



Center for Earth Observation and Digital Earth  
Chinese Academy of Sciences



# Introduction to CEODE

Huadong GUO (Director of CEODE)





# Centre for Earth Observation and Digital Earth, CAS

**Centre for Earth Observation and Digital Earth  
Chinese Academy of Sciences  
(2007)**

**Centre for Airborne Remote Sensing  
Chinese Academy of Sciences  
(1985)**

**China Remote Sensing Satellite Ground Station  
Chinese Academy of Sciences  
(1986)**

**Laboratory of Digital Earth Sciences  
Chinese Academy of Sciences  
(2003)**



# Centre for Earth Observation and Digital Earth, CAS

- **An Independent non-profit research institute of CAS**
- **It is responsible for the provision of national service for the acquisition, processing, archiving and distribution of airborne and spaceborne remote sensing data**
- **Engage in research on scientific and technical development of geospatial information and Digital Earth.**
- **Work closely with industrial partners for development and verification of airborne and spaceborne sensors**





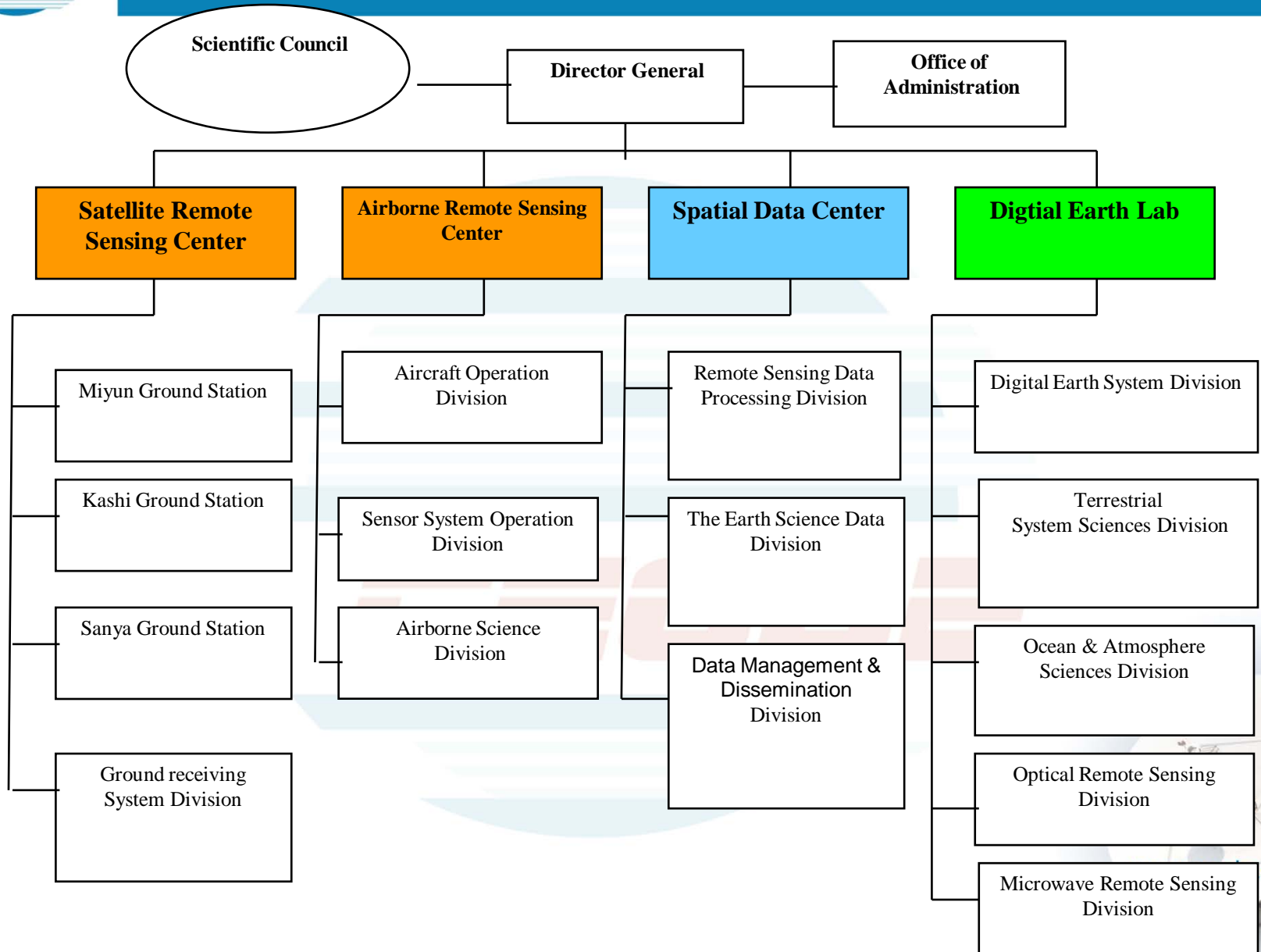
- **Supply application services with its integrated remote sensing data and relevant Earth Sciences data in various fields.**
- **Provide social services to broad variety of publics based on Digital Earth Prototype System (DEPS).**
- **Help human beings better understand of natural and man-made impact on our planet earth.**







