# Space Technology Applications for Disaster Management in China

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NDRCC

民政部国家减灾中心

NATIONAL DISASTER REDUCTION CENTER OF CHINA

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4 Future Prospects

# Overview of Natural Disasters

China is one of the countries in the world that suffer from the natural disasters. Along with global climate changes, economic takeoff and progress in urbanization, China suffers from the increasing pressure on resources, environment and ecology. The situation in the prevention of and the response to natural disasters has become more serious and more complicated.

—— China's Actions for Disaster Prevention and Reduction (2009)

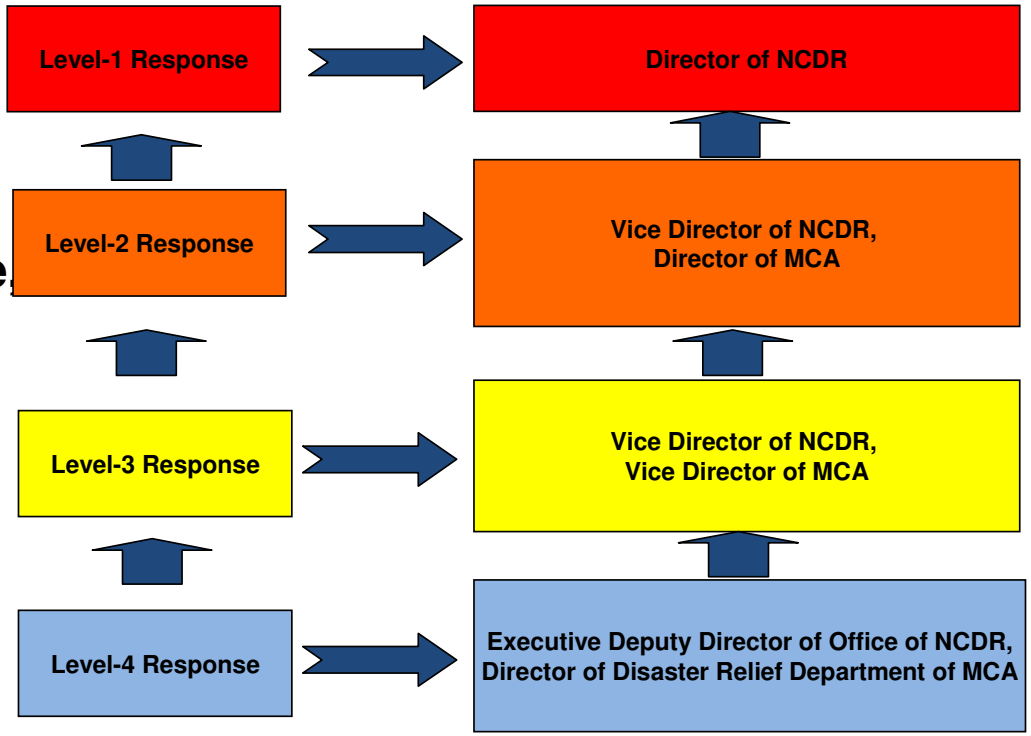
# Distribution of Natural Disasters

- Diverse types
- Wide scope of distribution
- High frequency
- Huge losses

# Disasters Management System

China has adopted a disaster reduction and relief system featuring: central leadership, departmental responsibility and disaster administration at different levels with major responsibility on local authorities.

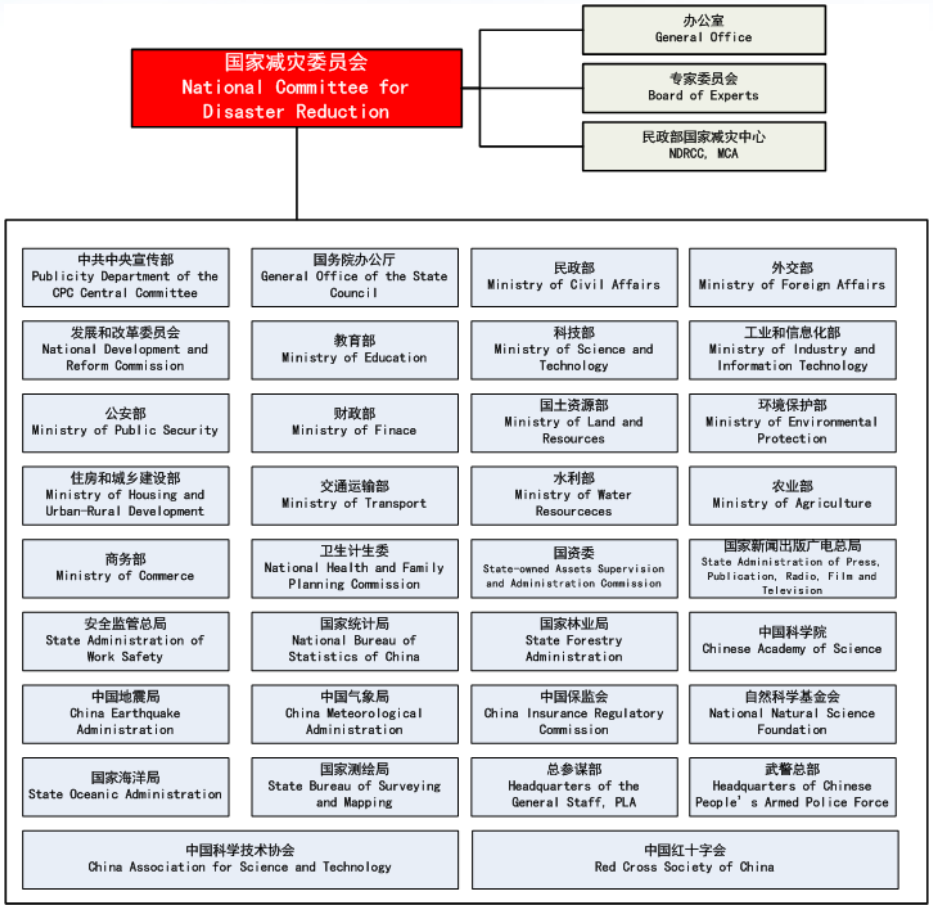
During disaster reduction and relief work, the People's Liberation Army, the Armed Police, militiamen and reservists play the major role; Experts & scholars, social groups, NGOs and volunteers also join the effort.



# National Committee for Disaster Reduction (NCDR)

The National Committee for Disaster Reduction (NCDR), previously known as China International Disaster Reduction Committee before January 2005, was established in 1989. The director of NCDR is the vice premier or the member of the State Council.

The office of NCDR is located in the Ministry of Civil Affairs (MCA). The minister of MCA is appointed as the deputy director of NCDR.



# National Disaster Reduction Center of China (NDRCC)

Being the technical support unit to NCDR, NDRCC was formally established in April, 2002. In February of 2009, The Satellite Application Center for Disaster Reduction was appended to NDRCC. Currently, about 100 formal staffs are working in NDRCC.

NDRCC assume the following responsibility of disaster reduction such as information management, disaster risk assessment and product service, space technology application, research on scientific technology and policies, research and development of technical equipment and disaster relief materials, publicity and education, training, and international cooperation.

