



Space Technology Application for Disaster Management in China

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Satellite Application Center for Disaster Reduction

Ministry of Civil Affairs, China

March, 2011



国家减灾委员会

National Committee for Disaster Reduction



民政部国家减灾中心

National Disaster Reduction Center of China, MCA

CONTENT



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International Cooperation



Development Plan





Natural Disaster in China

- Natural Disaster Characteristics of China
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- National Disaster Reduction Center of China (NDRCC)



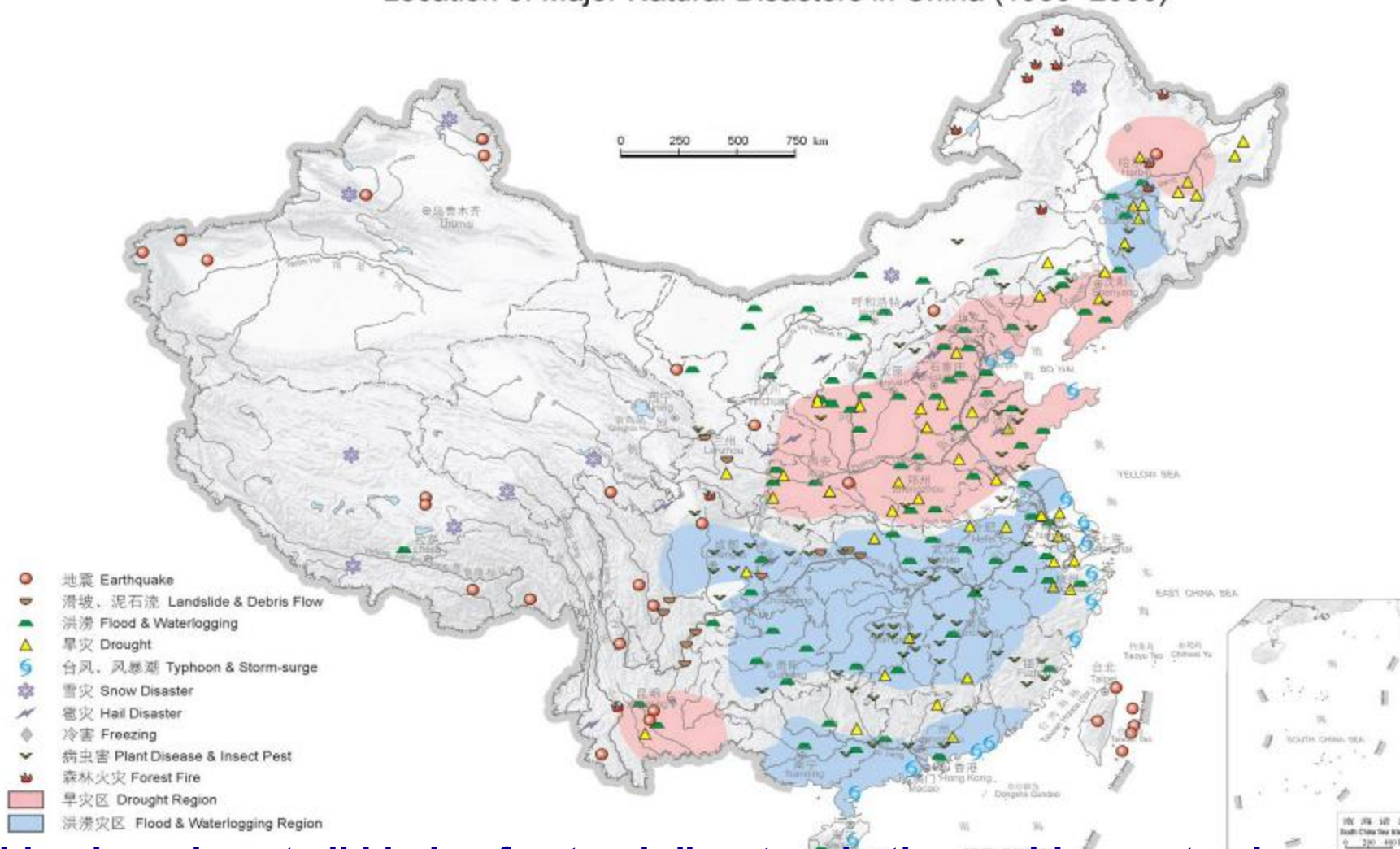
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National Committee for Disaster Reduction



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National Disaster Reduction Center of China, MCA

Natural Disasters in China

中国重大自然灾害点位图 (1900~2000年)
Location of Major Natural Disasters in China (1900~2000)

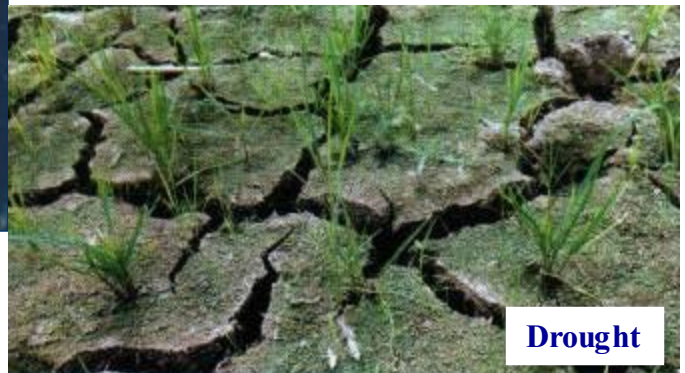
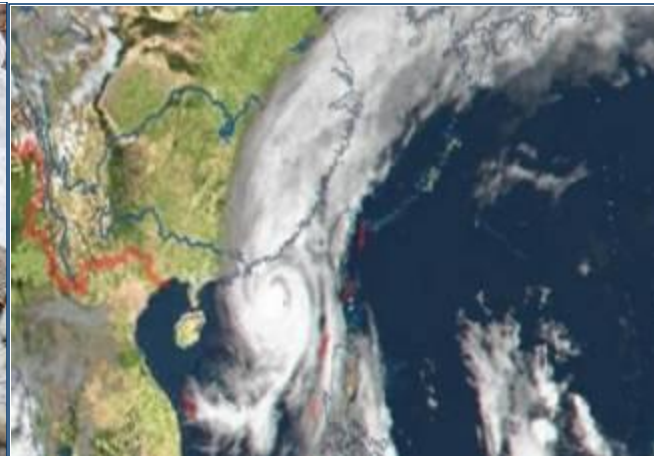


China has almost all kinds of natural disasters in the world except volcano.

Characteristics of the nature disasters

Earthquake

- ❖ High frequency
- ❖ Multiple types
- ❖ Regional discrepancy
- ❖ Severe loss



Blizzard

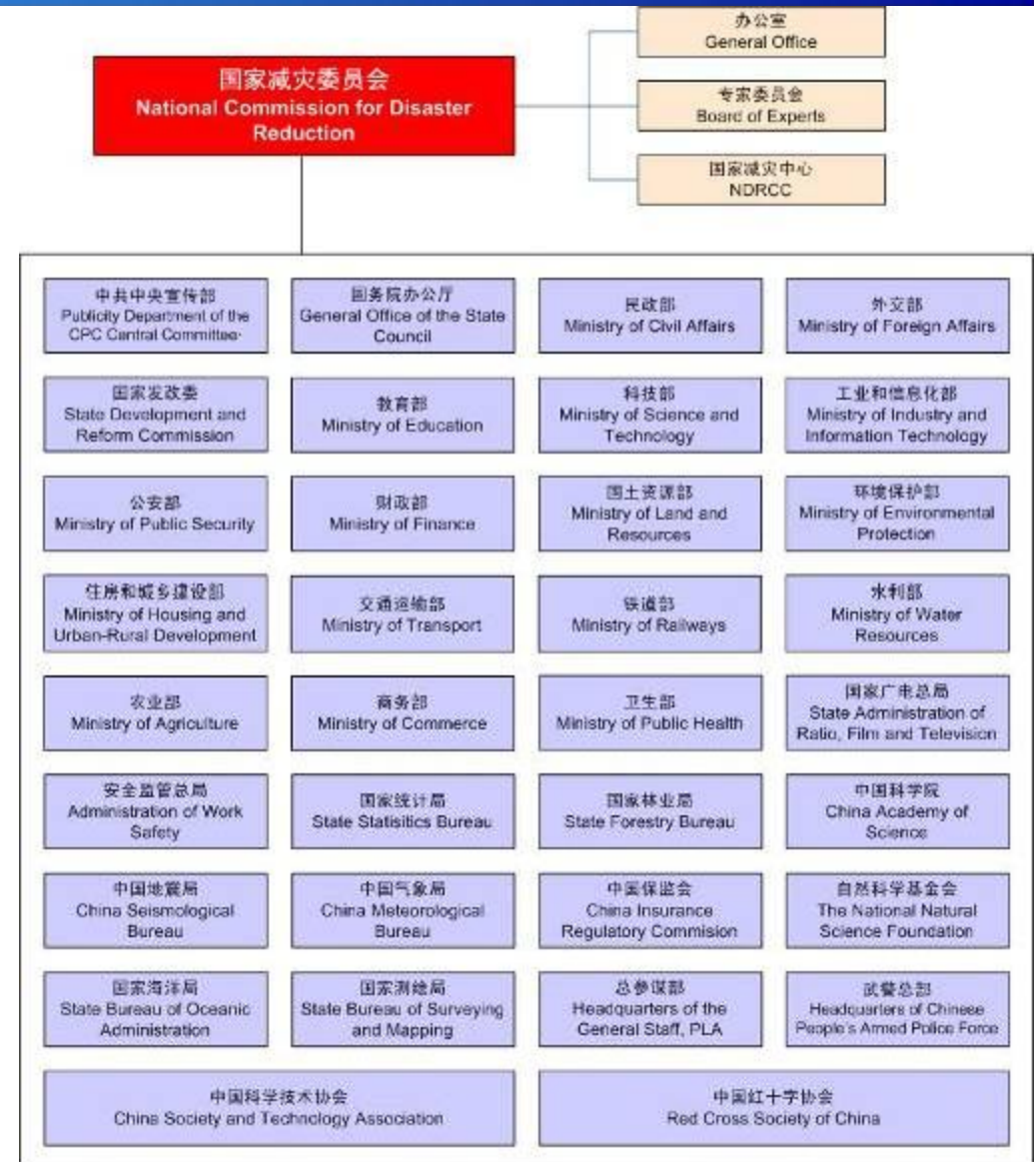
Typhoon



National Committee for Disaster Reduction (NCDR)

❖ **NCDR** is the national counseling and coordination body under the guidance of the State Council for emergency disaster response and relief.

❖ NCDR consists of **34** disaster related member agencies.