# Organizational Structure





## Satellite Remote Sensing Centre

The Center is one of the largest international ground stations by receiving data from 16 satellites worldwide, including Environment No.1 satellite, Landsat-5/7, SPOT-2/4/5, Radarsat-1, ERS-1/2, ENVISAT, IRS-P6, MODIS, CBERS and so on. At present, it keeps about 1.6 million remote sensing scenes and 160 TB data in total, and increases the amount in the rate of 15 TB per year.





# Satellite Remote Sensing Centre



Miyun ground station



Kashi ground station



Sanya ground station



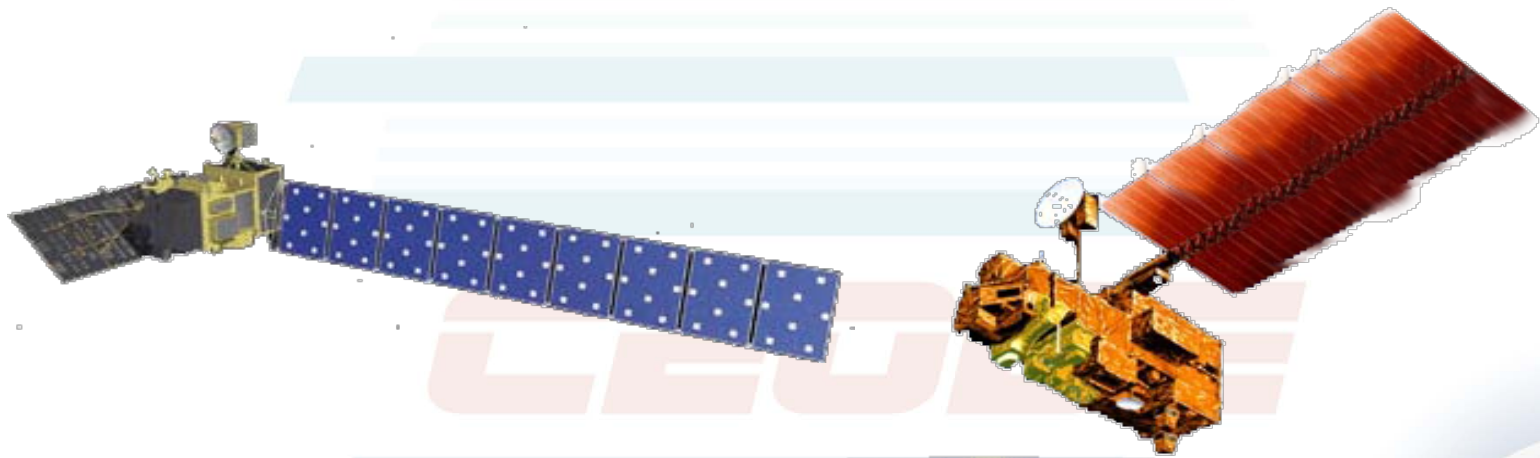
Data coverage of the three ground receiving stations