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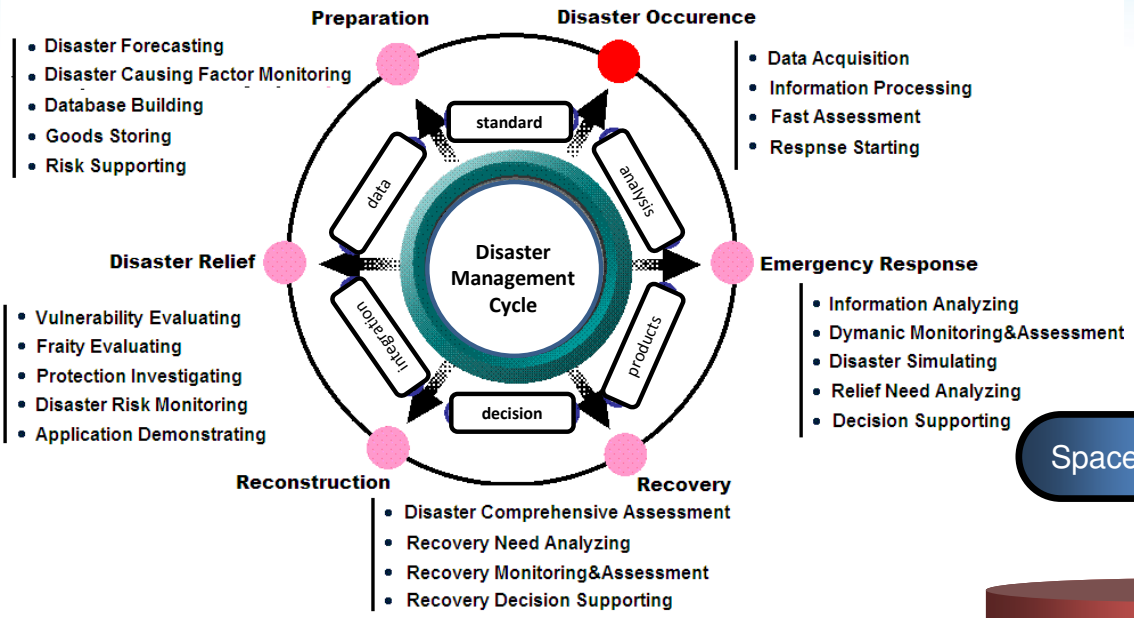
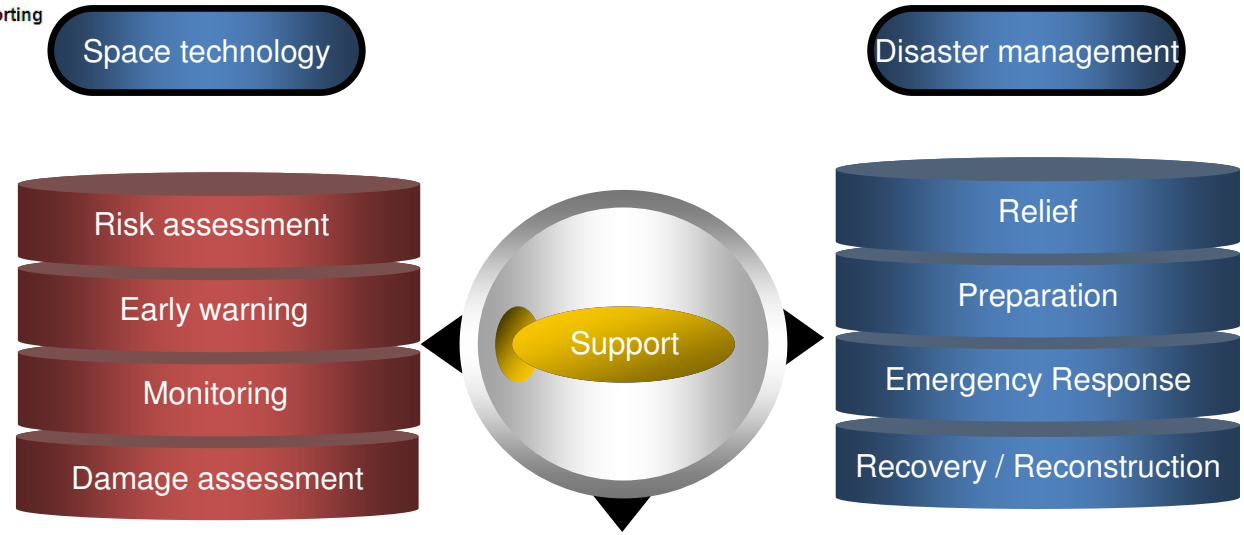
# Support to Disaster Management