Responsibilities of NCDR

- ❖ To develop and implement of the national plan on disaster reduction
- ❖ To develop the guidelines and policies as well as activities
- ❖ To propel international exchange and cooperation in disaster reduction
- ❖ To supervise the relevant works in the provincial levels
- ❖ To organize and coordinate the disaster relief work



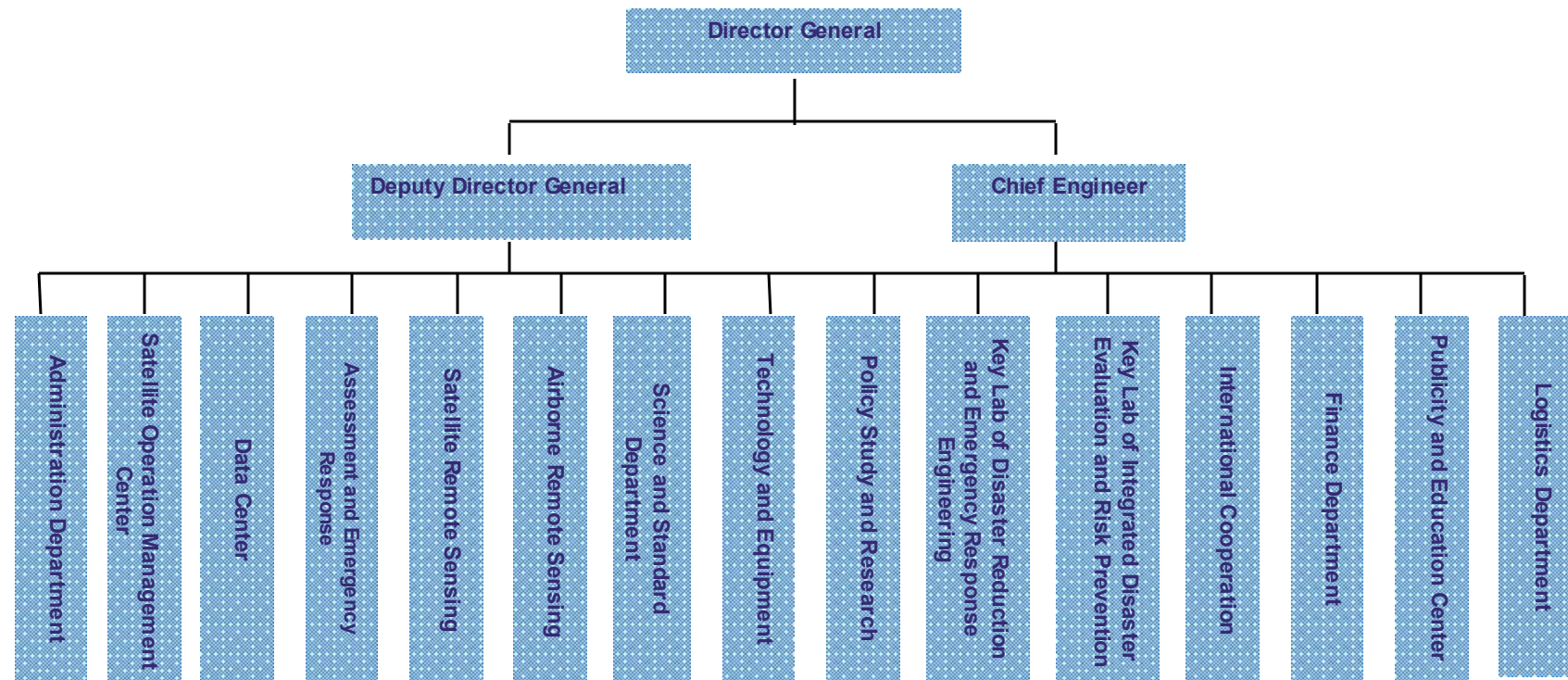
National Disaster Reduction Center of China (NDRCC)

NDRCC, established in 2002, is the decision-making support agency for **NCDR**.

- ❖ Integrating, processing and sharing the disaster information
- ❖ Providing technical services, application research and personnel training
- ❖ Helping the government to make decision for disaster reduction and relief
- ❖ International cooperation on disaster reduction



Brief Introduction of NDRCC



Ministry of Civil Affairs & Ministry of Education Academy of Disaster Reduction and Emergency Management

International Center for Drought Risk Reduction

UN-SPIDER Beijing Office

Application and Research Center of National Space Technology for Disaster Reduction

Secretariat of the National Committee for Disaster Reduction of China

Secretariat of the National Technical Committee on Disaster Reduction and Relief of the Standardization Administration of China





Small Satellite Constellation for Environment and Disaster Monitoring & Forecasting

- Satellite Constellation
- Characters of Payloads
- Space Technology Cooperation System
- Operation Management



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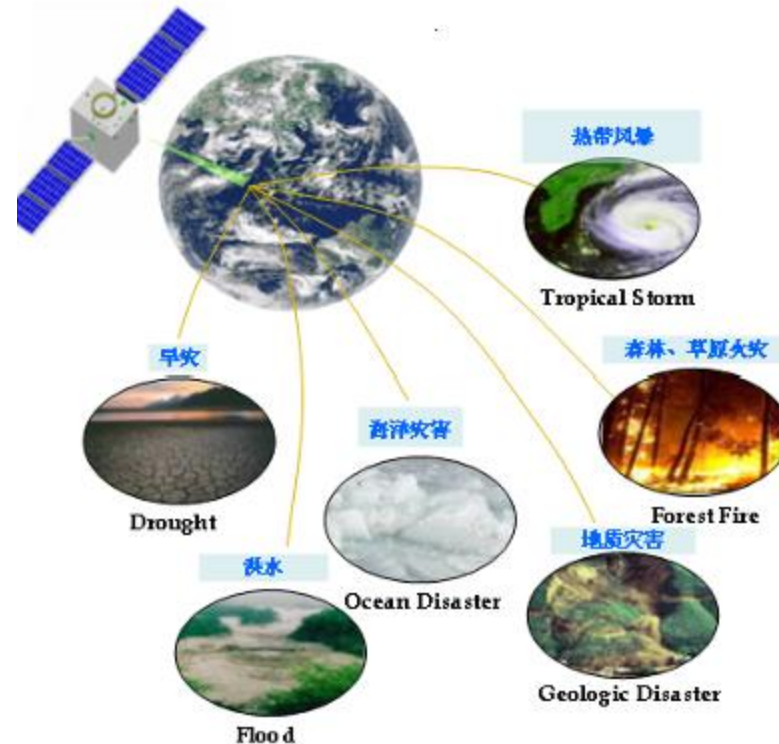


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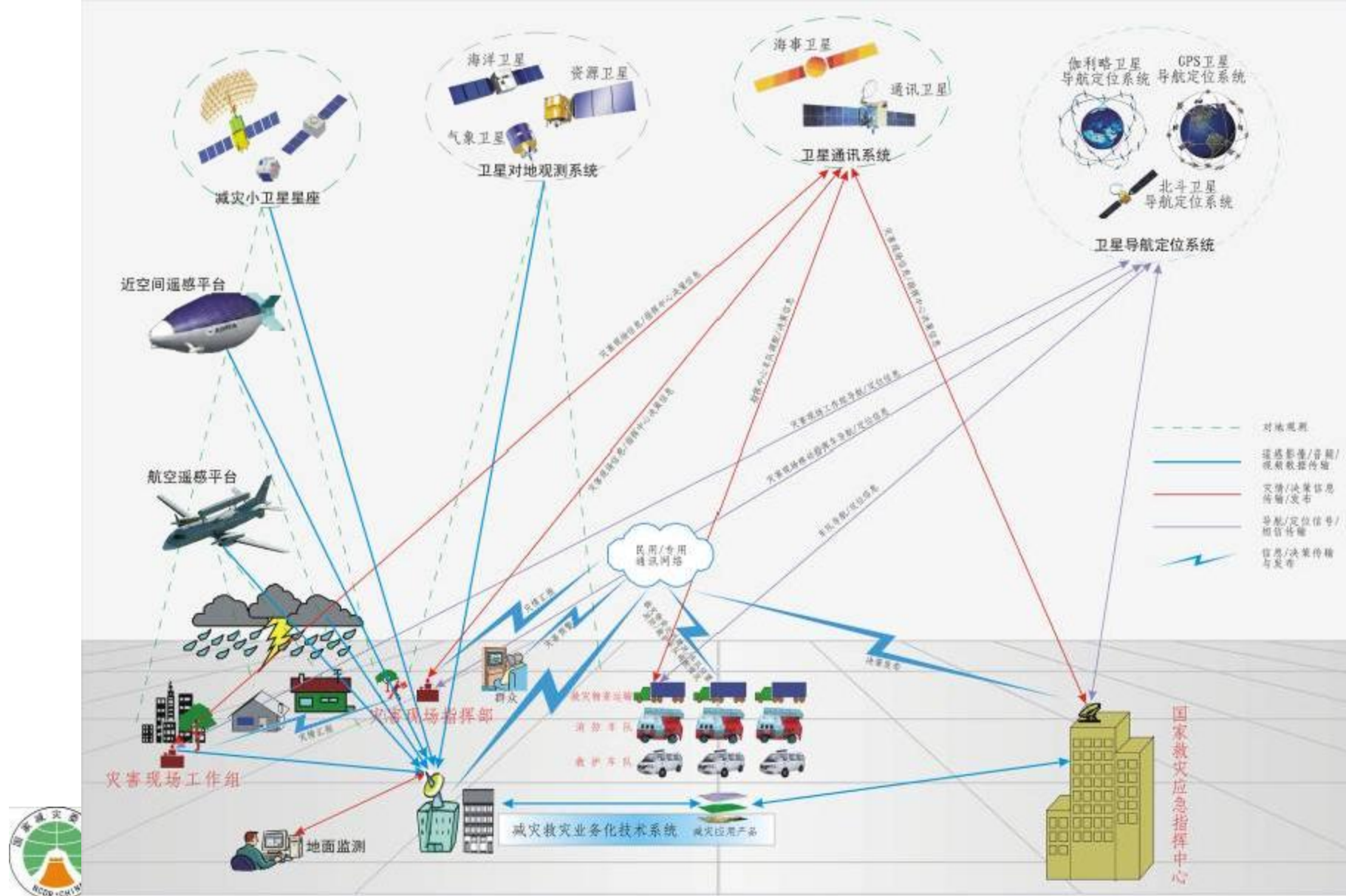
Satellite Constellation

Small Satellite Constellation for Environment and Disaster Monitoring & Forecasting

- ❖ According to the development plan, HJ constellation includes Launching four optical satellites and four radar satellites.
- ❖ On 6th Sep, 2008, HJ-1-A and HJ-1-B were launched. That is the first step of HJ constellation construction.



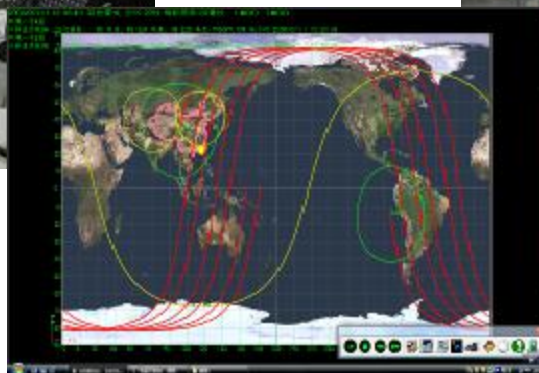
Space Technology Cooperation System



Operation Management

HJ-1 is operated by Satellite Application Center for Disaster Reduction (SACDR), and SACDR is responsible for.

- ❖ Receive and process telemetry data, monitor the working condition of the satellites and payloads.
- ❖ Program the observing plan and data receiving plan.
- ❖ Satellites conventional and emergent operational management.
- ❖ Program and transmit satellites control commands.





Space Technology Applications for the Disaster Management

- Disaster Management Cycle
- National Natural Disaster Management System in NDRCC
- Operational Working Modes
- Space Technology Application
- International Data and Product Service