## Satellite Remote Sensing Centre

- Data Reseller for: ALOS, ASTER
- Data sub-distributor relationship with: USGS, RESTEC, GISTDA, EURIMAGE



**RESTEC**



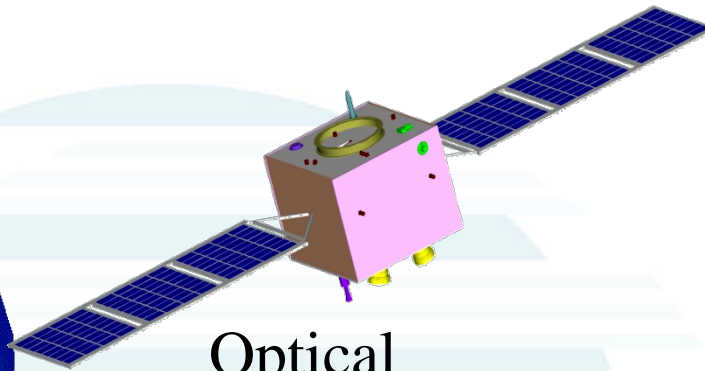
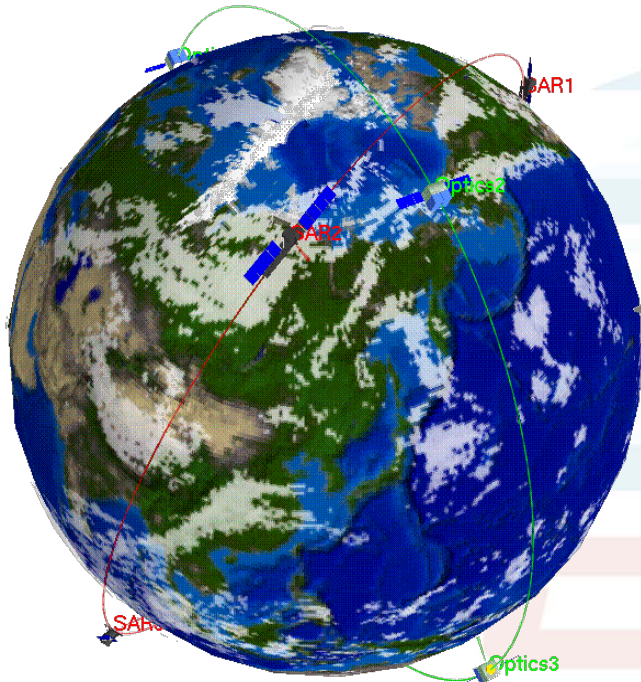
[www.ceode.ac.cn](http://www.ceode.ac.cn)





# Satellite Remote Sensing Centre

CEODE receives HJ-1A,HJ-1B(optical sat.) and HJ-1C(SAR) data

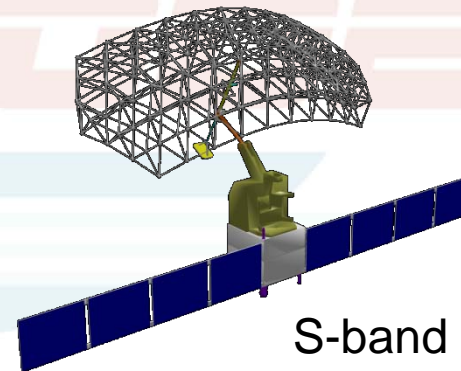


Optical  
Satellite  
Configuration

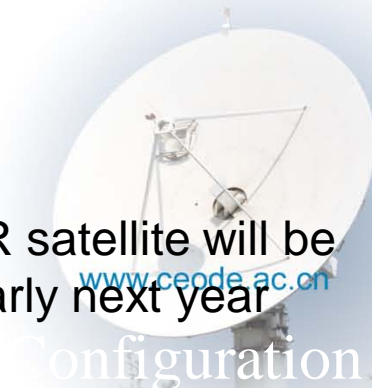


Two optical satellites  
were launched on  
Sept. 6, 2008

Disaster, Environment Monitoring  
and Forecast Small Satellite  
Constellation in orbit