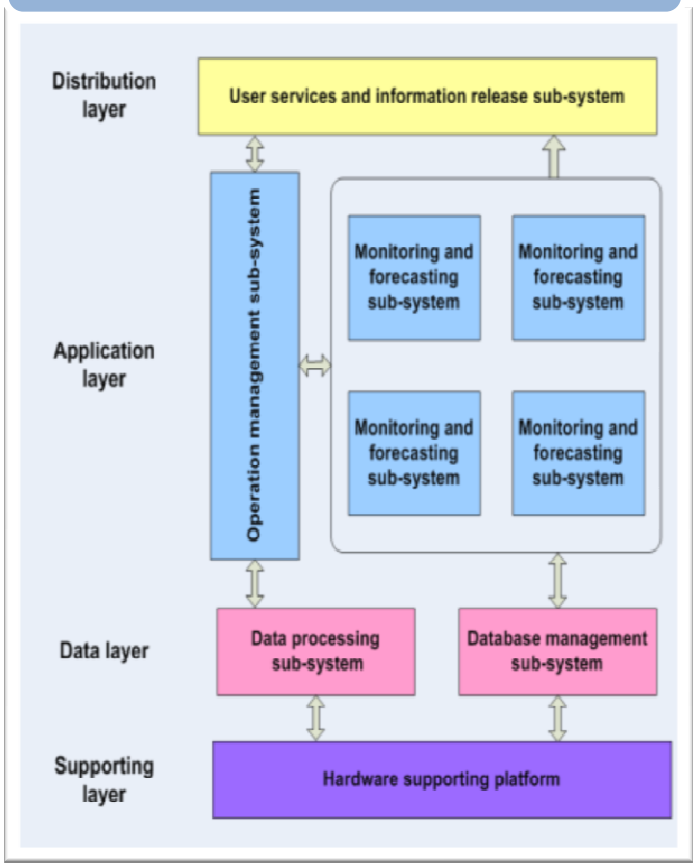

## Disaster Management Cycle

## Support to Disaster Management

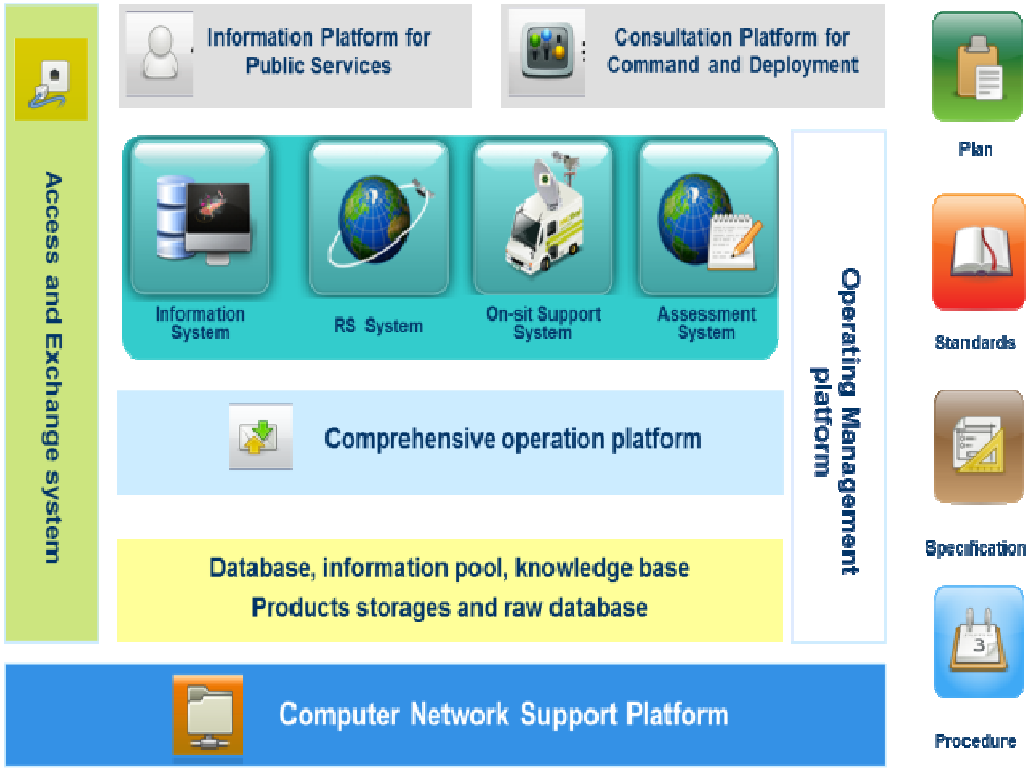


# Operation System

## Space Technology Application System for Disaster Reduction

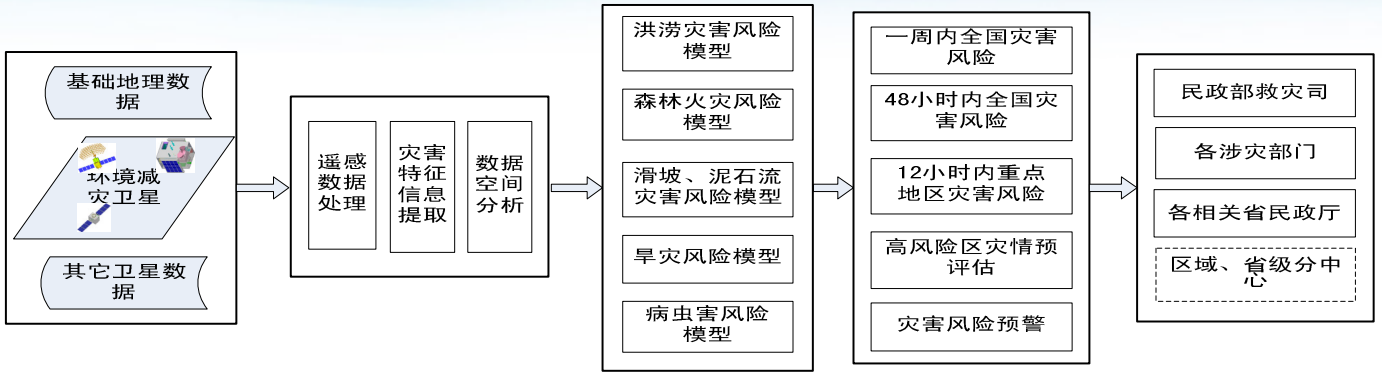



## National Comprehensive Disaster Reduction System

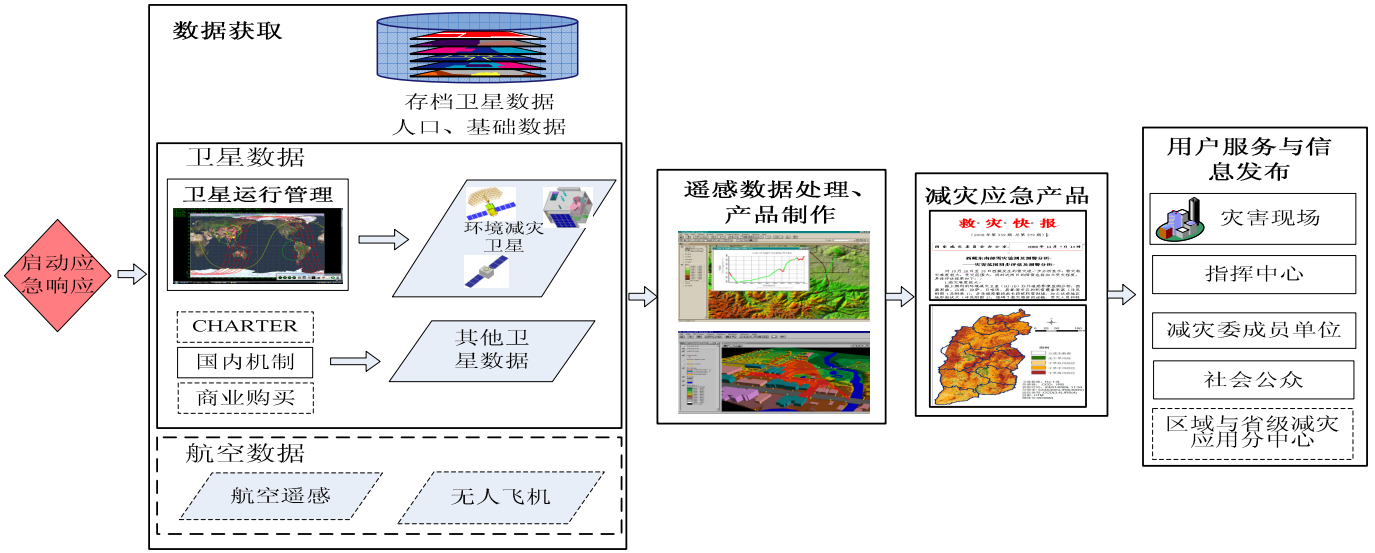


# Operational Mode

❖ **Normal Mode:**
**keep daily investment**




❖ **Emergent Mode :**
**start emergency regulations**

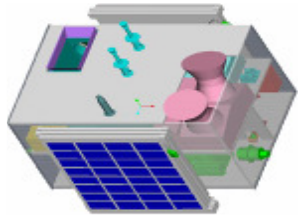


# HJ satellite constellation

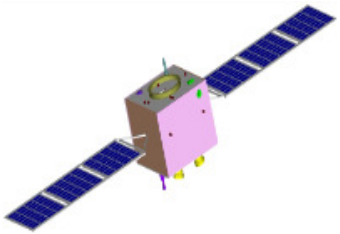
On September 6th, 2008, HJ-1-A and HJ-1-B were launched, this is the first step of HJ constellation construction. HJ-1 C has just been launched on November 19th, 2012.

The satellite constellation is special for disaster applications.

| Satellite | Payload | Resolution（m） | Swath（km） | Band |
|---|---|---|---|---|
| HJ-1 A | CCD | 30 | 360 | 4 bands |
| | HSI | 100 | 50 | 115bands |
| HJ-1 B | CCD | 30 | 360 | 4 bands |
| | IRS | B1、B2、B3：150<br>B4：300 | 720 | 4 bands |
| HJ-1 C | SAR | S-band | 5m / 20m | single polarization |