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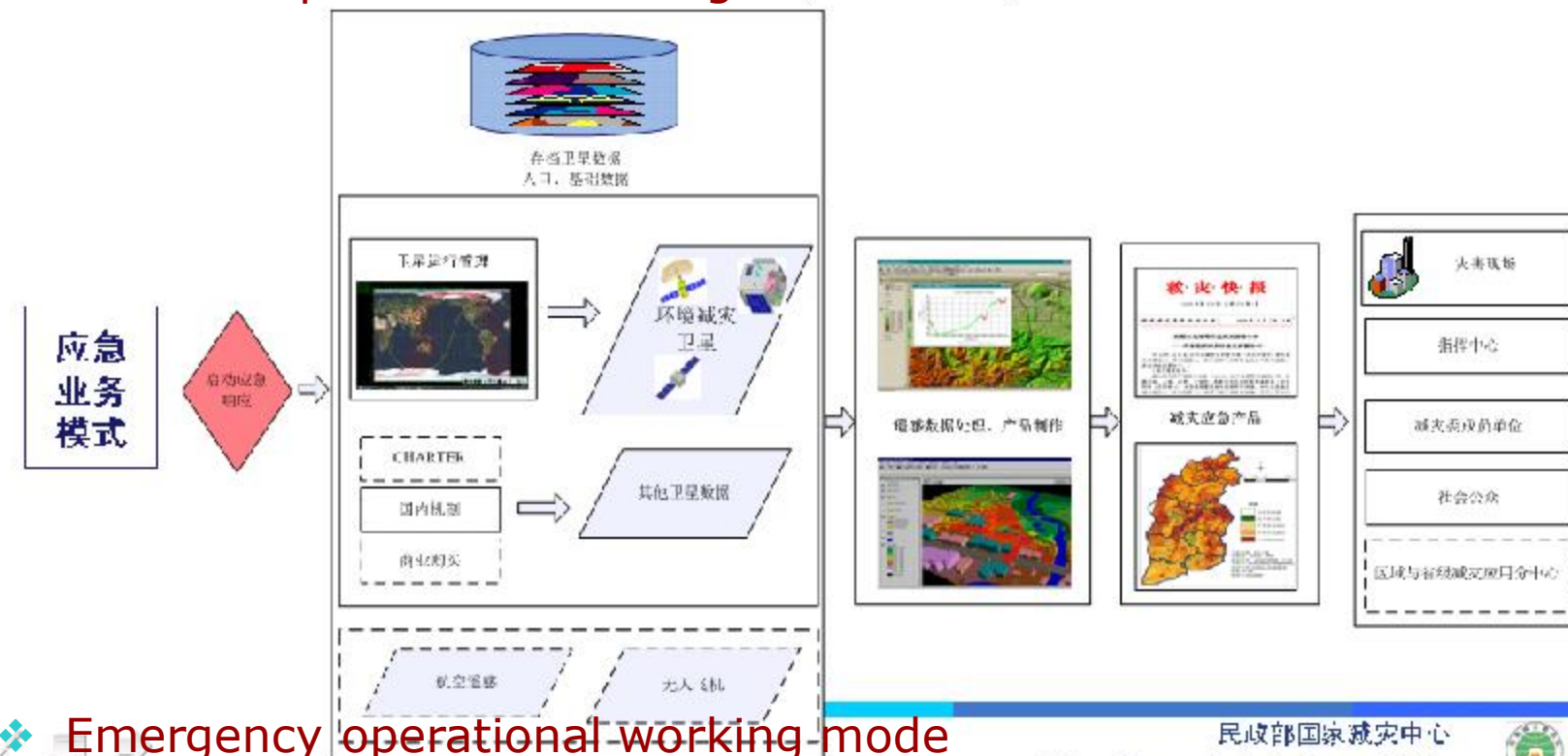
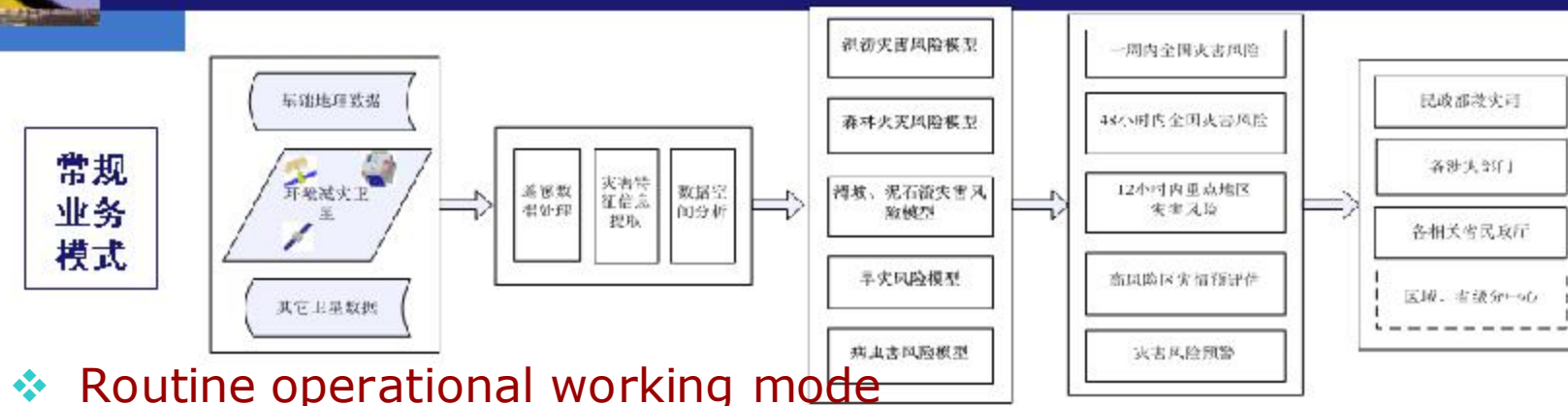


民政部国家减灾中心
National Disaster Reduction Center of China, MCA

Disaster Management Cycle



Operational Working Modes



Application Product System

Application Products

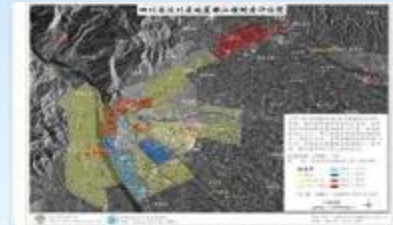
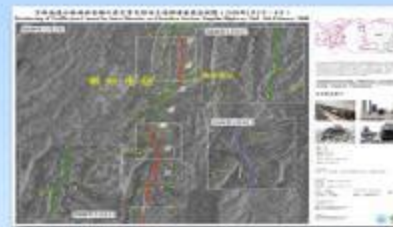
Risk Early-warning