S-band SAR satellite will be  
launched early next year  
[www.ceode.ac.cn](http://www.ceode.ac.cn)



Configuration



## Spatial Data Centre

- Over 150TB Satellite Data Archived
- Largest Civil EO Ground Station in China
- Strong User Basis
- More Than 100,000 Services Provided
- Data Service Among the Top in the World







## Airborne Remote Sensing Centre

The Centre operates two Cessna Citation S/II and plan to purchase two new advanced airplane. The aircrafts are used as test-beds for developing advanced sensor concepts and specification designs, satellite simulation, and algorithms validation, and for the support of scientific and operational data collection.







## Airborne Remote Sensing Center

Many sensor systems are in use, and most of them were developed by Chinese Academy of Sciences, including multi-spectral imaging devices, imaging spectrometer, SAR system, and a suite of large-format mapping cameras.



Airborne whiskbroom  
imaging spectrometer  
( $0.45\mu\text{m}$ - $12.5\mu\text{m}$ )



Airborne 3-D  
light detection  
and ranging



Digital CCD  
camera





## Airborne Remote Sensing Center

Airborne remote sensing data are collected for the atmospheric, land, and ocean processes aspects of the Chinese Earth Science program, as well as for academy institutes and other government agencies.



Airborne atmospheric  
laser SAR



Airborne X-band  
interferometry SAR



Airborne pushbroom  
imaging spectrometer  
(0.45 $\mu\text{m}$ -2.5 $\mu\text{m}$ )



## Total 10 sensors

- High resolution linear array digital airborne camera
- High resolution phase array digital airborne camera
- Multi-mode digital camera
- Wide spectrum band imaging spectrometry
- Push-broom hyper-spectral imager
- 3D lidar
- High resolution polarimetric and interferometric SAR
- Multibands polarimetric SAR
- Polarimetric microwave radiometer/scatterometer
- Environmental atmospheric component detecting system

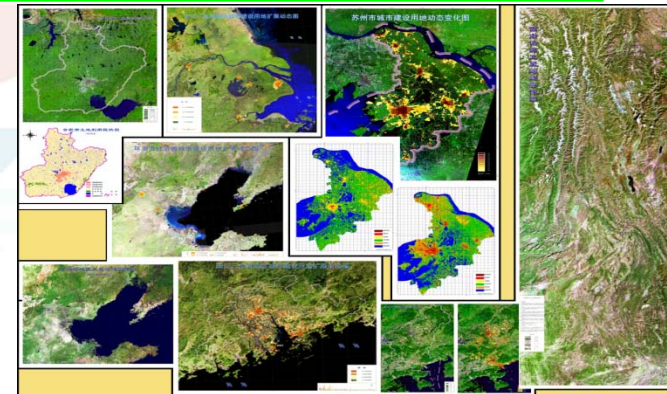
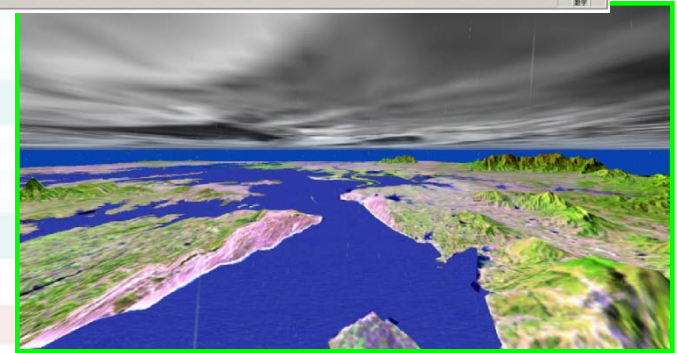
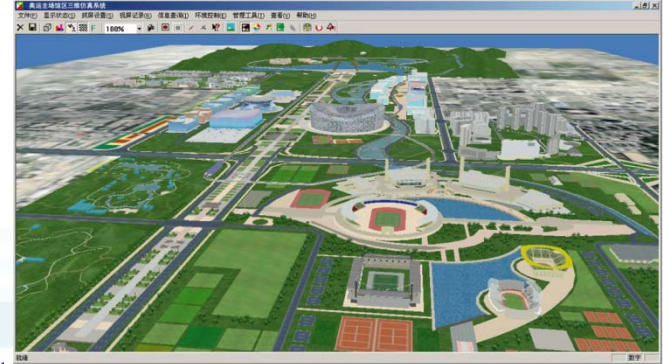