HJ-1-A

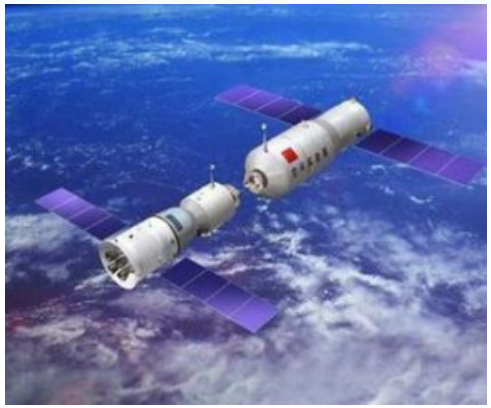


HJ-1-B

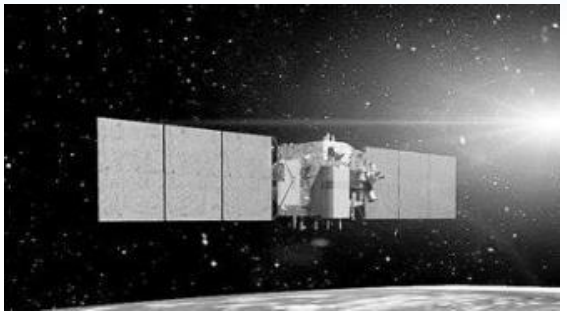
HJ-1-C

# Chinese RS Resources

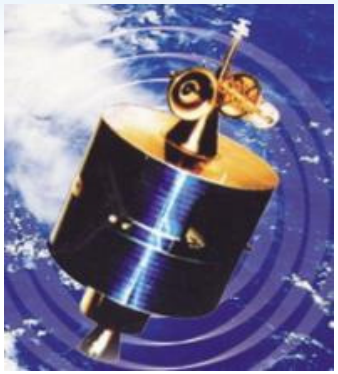

GF-1



Tiangong-1



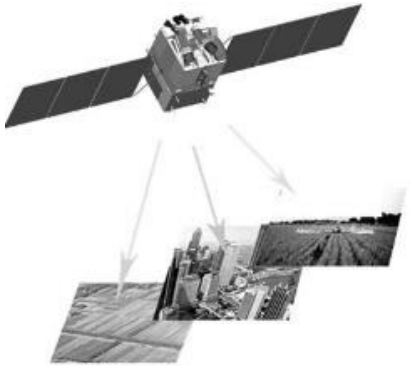
TH-1



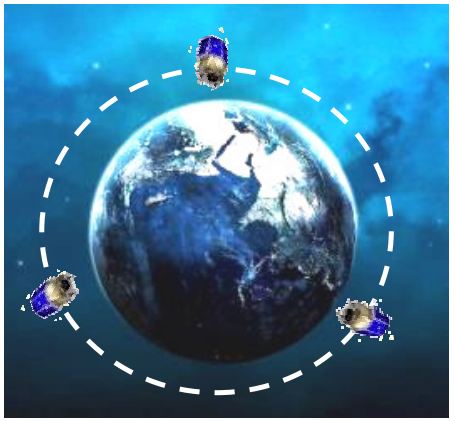
FY-2/3

GF-2/3/4/… *to be launched*

HY-1/2



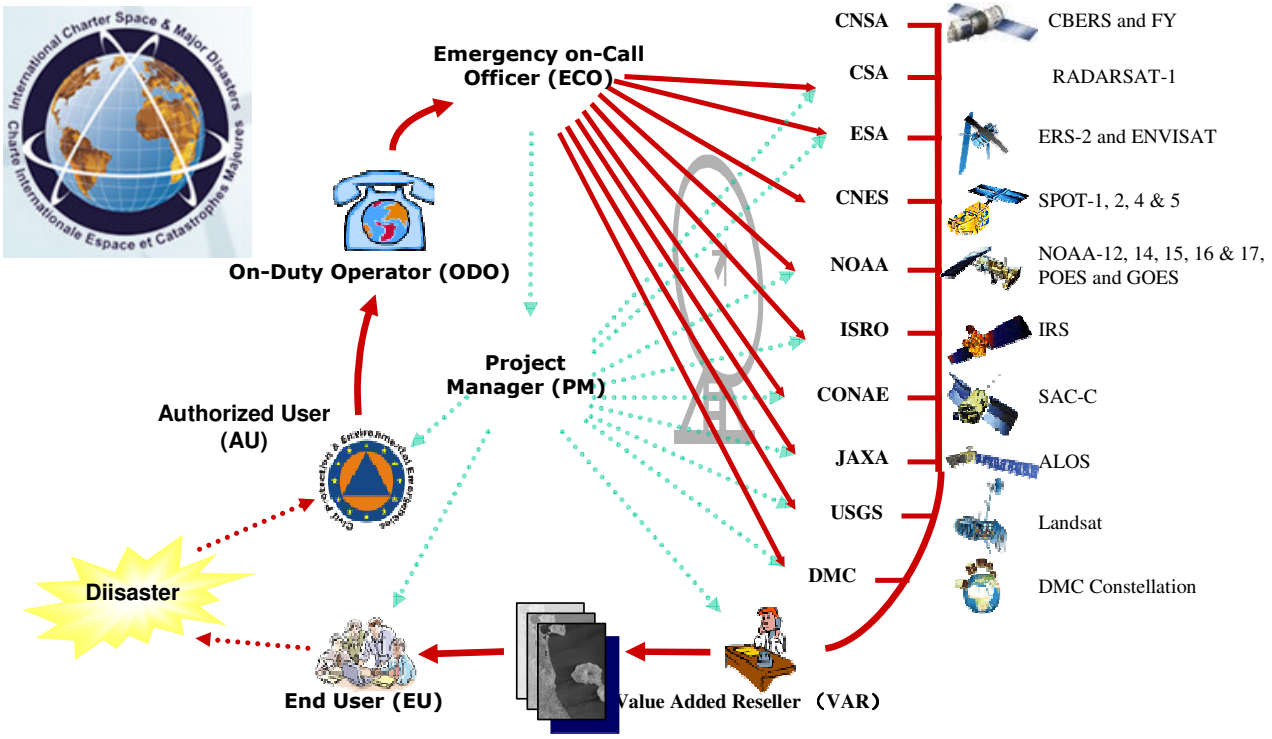
CBERS-02B/03

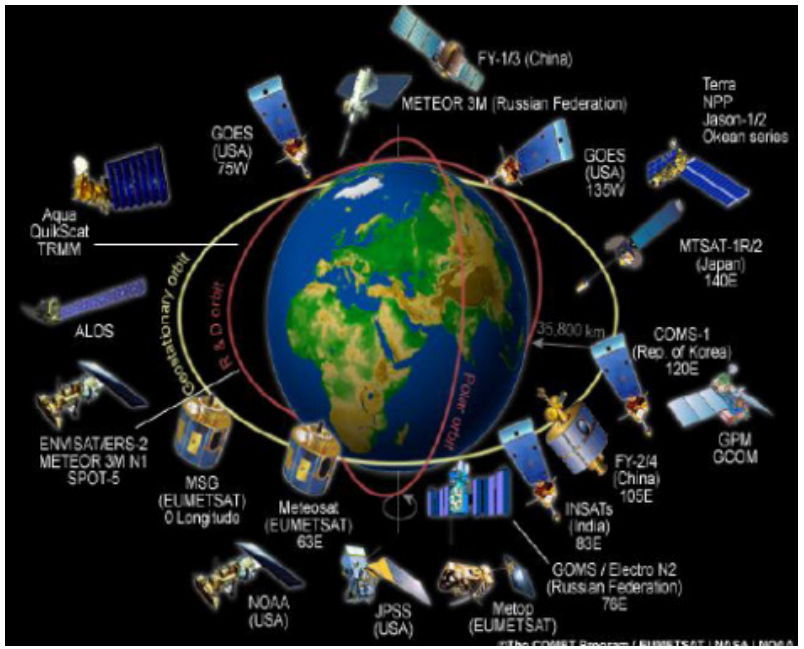


BJ-1/2

# Global RS Resources

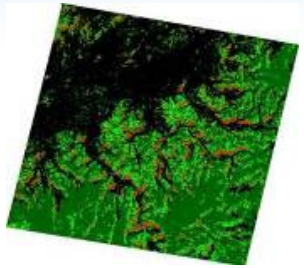
**China joined the CHARTER formally on May 24 2007. The NDRCC acts as the Authorized User (AU) and Project Manager (PM) of the mechanism.**

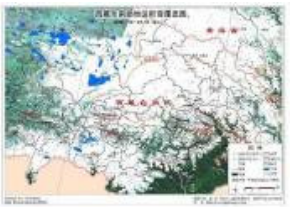


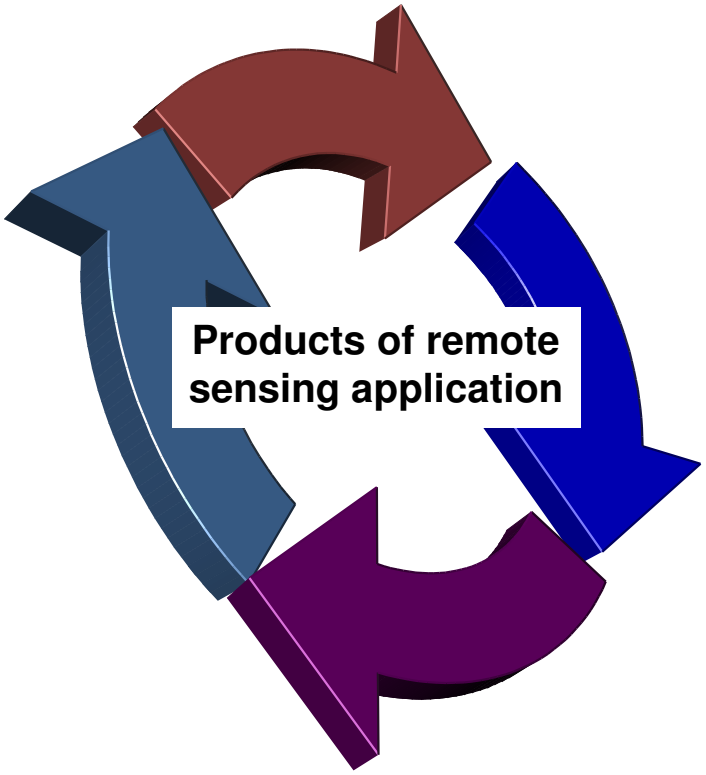
# Application Capabilities

| Application Area | | Payload | | | |
|---|---|---|---|---|---|
| | | CCD | IRS | HSI | SAR |
| Direct monitoring | Flood | △ | △ | | △ |
| | Geological hazard | △ | | | △ |
| | Snow coverage | △ | △ | | |
| | Ice slush monitoring | △ | | | △ |
| | Background parameter | △ | △ | △ | △ |
| | Ecological restoration | △ | | | |
| | Wide fire | △ | △ | | △ |
| Indirect monitoring | Ecological hazard | | | △ | |
| | Insects and diseases | △ | | △ | |
| | Drought risk | △ | △ | | △ |
| | Tailings | | | △ | |
| Indirect assessment | Disaster range | △ | | | |
| | Damaged houses | △ | | | |
| | Damaged lifeline | △ | | | △ |
| | Agriculture losses | △ | | △ | |
| | Evacuated Tents | △ | | | |