Disaster Monitoring



Disaster Assessment

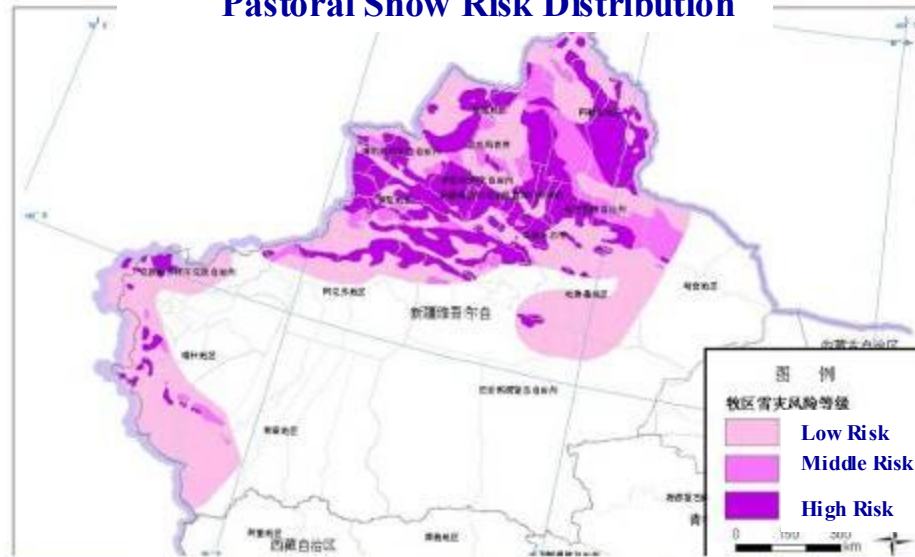


Recovery and Reconstruction Assessment

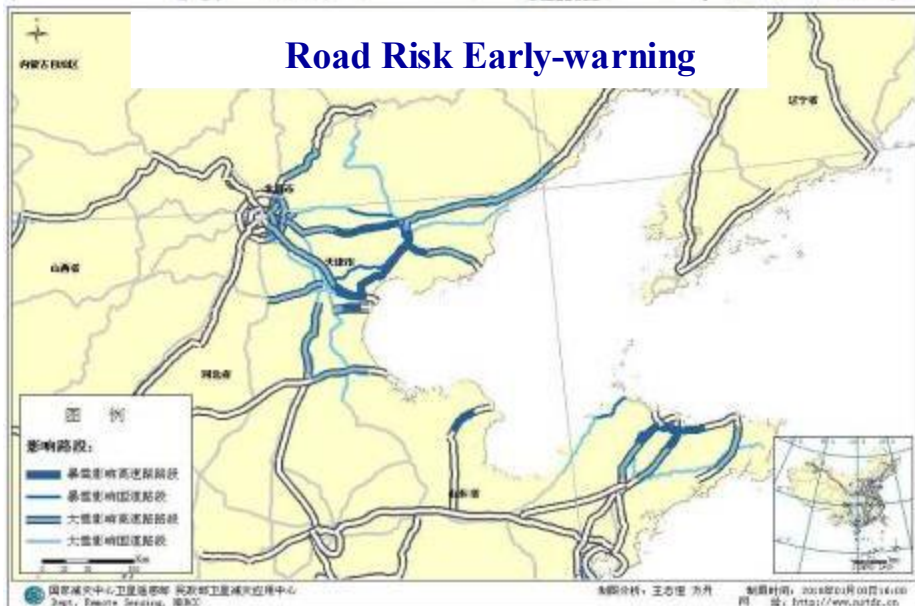


Risk Early-warning

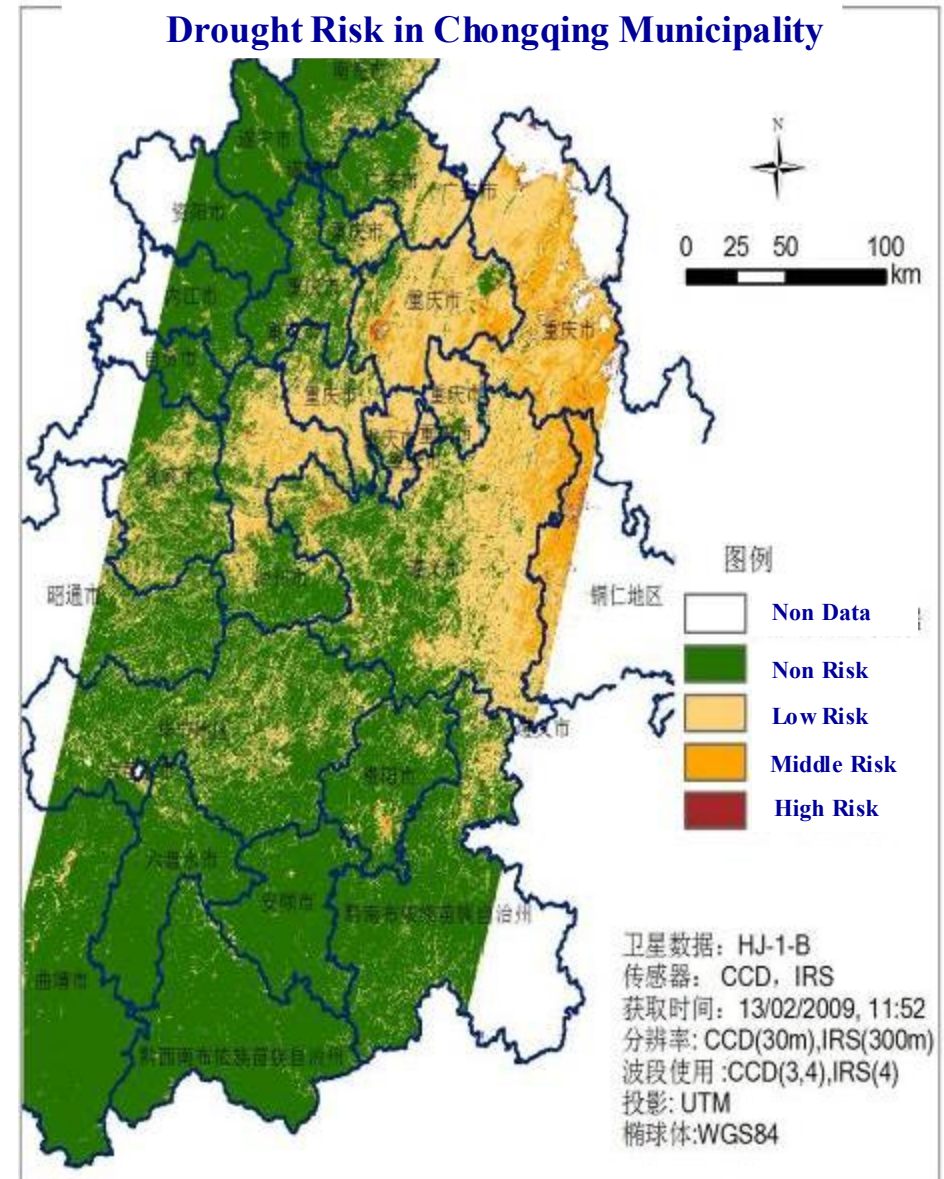
Pastoral Snow Risk Distribution



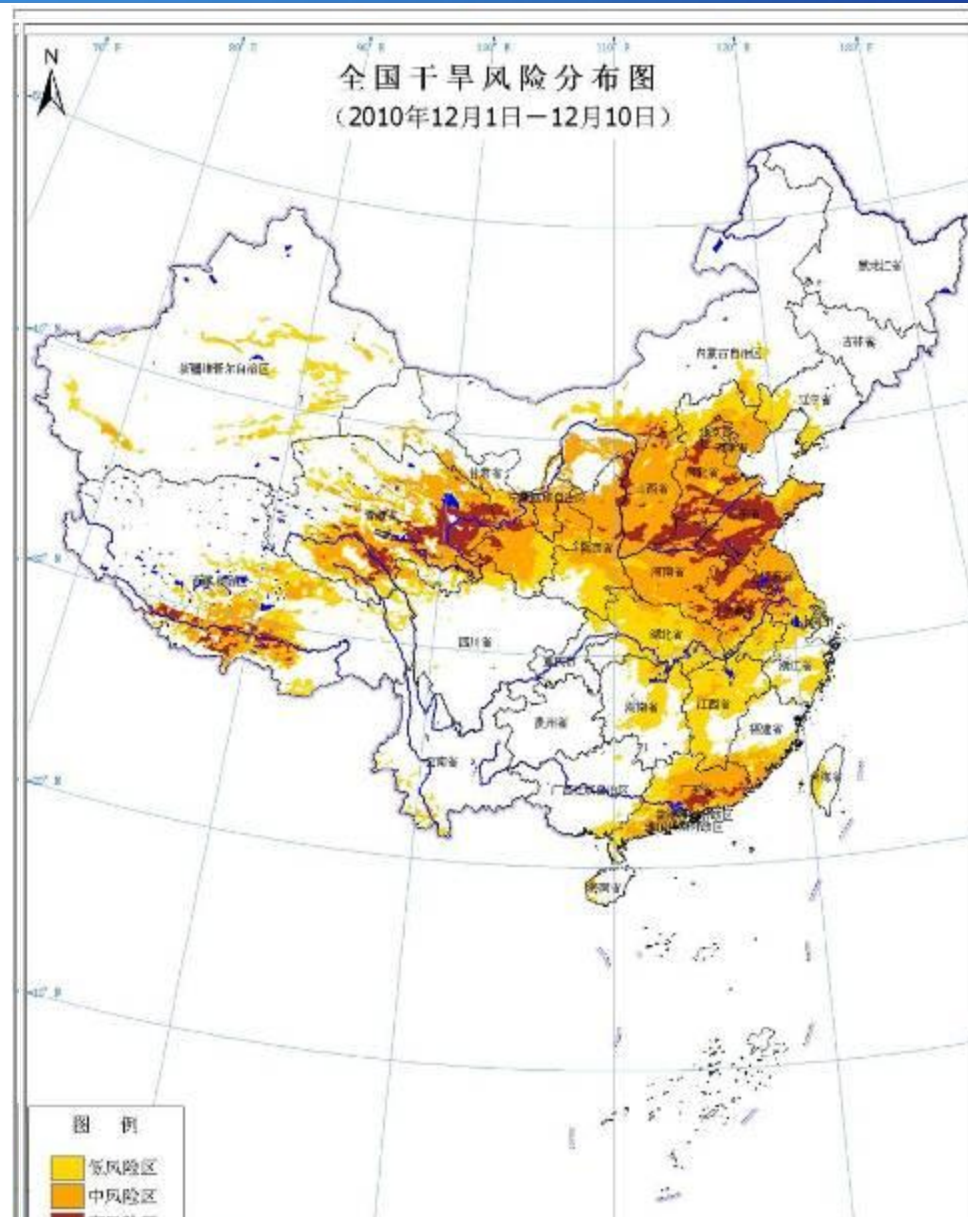
Road Risk Early-warning



Drought Risk in Chongqing Municipality



Drought Risk



Flood Risk

全国洪涝灾害风险分布图（2010年10月18日-10月19日）



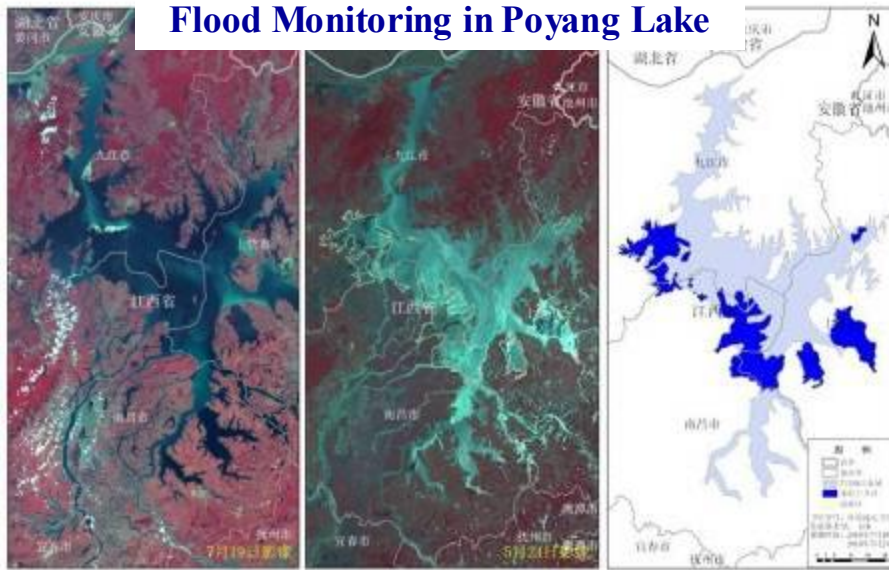
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民政部国家减灾中心/民政部三星减灾应用中心

制图时间：2010年10月18日

Disaster Monitoring

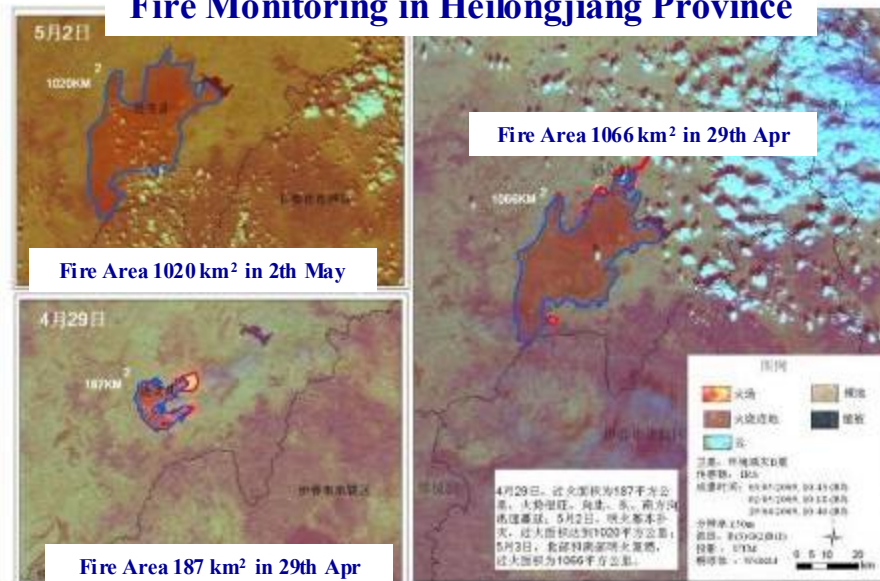
Flood Monitoring in Poyang Lake



Snow Coverage Monitoring in Tibet



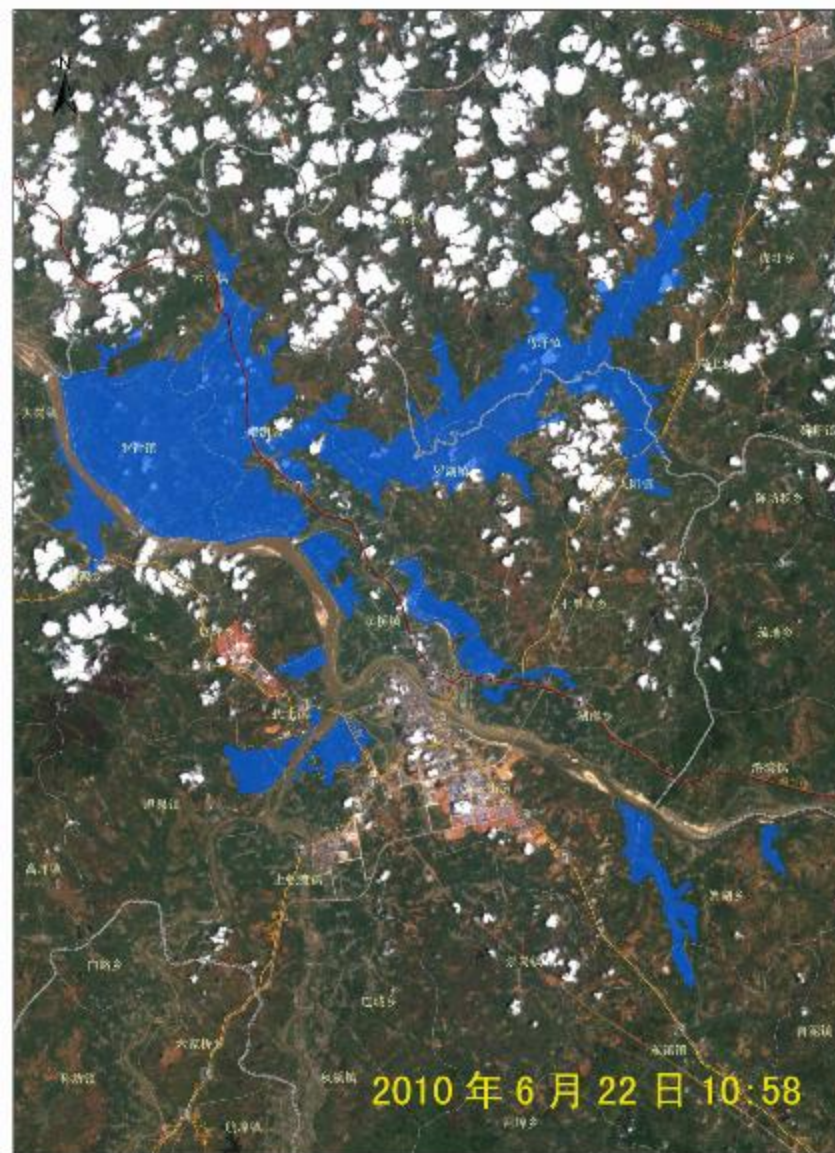
Fire Monitoring in Heilongjiang Province