# Laboratory of Digital Earth Sciences (LDES)

LDES is constituted principally for the research on the digital earth technology and remote sensing applications. A high-performance Platform provides a powerful computational tools and a wonderful visualization environment to both scientists and public.

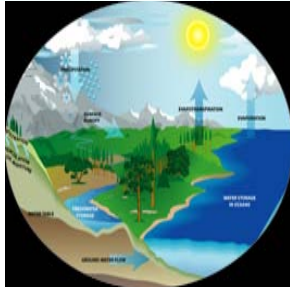
LDES conducts high level application researches related to land-use survey, atmospheric detection, ocean surveillance, mineral exploration, archeological finding, environmental and ecological investigation, global change, etc.





# Digital Earth Sciences Platform

Hydrosphere



Atmosphere



Human Being



Biosphere



Ice and snow



Land and Ocean



Lithosphere



## Research Areas

- Digital Disaster Mitigation
- Digital Health
- Digital Energy
- Digital Hydrology
- Digital Atmosphere
- Digital Ecology
- Digital Heritage
- Digital Environment
- Digital Ocean
- Digital City





Quickbird Image of  
Feb.15 2008, shows the  
distribution of Ice and  
Snow along the roads in  
Jiangxi Province



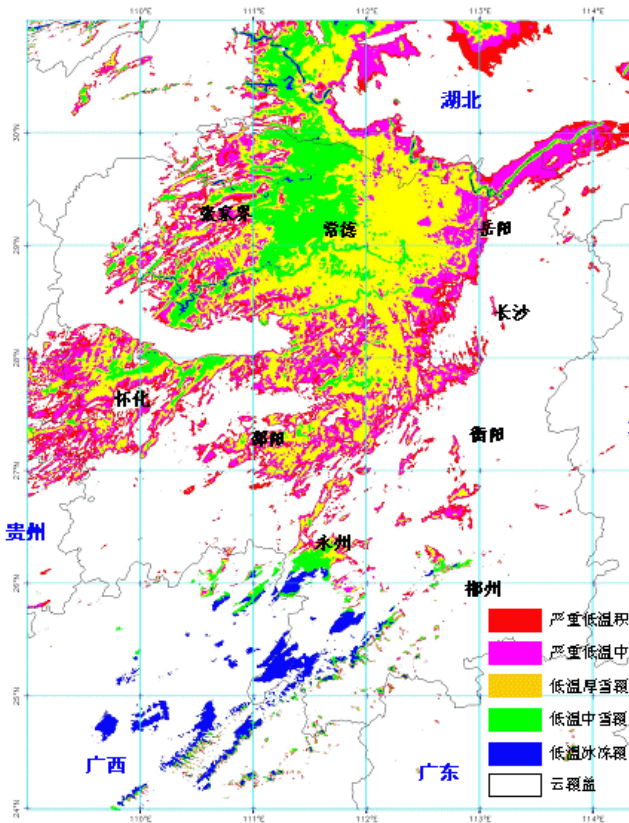
**View in Wuhan City**



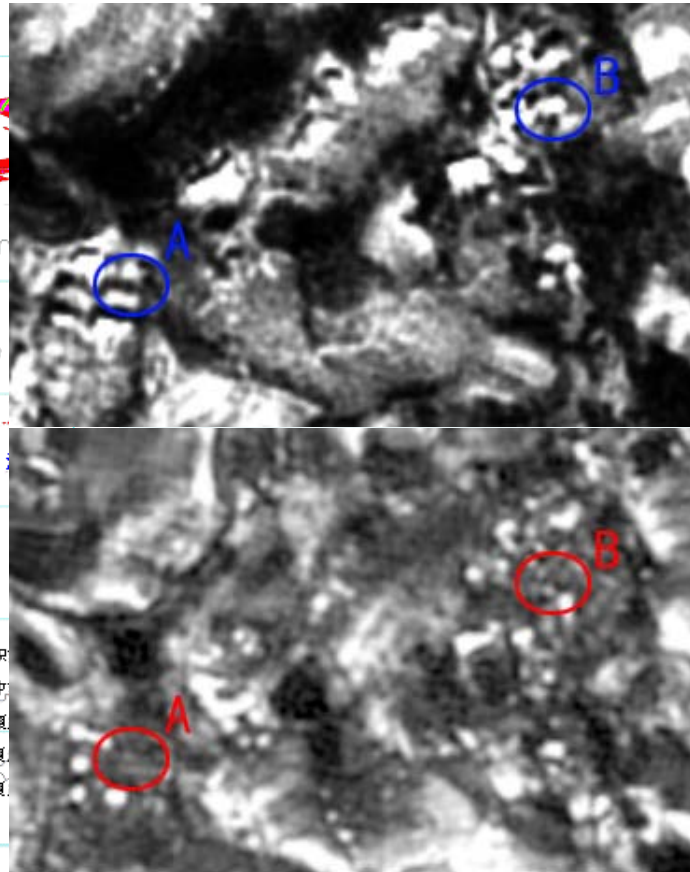




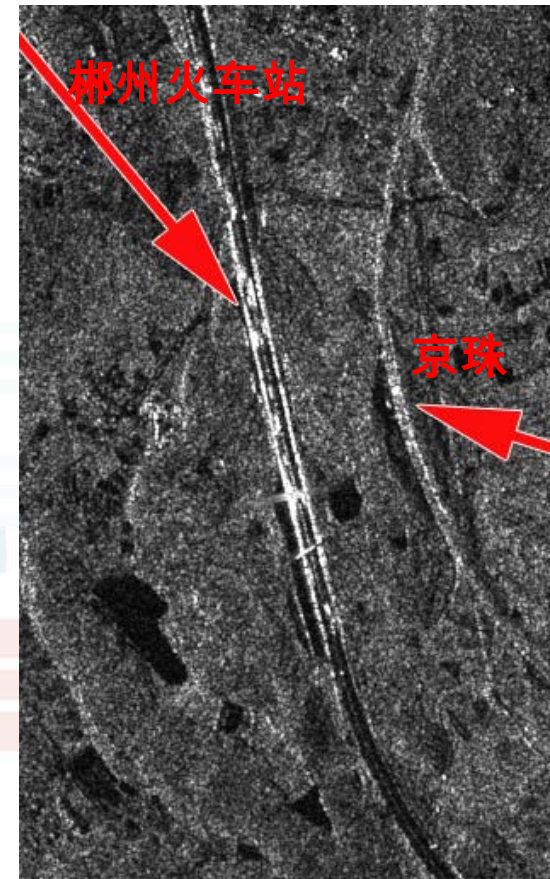
# RS Assessment for Ice & Snow Disaster in South China



Snow Disaster in Hunan  
Jan 29, 2008



Comparison analysis of  
Collapsed Houses in Anhui



Airborne SAR Monitoring  
for Railway and highway  
[www.ceode.ac.cn](http://www.ceode.ac.cn)

