (3)

- China has made a great efforts to promote the cooperation with the international communities in Earth observation and signed 13 cooperation agreements and memoranda with a lot of nations, space agencies and international organizations.

- Three earth resource satellites have been successfully launched with the collaboration of China

Pseudo-color Image of Yellow River Delta from CCD of CBERS-1

Welcome to Beijing GEO-V plenary session