Quake Lake Monitoring in Wenchuan



Flood Monitoring

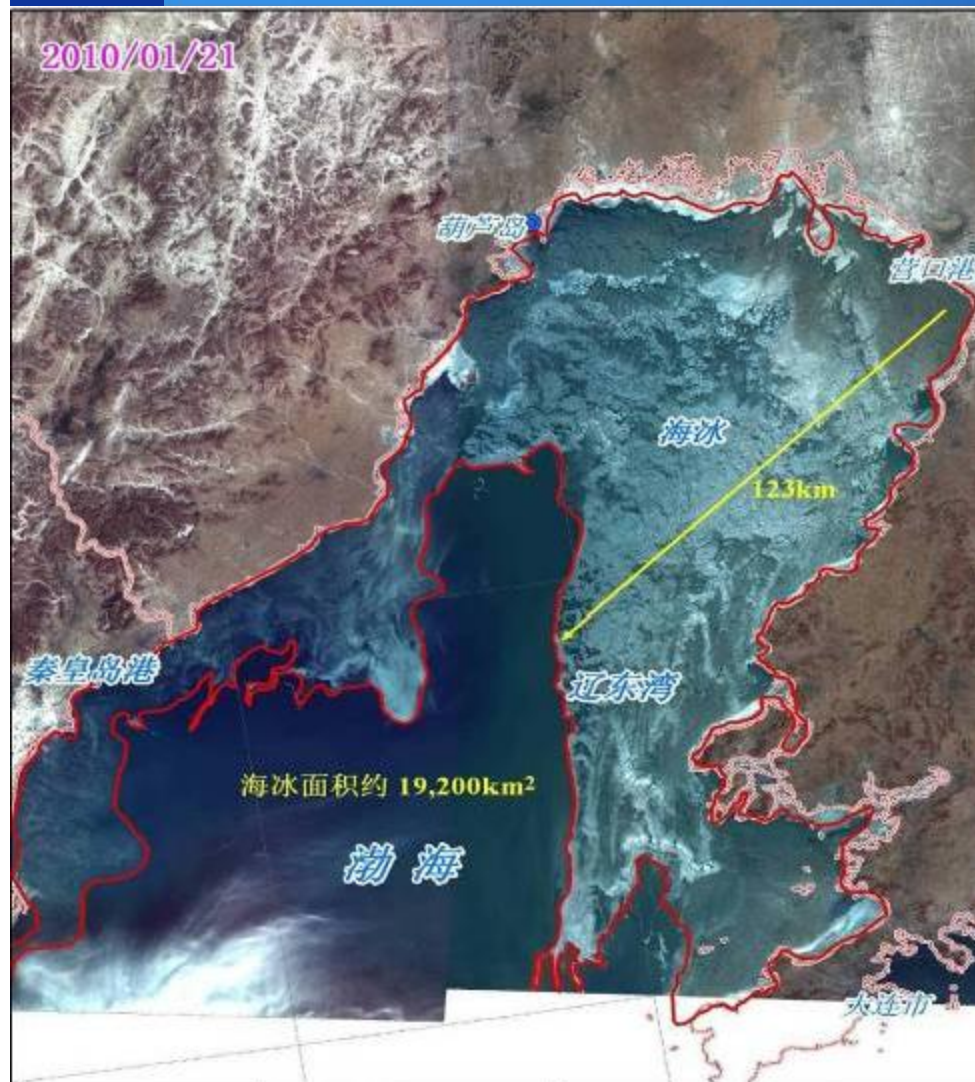


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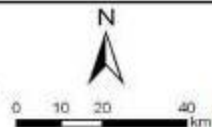
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Sea Ice Monitoring



利用2010年1月21日环境减灾
A星数据对辽东湾海冰进行监测，
结果显示：1月21日，辽东湾海
域海冰面积约为19,200平方公里。

卫星型号：HY-1A
传感器类型：CCD
获取时间：2010/01/21
分辨率：30m
波段使用：重(1G(5)8(2))
投影：UTM
坐标系：WGS84

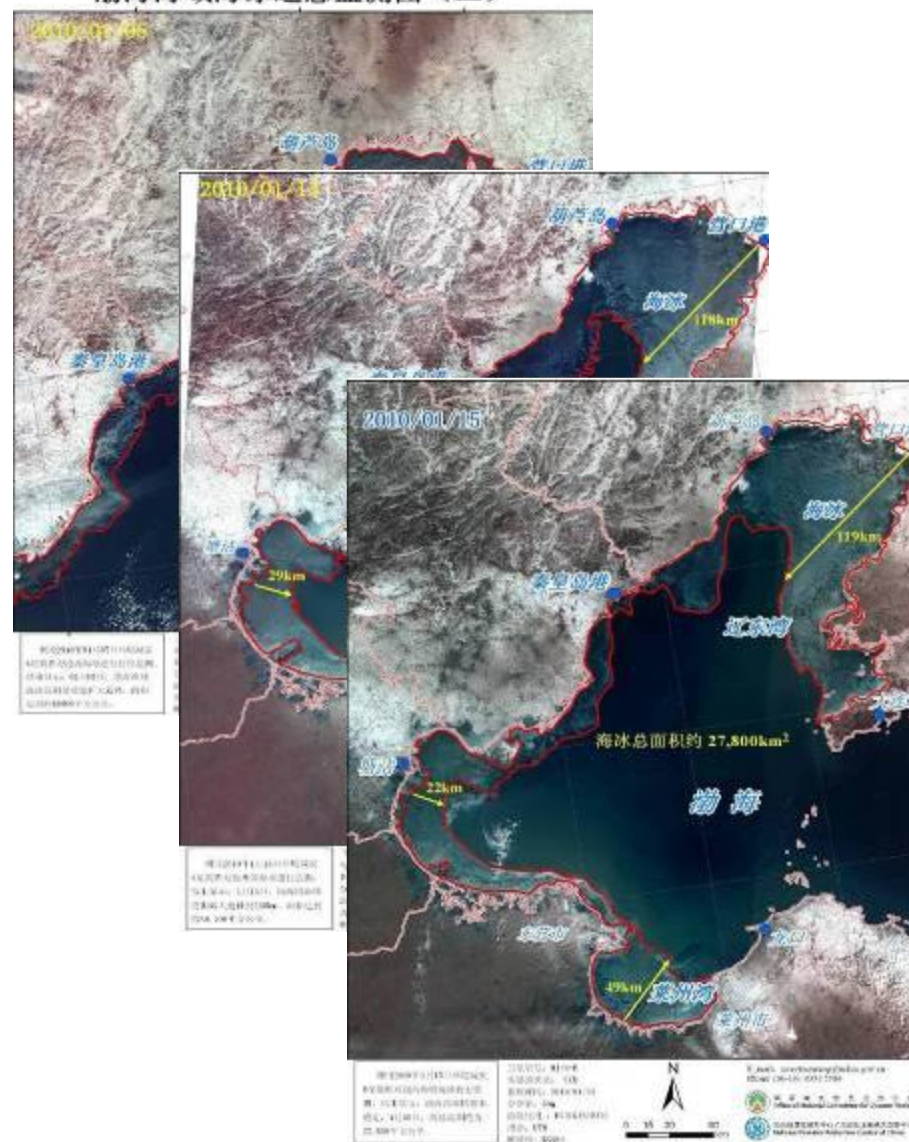


E-mail: ram@caenmp@ndrc.gov.cn
Phone: (86-10) 8354 5550

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National Disaster Reduction Center of China

渤海海域海冰遥感监测图 (二)



利用2010年1月13-15日环境减灾
A星数据对渤海海冰进行监测，
结果显示：13-15日，渤海海冰
面积持续增加，15日达到27,500
平方公里。

卫星型号：HY-1A
传感器类型：CCD
获取时间：2010/01/13-15
分辨率：30m
波段使用：重(1G(5)8(2))
投影：UTM
坐标系：WGS84

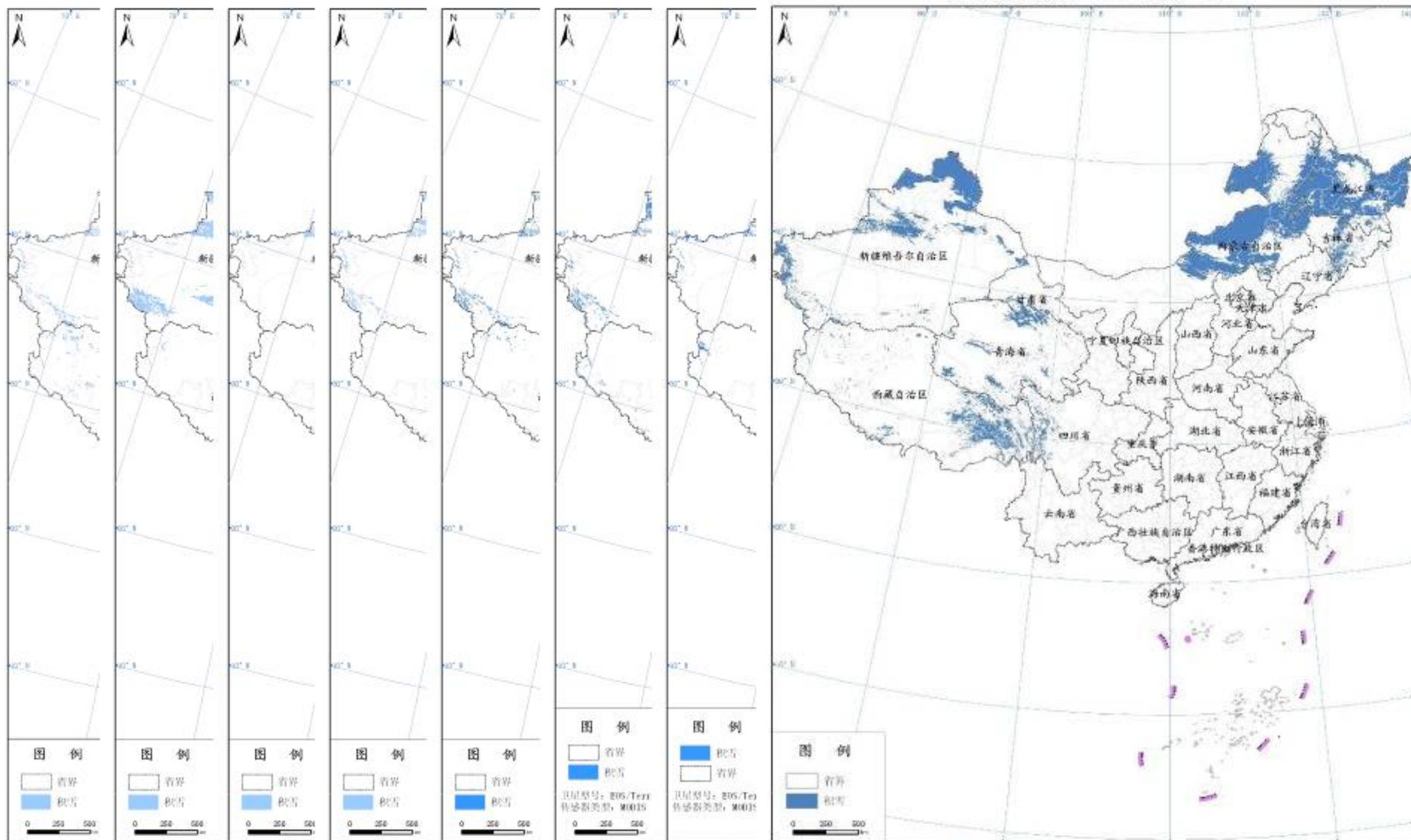
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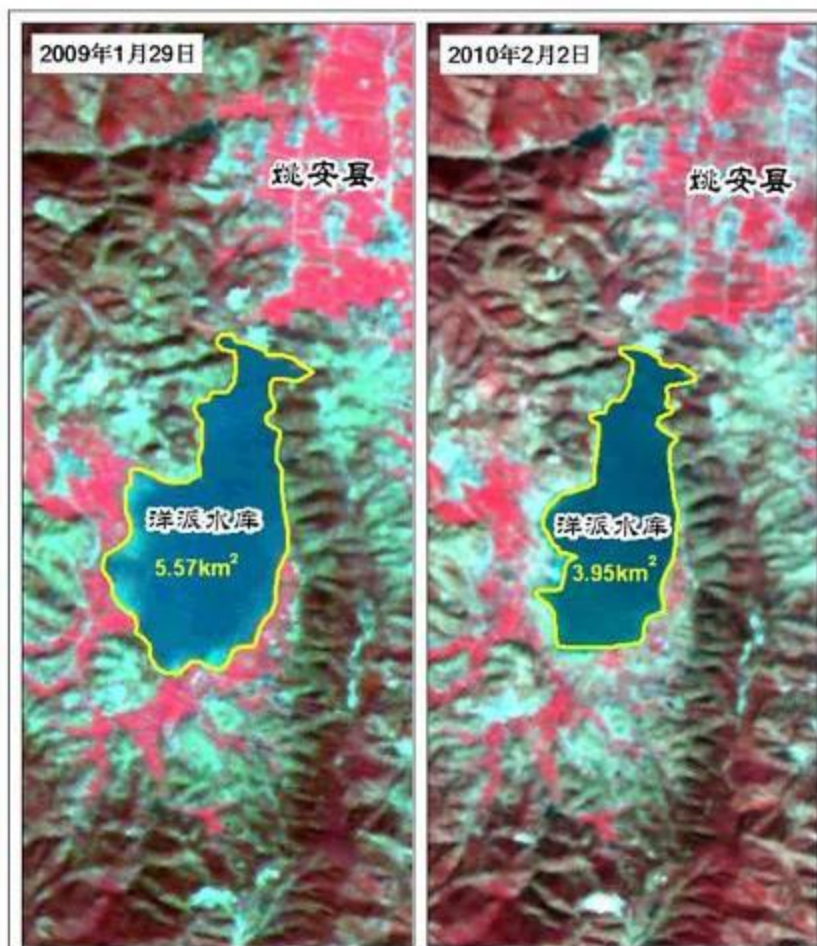
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Snow Coverage Monitoring