# Applications Products System



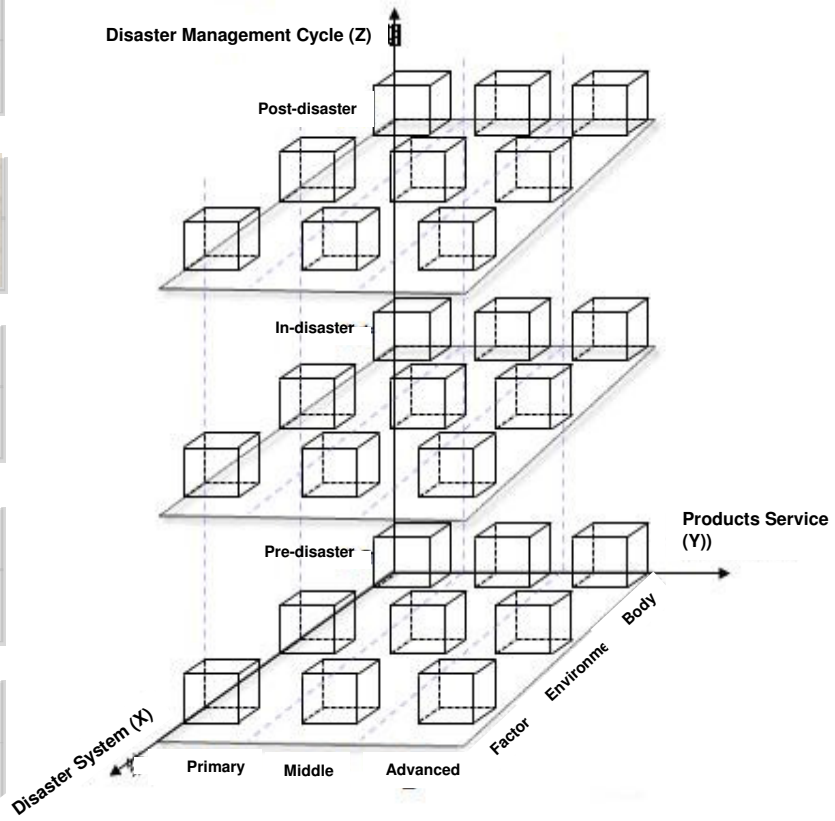

**Disaster Parameter**

**Disaster Risk Assessment**

**Disaster Monitoring**

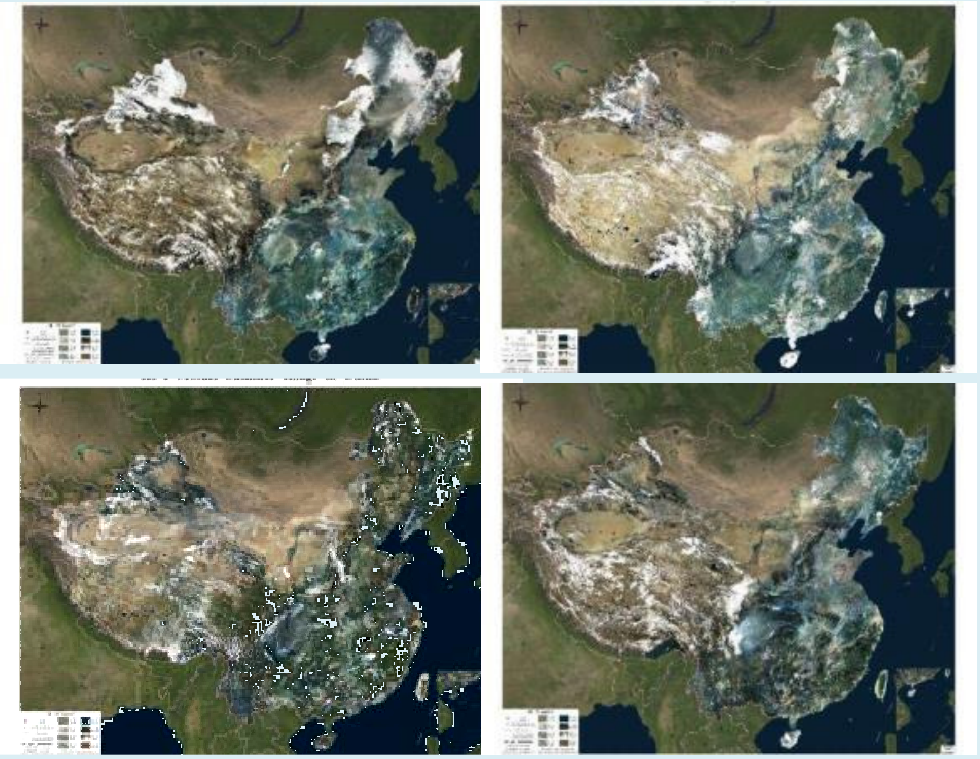
**Disaster Losses Assessment**

**Disaster Recovery Assessment**



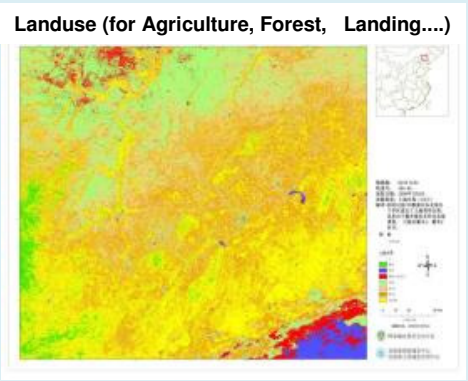
# Application Products

## Hazard Inducing Environment

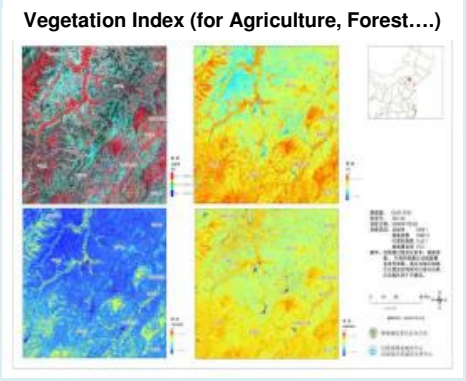


## Disaster Parameters

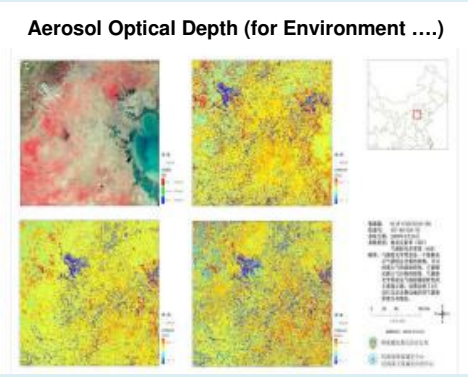
Landuse (for Agriculture, Forest, Landing....)



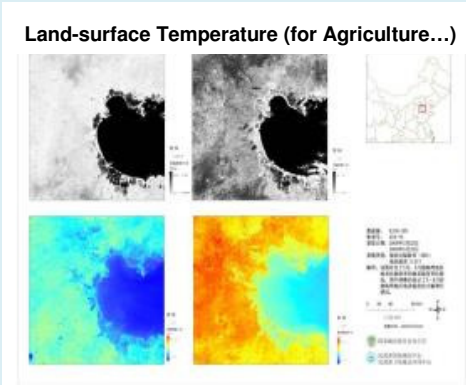
Vegetation Index (for Agriculture, Forest….)



Aerosol Optical Depth (for Environment ….)



Land-surface Temperature (for Agriculture…)