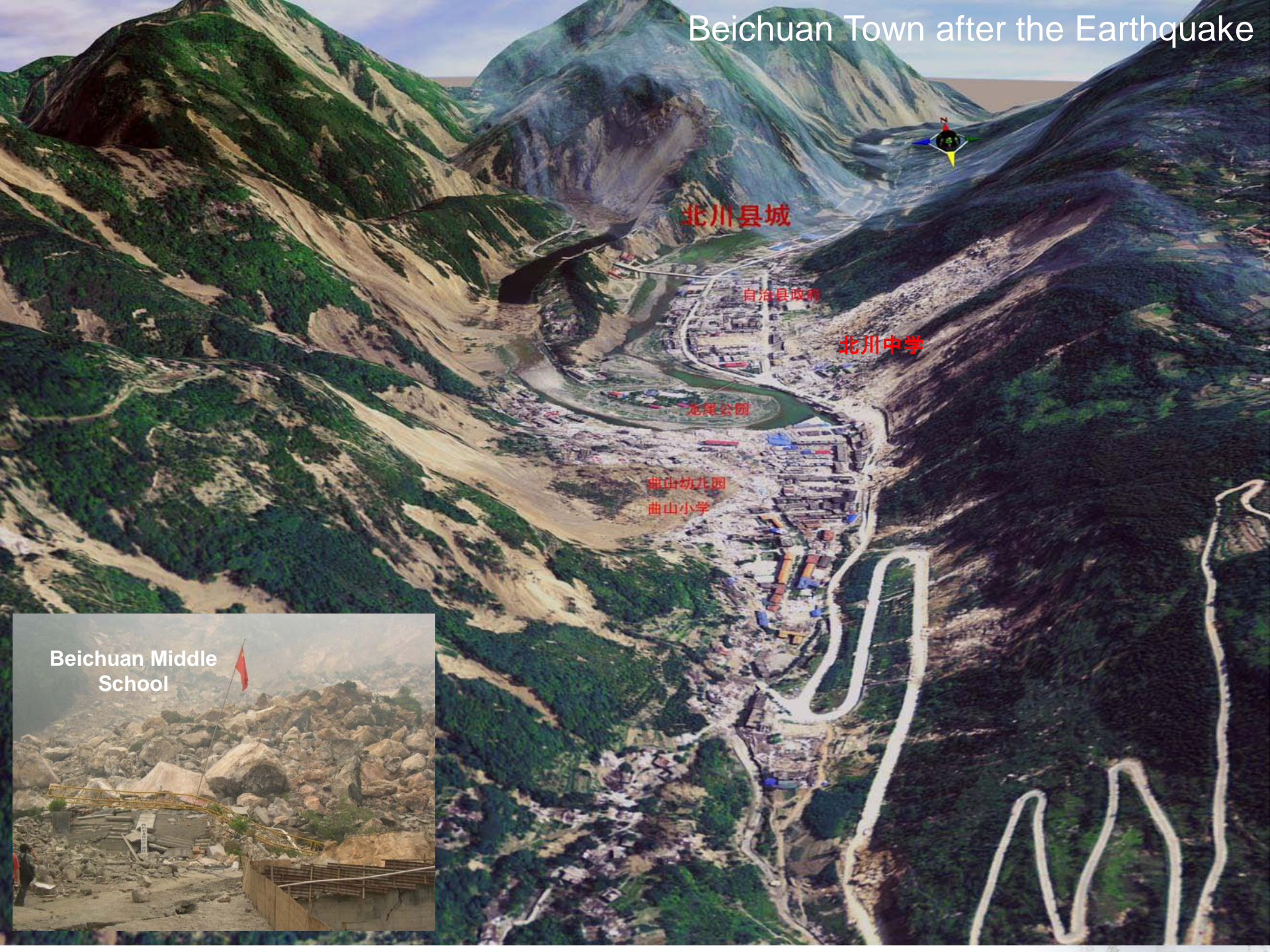


Beichuan town before the Earthquake





# Beichuan Town after the Earthquake



北川县城

自治县政府

北川中学

龙坪公园

曲山幼儿园  
曲山小学

Beichuan Middle  
School





2008年5月27日三维立体航空遥感图

地震使得北川县城几乎夷为平地，老县城将做为地震博物馆以警示后人，北川将新生在他乡，期待北川浴火重生！



A图为2008年6月10日航拍的北川县城，唐家山堰塞湖泄洪造成县城部分淹没。





# *International Cooperation*

**CEODE**



[www.ceode.ac.cn](http://www.ceode.ac.cn)



Natural Resources  
Canada

中国科学院 加拿大自然资源部

对地观测能力建设中心

Capacity Building  
Centre for Earth Observation  
CAS-NRCAN

中国科学院对地观测  
与数字地球科学中心

澳大利亚国家空间  
信息合作研究中心

中澳空间信息中心

CEODE—CRCSI Joint  
Centre for Spatial Information

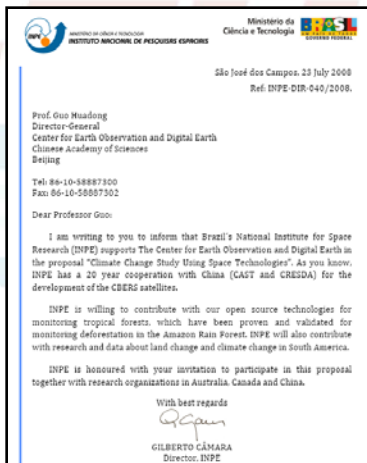




# Remote Sensing for Global Environmental Change (ABCC Program)

The development of space remote sensing techniques provides the possibility for monitoring, analyzing, and simulating the environment change of the earth system from global perspective.

To better understand the mechanism of global change, CEODE is proposing to focus on four major countries of the world, namely Australia, Brazil, Canada, China. Pilot representative areas for climate change in the four countries will be selected and the comparison study for sensitive areas will be implemented.



[www.ceode.ac.cn](http://www.ceode.ac.cn)



# Host *International Society for Digital Earth (ISDE)*





# THE 6<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON DIGITAL EARTH

## DIGITAL EARTH IN ACTION

SEPTEMBER 9-12, 2009

CHINA NATIONAL CONVENTION CENTER, BEIJING, CHINA



> 中文版  
> Home

WELCOME

CALL FOR PAPERS