全国积雪覆盖图 (2010年11月28日)



Drought Monitoring



卫星型号: FJ-1-B
传感器类型: CCD
观测时间: 2009年1月29日
2010年2月2日
分辨率: 30m
波段组合: R(4) G(3) B(2)
投影方式: UTM
椭球体: WGS84

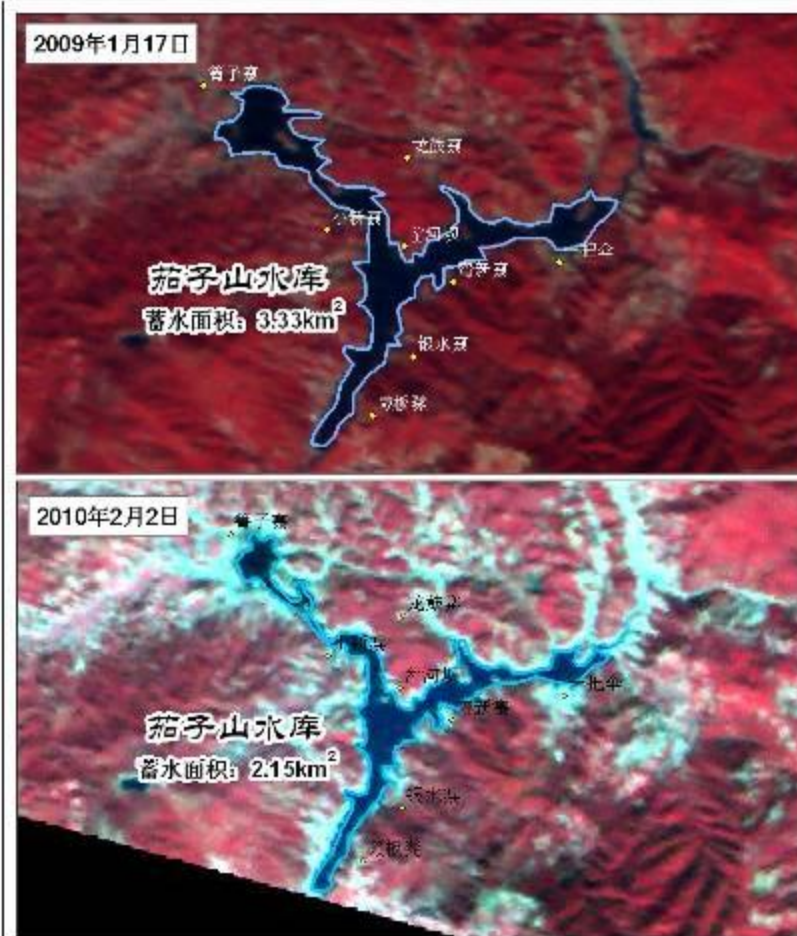


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Phone: (86-10) 8354 5980

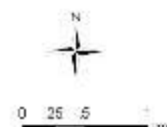
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National Disaster Reduction Center



卫星型号: FJ-1-B
传感器类型: CCD
观测时间: 2009年1月17日
2010年2月2日
分辨率: 30m
波段组合: R(4) G(3) B(2)
投影方式: UTM
椭球体: WGS84



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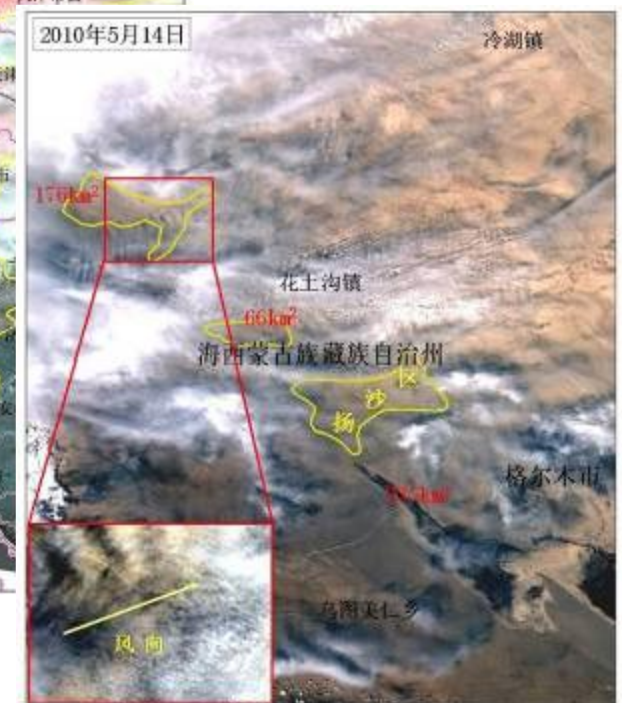
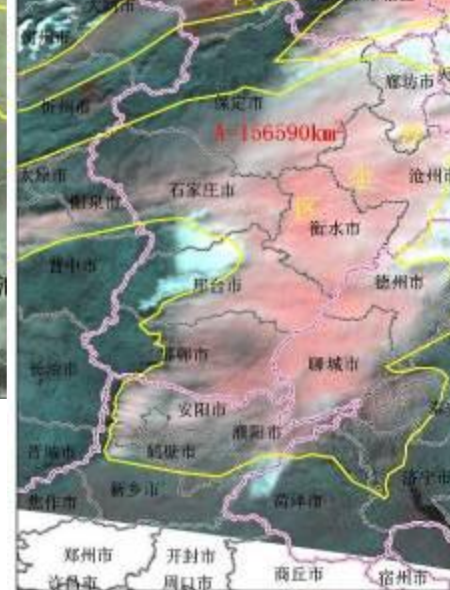
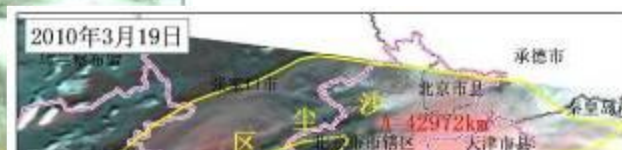
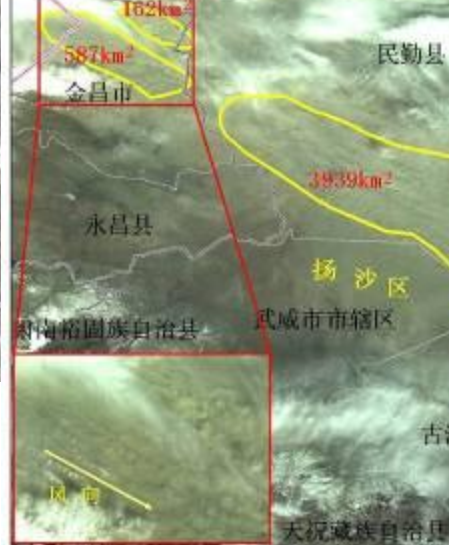
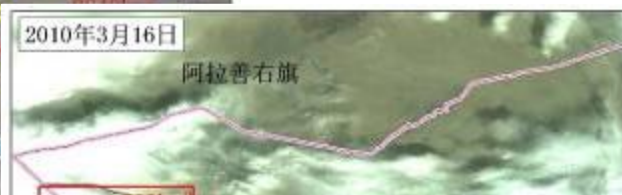
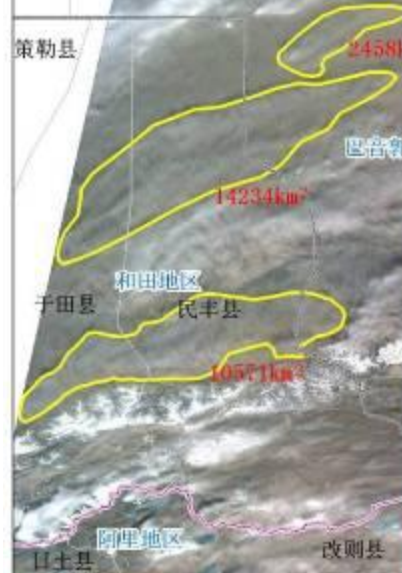
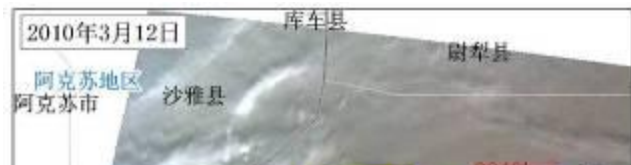
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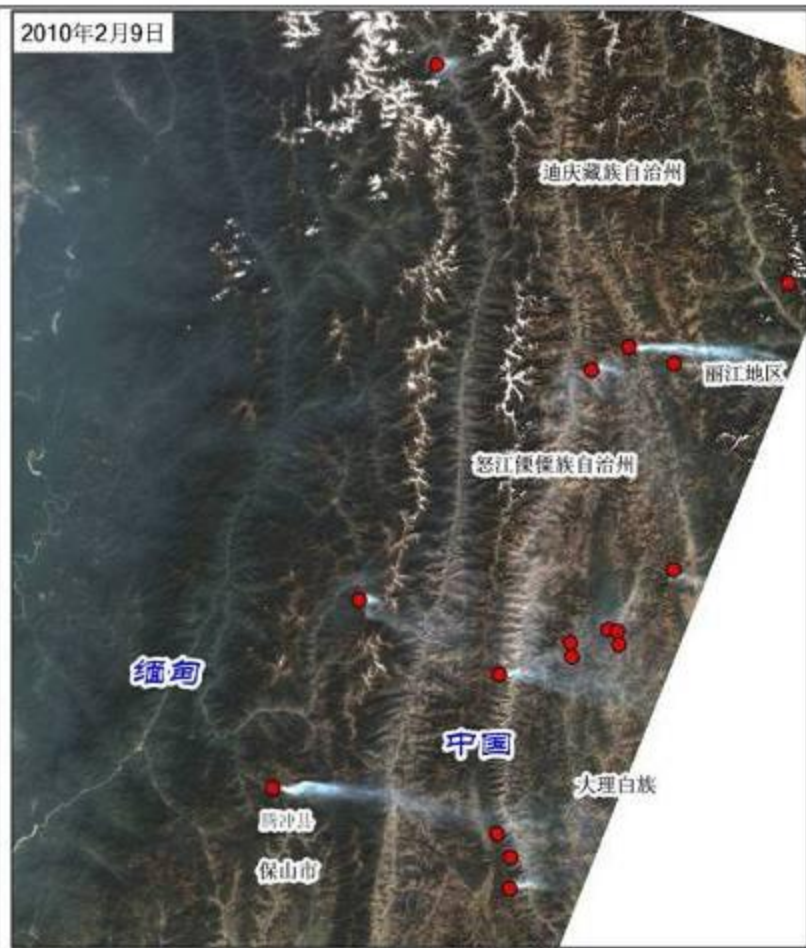
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National Disaster Reduction Center



Sandstorm Monitoring



Fire Monitoring



卫星型号: HJ-1-B
传感器类型: CCD
观测时间: 2010年2月9日
分辨率: 30m
波段组合: R(3) G(2) B(1)
投影方式: UTM
椭球体: WGS84

图例
● 火点



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卫星型号: HJ-1-B
传感器类型: CCD
观测时间: 2010年2月9日
分辨率: 30m
波段组合: R(1) G(2) B(3)
投影方式: UTM
椭球体: WGS84