# Application Products

## Disaster Risk Assessment





灾情遥感监测

（2013年第65期 总第1277期）

国家减灾中心卫星遥感部 2013年7月4日

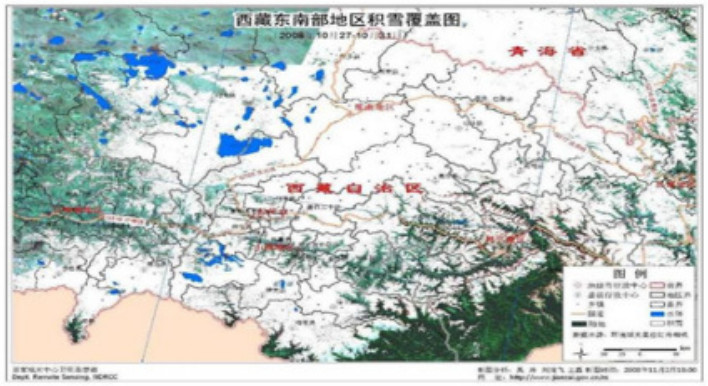
7月4日-6日全国洪涝灾害风险预警

一、基本情况

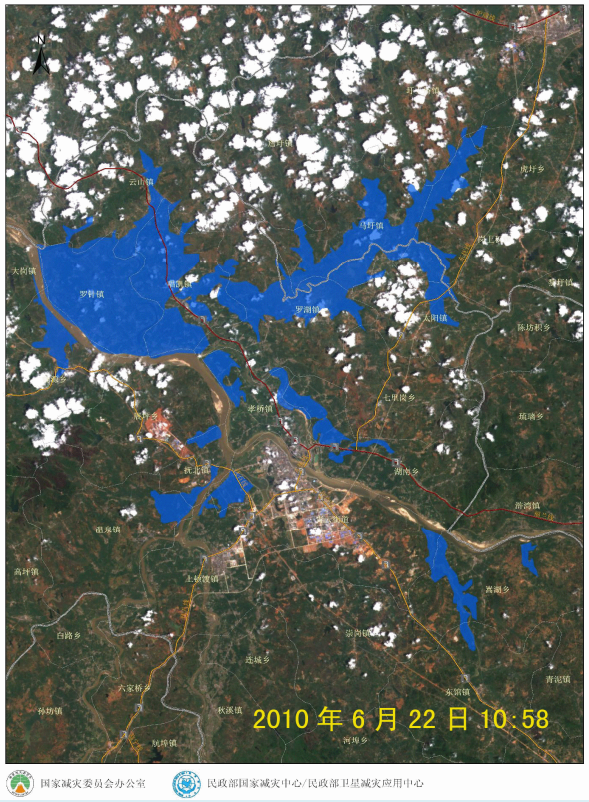
二、洪涝灾害风险分布特点

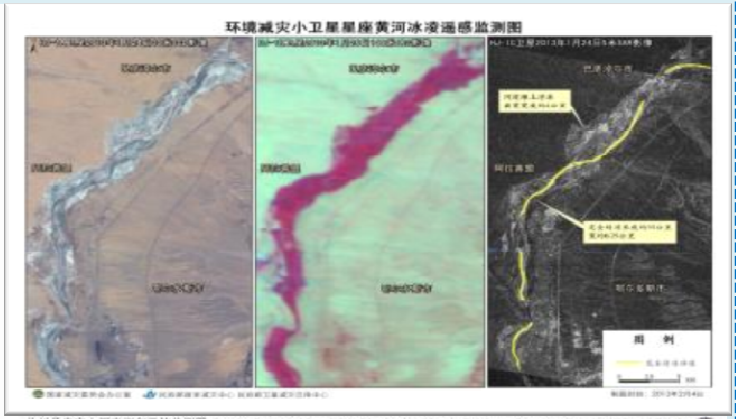
# Application Products

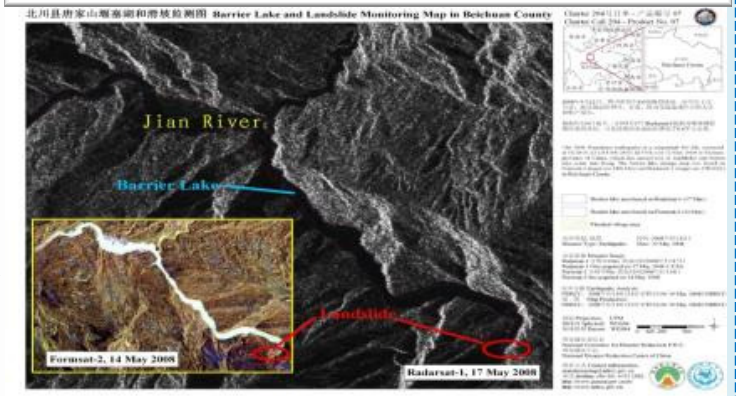
## Disaster Monitoring





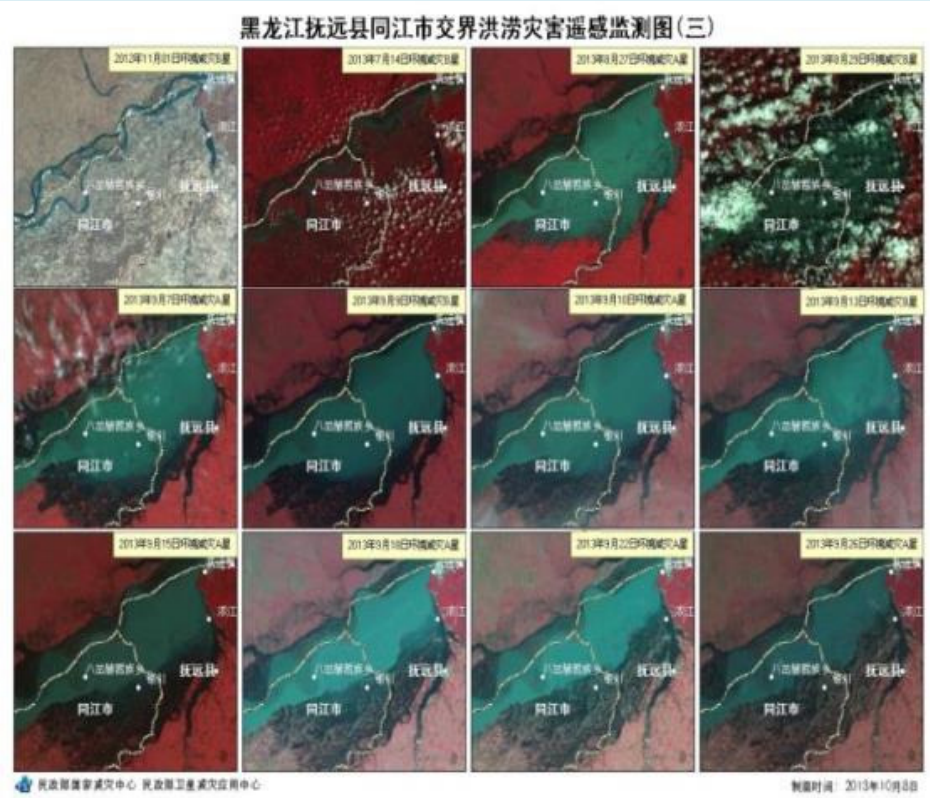


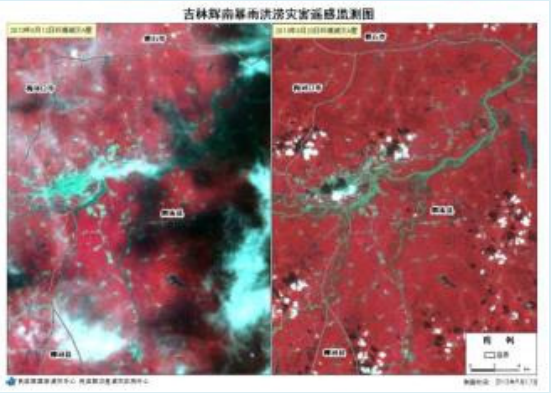



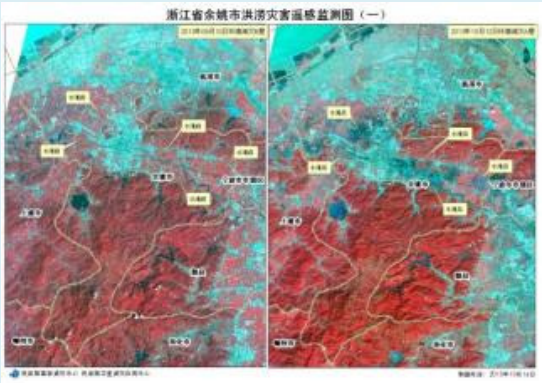
# Application Products

## Disaster Monitoring



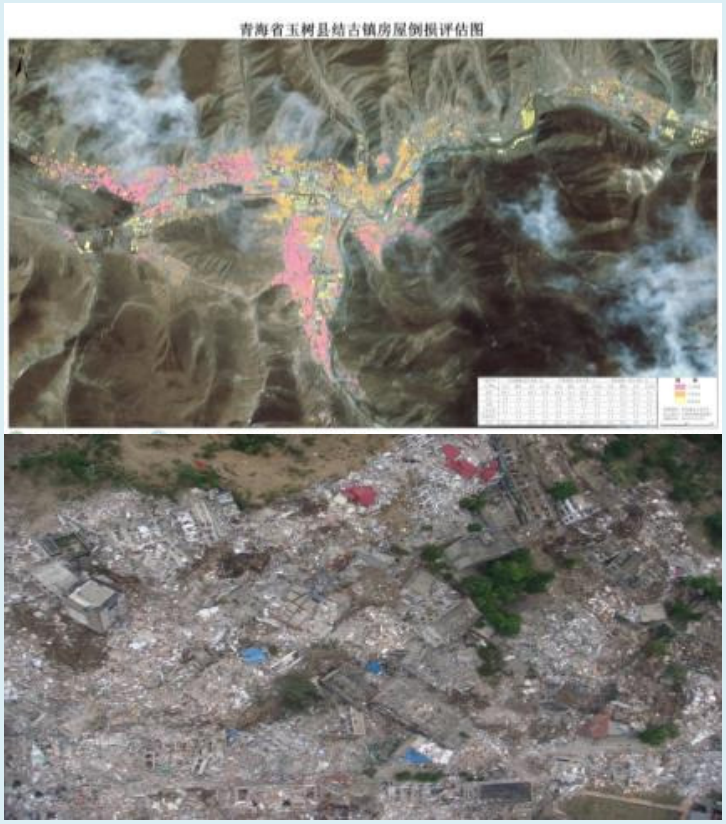


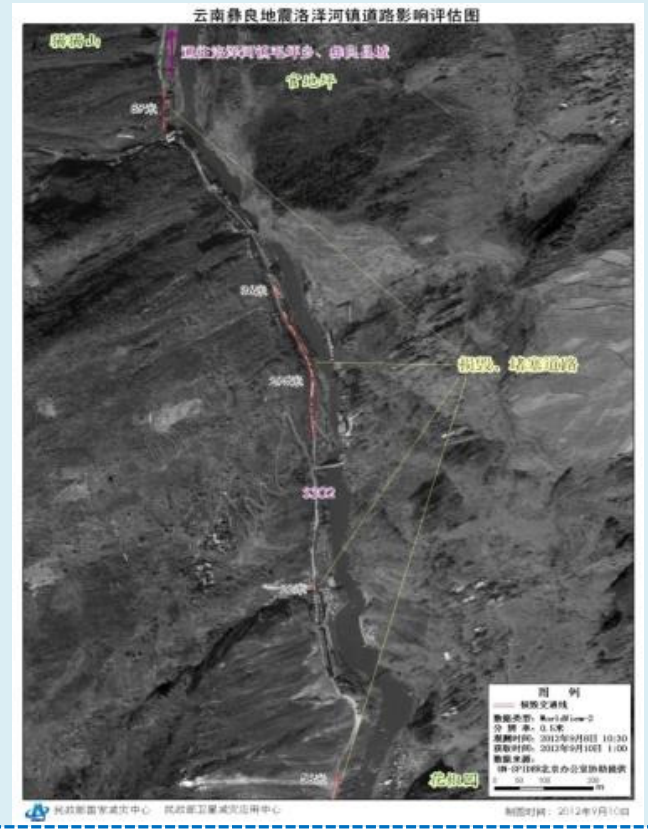


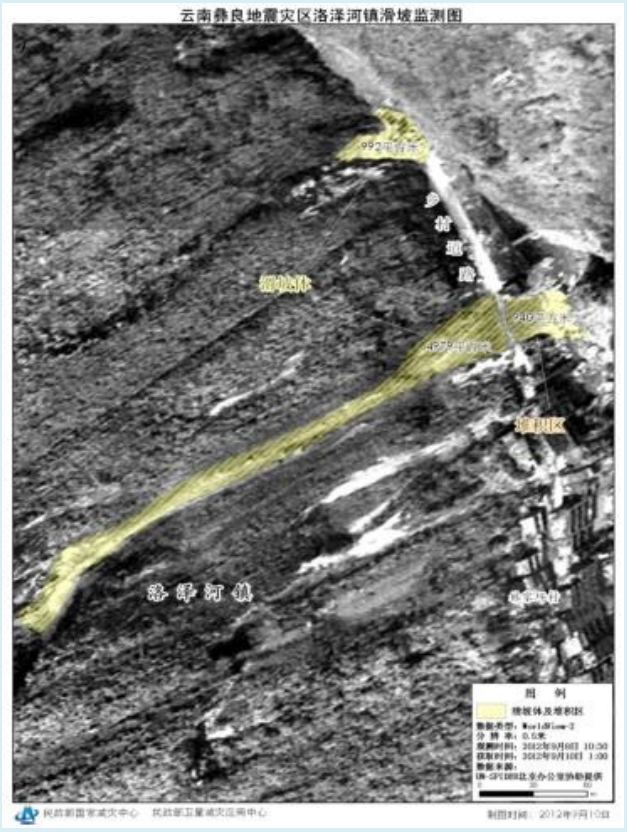




# Application Products

## Disaster Losses Assessment

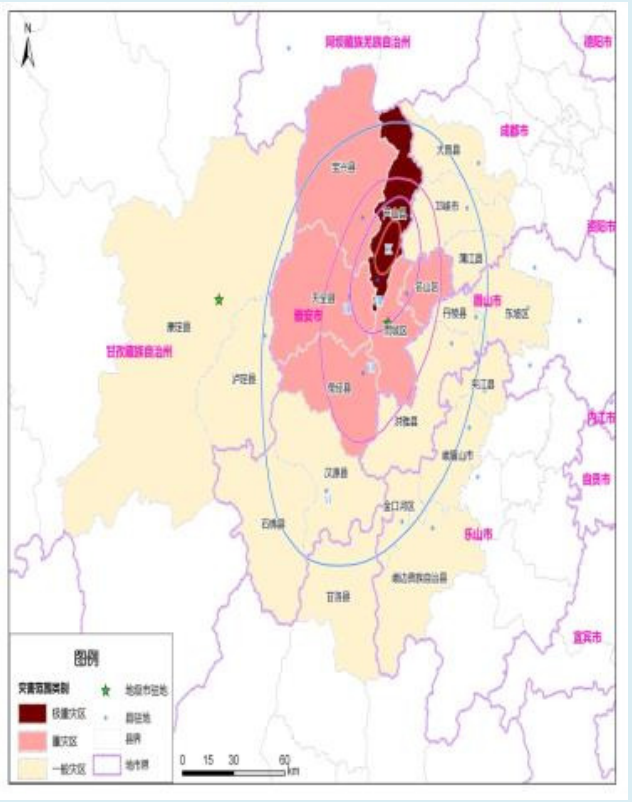


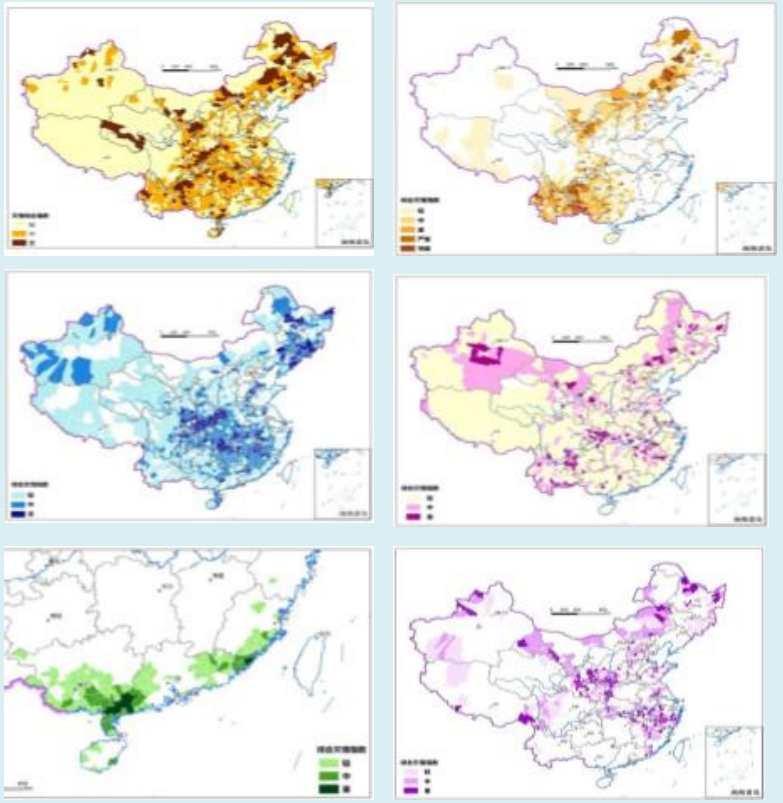



# Application Products

## Disaster Losses Assessment

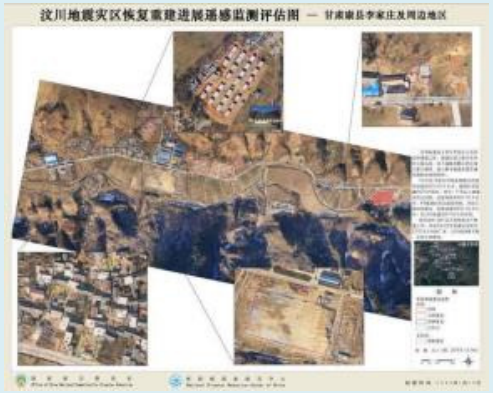


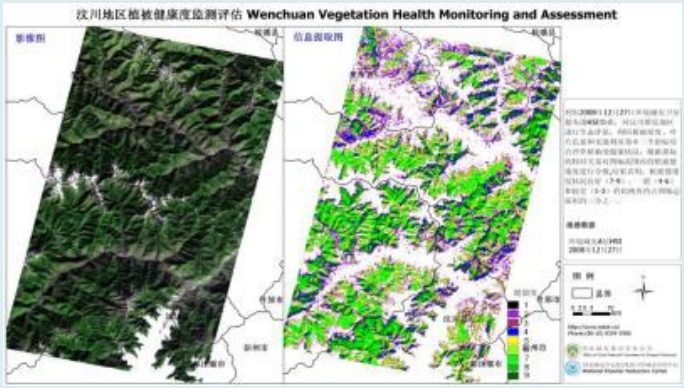




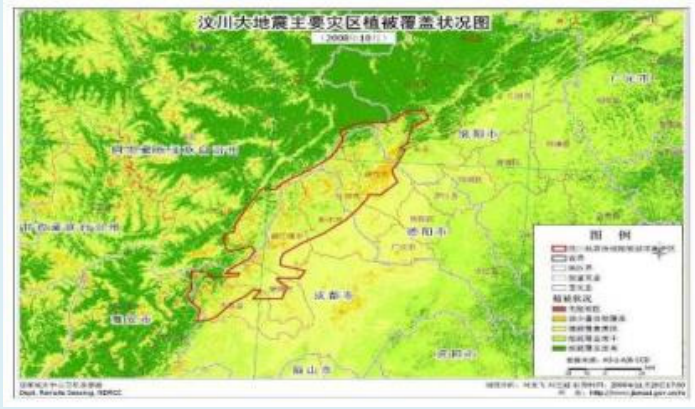
# Applications Products System

## Disaster Recovery Assessment





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# Emergency Service

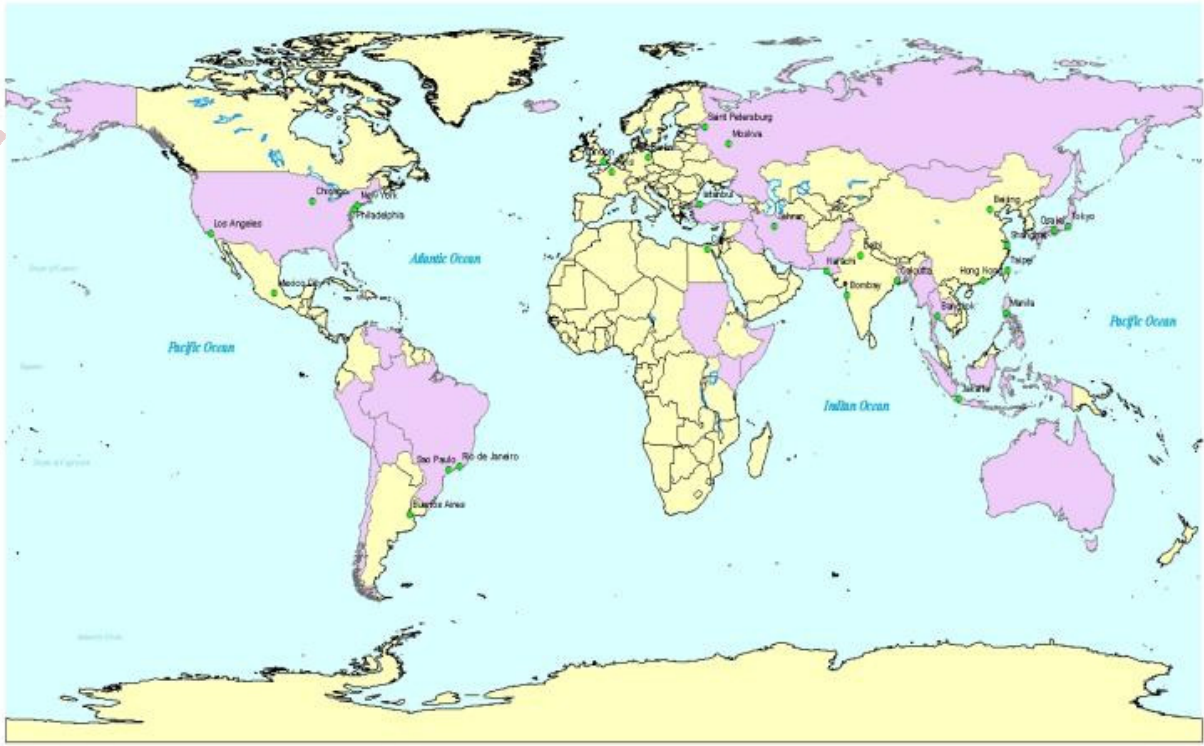
Forest Fire (Australia, 2009)

Volcano outbreak (Iceland, 2010)

Flood (Pakistan, 2010)

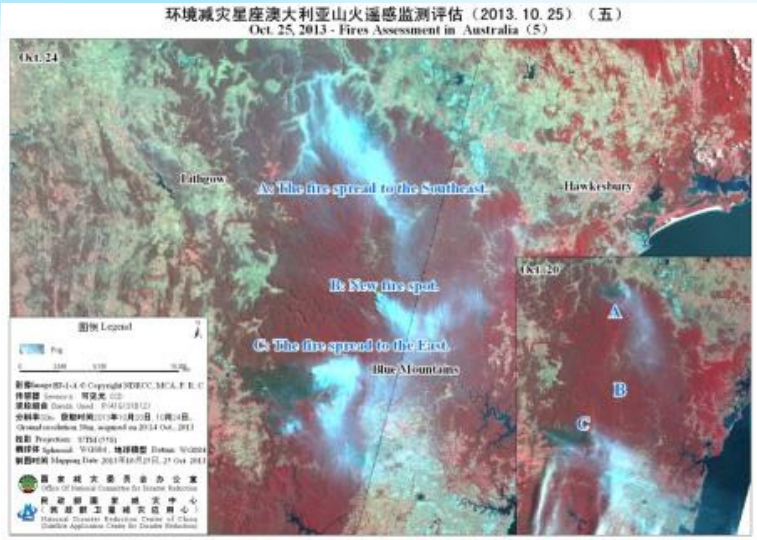
...

Over 21 services for international severe disasters, by the end of 2013

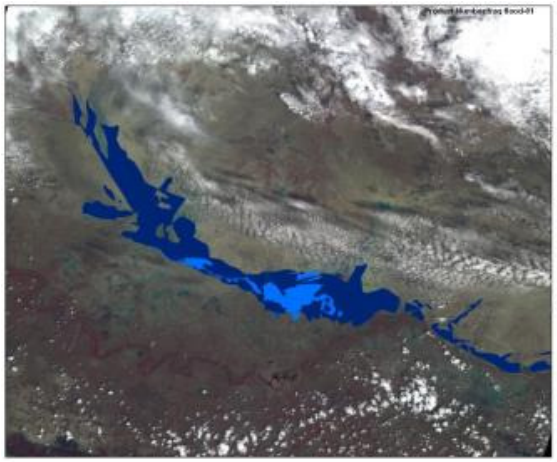


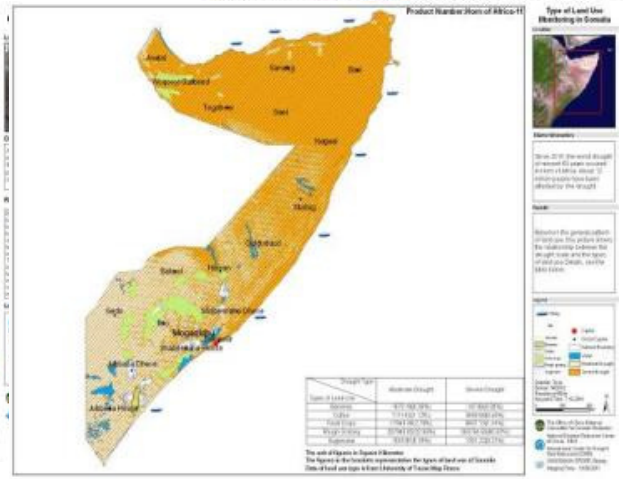

**International emergency services cover 6 continents, more than 20 countries, mainly for wide-fire, flood, drought, earthquake, typhoon.**

# Emergency Service









| NO. | Time | Disaster | Region |
|---|---|---|---|
| 1 | Feb. 2009 | Forest wide-fire | Australia |
| 2 | 2010 | Mosaic imagery | Pakistan, Bangladesh, Thailand, Mongolia, Indonesia, Peru, Iran |