PROGRAM

REGISTRATION

### INVITATION TO ISDE 6 >>>

Dear Colleagues,

You are cordially invited to attend the 6th International Symposium on Digital Earth ( ISDE6 ) with the theme of Digital Earth in Action and to visit Beijing, China in September, 2009. ISDE6 will continue the tradition of gathering world-class scientists, engineers and educators engaged in the fields of digital earth, earth observation, geo-informatics and relevant applications to review the progress of Digital Earth during the last decade and discuss the achievements of Digital Earth and the recent developments.

Since the promulgation of the Beijing Declaration on Digital Earth at the First International

322 day count down to the ISDE6

### REGISTRATION

User name:

Password:

sign in

register

### NEWS



**China 973 Project: “Study on the methodology and mechanism of observing sensitive environmental change areas and elements in China by remote sensing technology”**

**(2009CB723900)**

PI : Huadong GUO (CEODE)

Participants CEODE

Institute of Atmospheric Physics/CAS

Wuhan University

Shanghai Institute of Technical Physics/CAS

Ocean University of China

Institute of Tibetan Plateau/CAS

Beijing university of Aeronautics and Astronautics

2008-2012, 5.5 million US\$



- **New Building to be constructed, 28000m<sup>2</sup>**
- **250 Permanent Research Scientists, some contract staffs, over 200 students**



# Thanks



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Chinese Academy of Sciences

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