图例
● 火点
□ 火烧迹地



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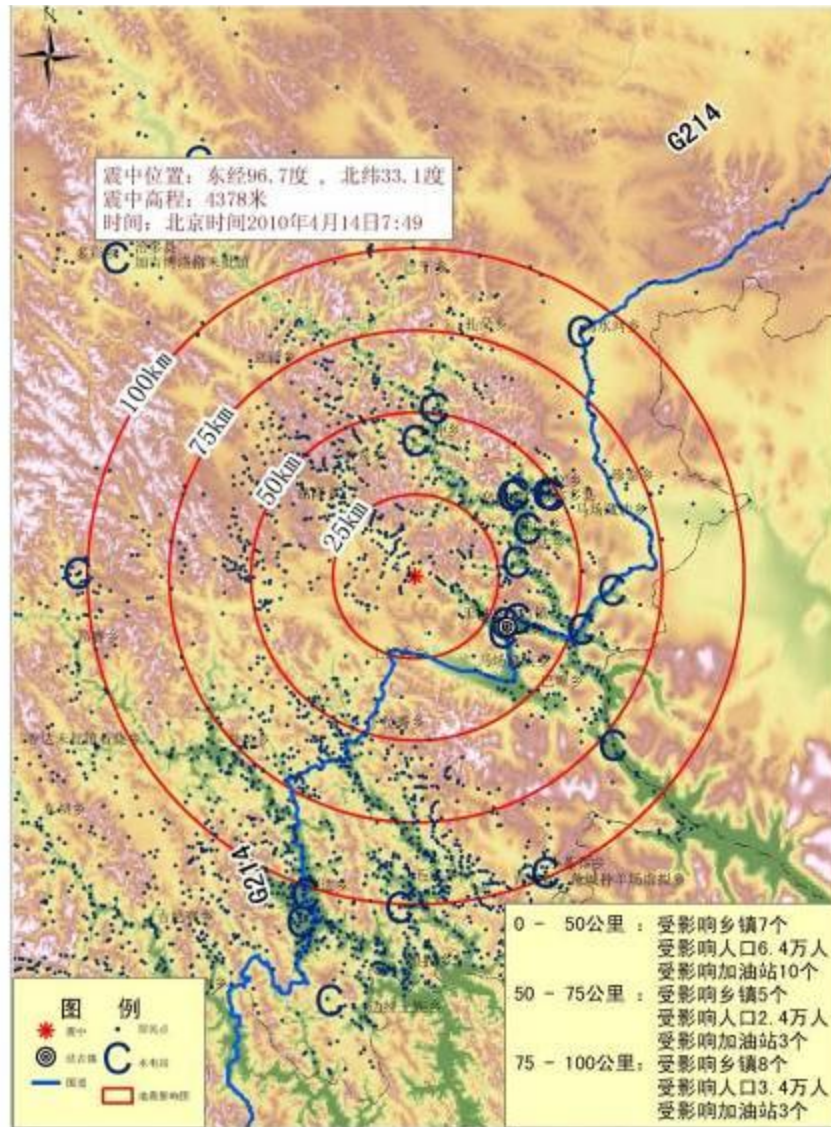
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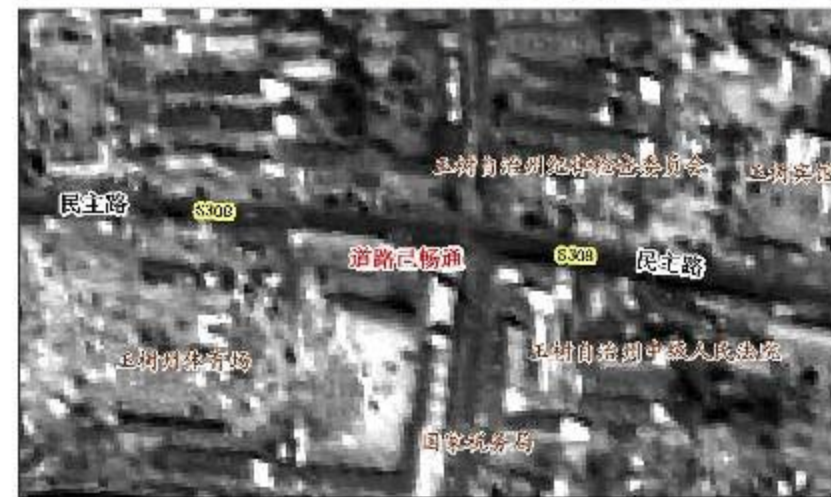
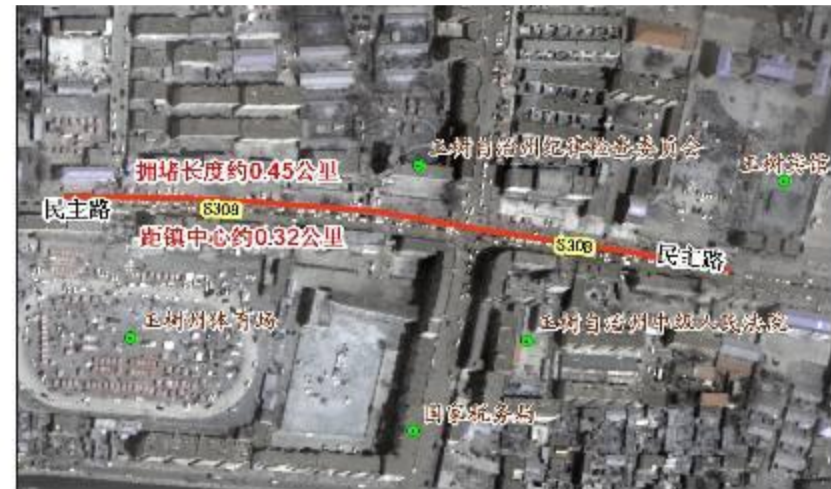
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Disaster Assessment

Yushu Earthquake Influenced Range



Yushu Earthquake Traffic jam in Jiegu Town



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2010年4月16日制作

Evacuated Tents Monitoring in Jiegu town, Qinghai Province



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民政部国家减灾中心/民政部卫星减灾应用中心

2010年4月25日制作



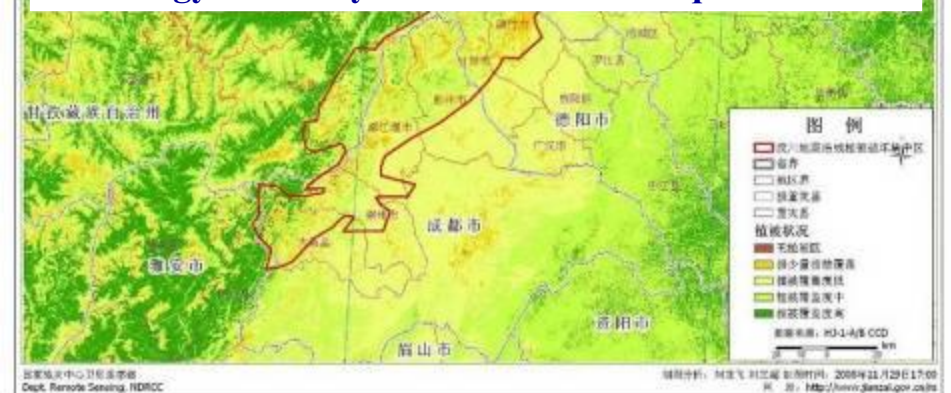
Recovery and Reconstruction Assessment

Reconstruction Monitoring in wenchuan Earthquake Area

Reconstruction Monitoring in wenchuan Earthquake Area



Ecology Recovery in wenchuan Earthquake Area





International Cooperation

- International CHARTER
- UN-SPIDER
- International Service



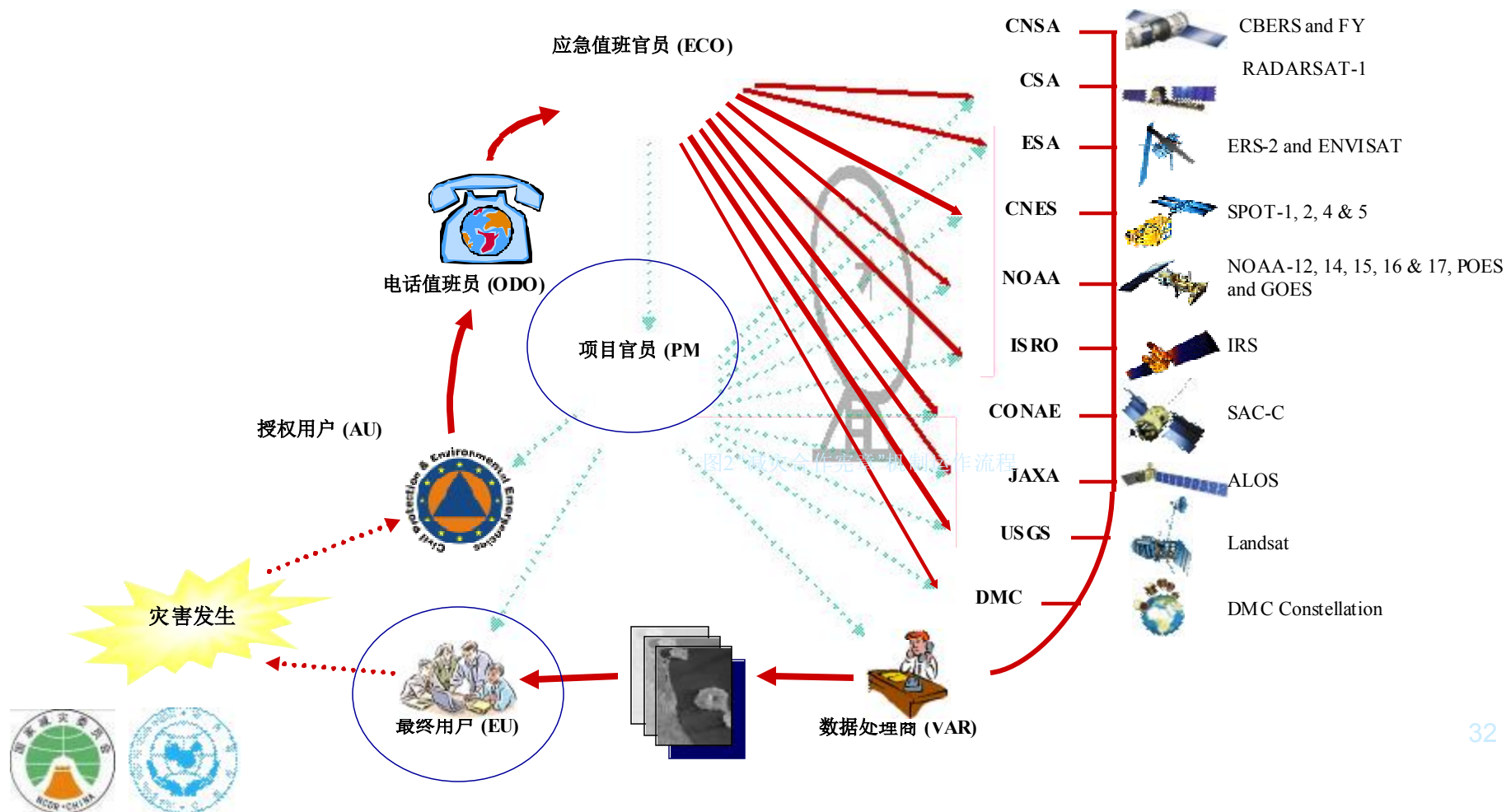
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International Charter

- ❖ China joined the Charter formally on May 24 2007. The NDRCC acts as the Authorized User(AU) and Project Manager(PM) of the mechanism, and have acted for 8 disasters.



UN-SPIDER

- ❖ Beijing office has been located in NDRCC, MCA, and the Inauguration Ceremony has been hold in NDRCC, 10th, Nov, 2010.