| 3 | Jan. 2010 | Earthquake | Haiti |
| 4 | Mar. 2010 | Earthquake | Chile |
| 5 | May 2010 | Volcano outbreak | Iceland |
| 6 | May 2010 | Oil-spill | USA |
| 7 | Jul. 2010 | Forest fire | Russia |
| 8 | Aug. 2010 | Forest fire | Brazil, Bolivia |
| 9 | Aug. 2010 | Flood | Pakistan |
| 10 | Dec. 2010 | Flood | Venezuela |
| 11 | Mar. 2011 | Earthquake | Japan |
| 12 | Mar. 2011 | Earthquake | Myamar |
| 13 | Jun. 2011 | Flood | Bangladesh |
| 14 | Jul. 2011 | Drought | HOA (Kenya, Somalia, Djibouti, Ethiopia) and Sudan |
| 15 | Oct. 2011 | Earthquake | Turkey |
| 16 | Nov. 2011 | Flood | Thailand |
| 17 | Dec. 2011 | Flood | Venezuela |
| 18 | Apr. 2013 | Earthquake | Pakistan |
| 19 | May 2013 | Flood | Iraq |
| 20 | Oct. 2013 | Bush wide-fire | Australia |
| 21 | Nov. 201 | Typhoon | Philippines |

# Training and Conferences

- China-ASEAN Seminar on Disaster Early Warning and Space Technology Application
- China-ASEAN Seminar on Space Information Products Sharing in Disaster Risk Reduction
- Training on Space Technology Application for Drought Monitoring in Africa and Asia
- Training on Demonstration of Remote Sensing Data Usage for Earthquake Monitoring and Evaluation
- UN International Conference on Space-based Technologies for Disaster Risk Management (2011)
- UN International Conference on Space-based Technologies for Disaster Management: Risk Assessment in the Context of Global Climate Change (2012)
- UN International Conference on Disaster Risk Identification, Assessment and Monitoring (2013)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3 International Cooperation

4 Future Prospects

# Future Prospects

In 2011, the General Office of the State Council released the National Planning for Comprehensive Disaster Prevention and Reduction (2011-2015), stipulating that disaster prevention and reduction should be dominated by the government and widely participated by the public; place people first, depend on science and technology, and focus on prevention and integrated reduction.

According to the requirements in the Planning, the efforts in disaster prevention and reduction should comply with the state's overall economic and social development objectives, and local governments should incorporate disaster prevention and reduction into their ecomomic and social development planning and do their utmost to balance disaster prevention and reduction with economic development, social progress and environmental protection.

# Future Prospects

- Strengthen natural disaster monitoring and early warning capabilities
- Improve information management and service capabilities for disaster prevention and reduction
- Boost natural disaster risk management capabilities
- Strengthen defence engineering capabilities against natural disasters
- Strengthen regional and grassroots capabilities for disaster prevention and reduction
- Strengthen natural disaster response and post-disaster recovery capabilities
- Enhance science and technology support for disaster prevention and reduction
- Promote social mobilization capability for disaster prevention and reduction
- Increase efforts in human resources development and team building
- Strengthen cultural building for disaster prevention and reduction

# Future Prospects

We are willing to make more contributions.

- To strengthen the international data/information/technology exchange on space technology application for disaster reduction with other countries.
- To improve the capacity on disaster management by using space technology for other countries.
- To cooperate for the build-up of the Cooperation Mechanism with each parts.

# Thanks!