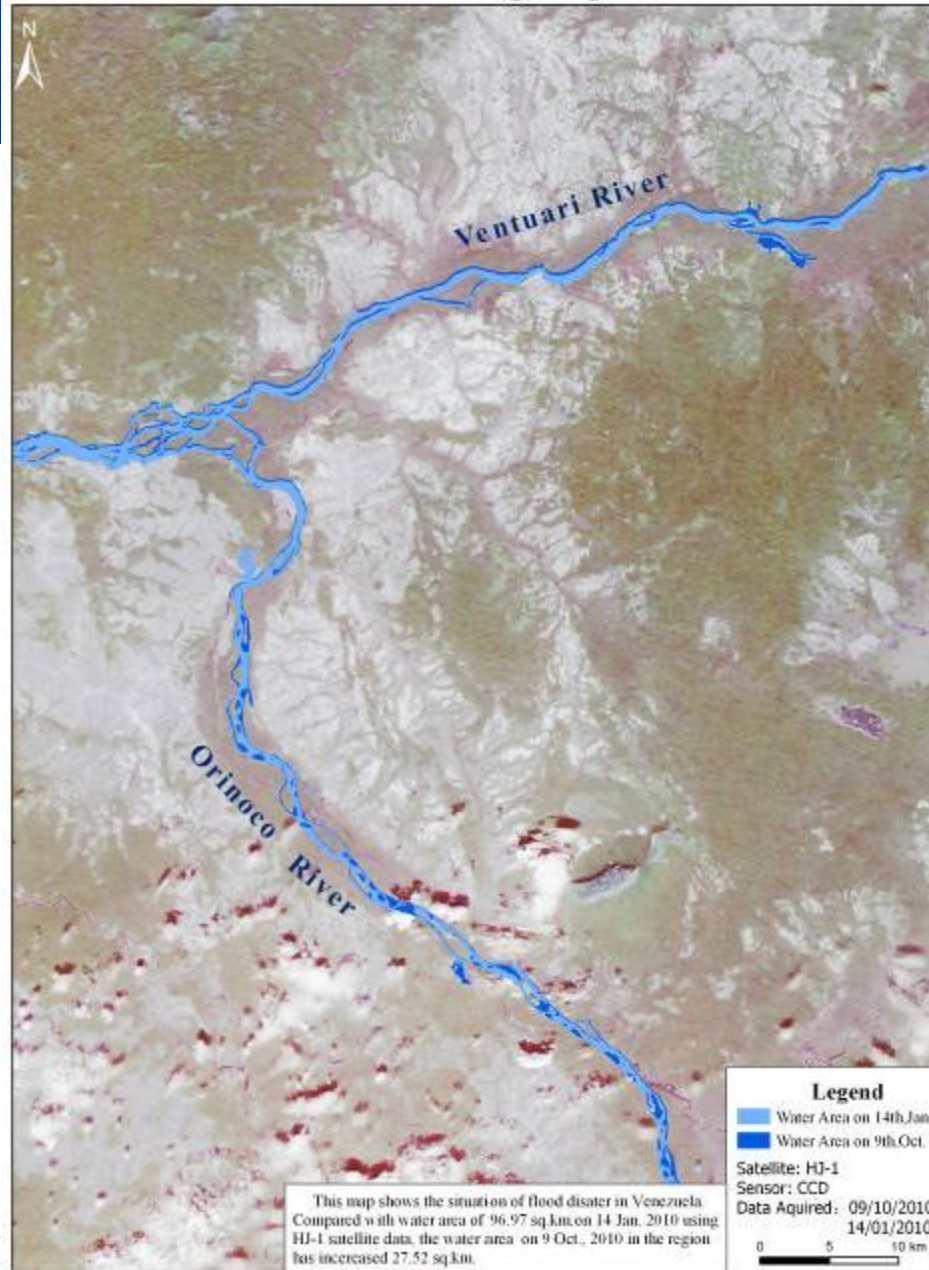


International Service - Venezuela Flood

- ## International Service - Venezuela Flood



Flood Area Monitoring Map in Venezuela



Flood Area Monitoring Map in Venezuela

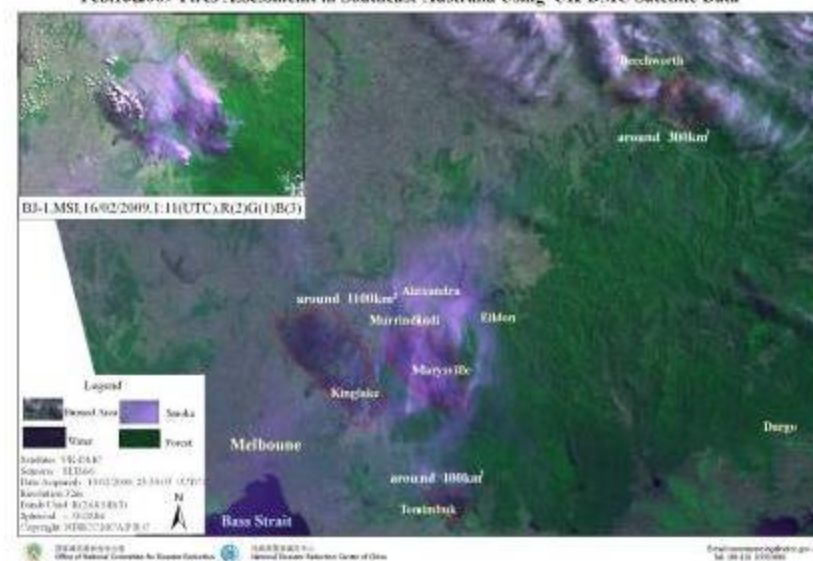


International Service - Australia Forest Fire

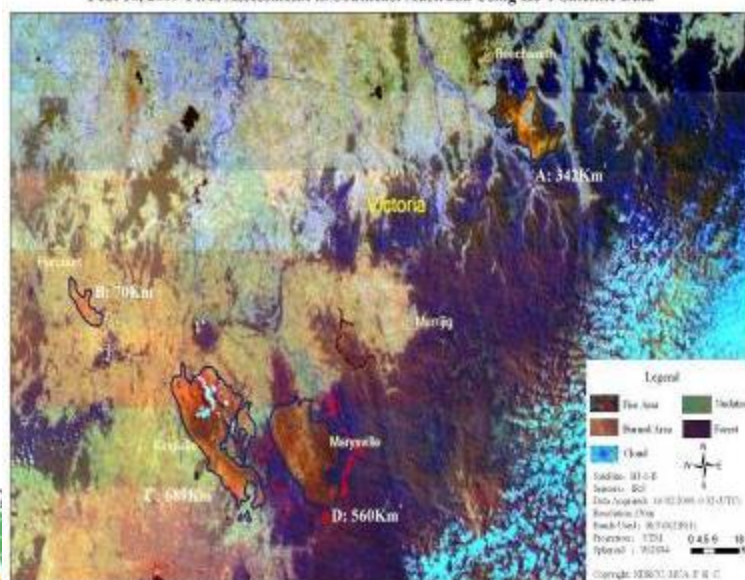
Feb.16,2009-Fires Assessment in Southeast Australia Using BJ-1 Satellite Data



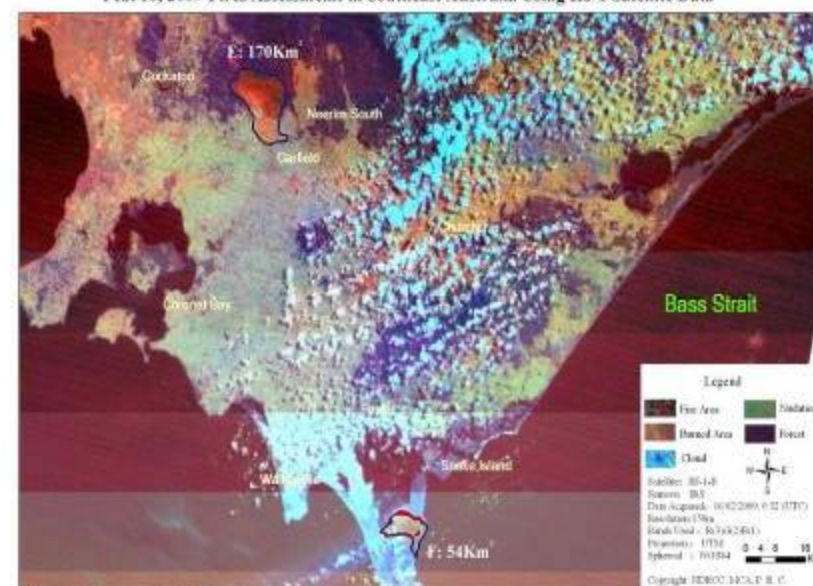
Feb.13,2009-Fires Assessment in Southeast Australia Using UK-DMC Satellite Data



Feb. 16, 2009-Fires Assessment in Southeast Australia Using HJ-1 Satellite Data

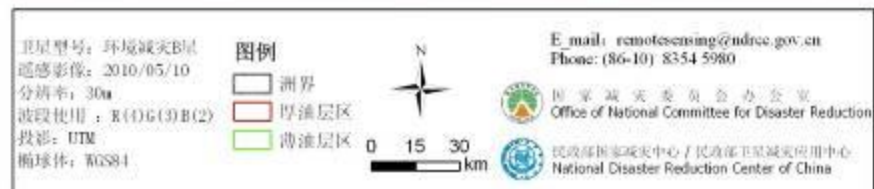


FEB. 10, 2009-FIRES ASSESSMENT IN SOUTHEAST AUSTRALIA USING HJ-1 SATELLITE DATA

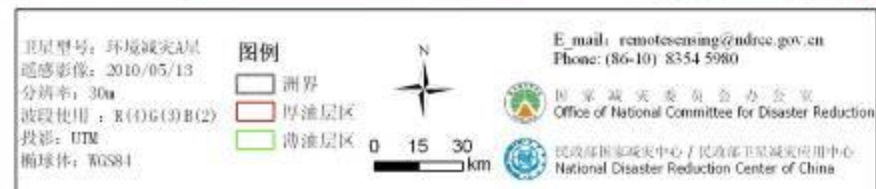
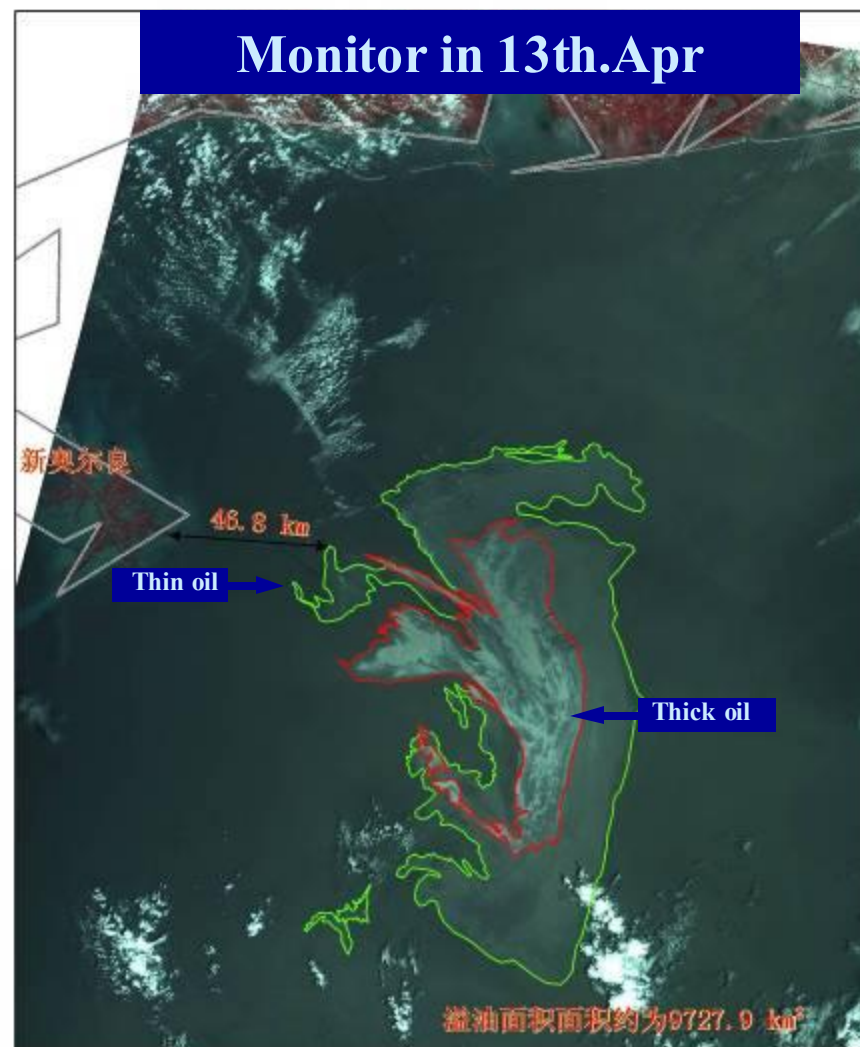


International Service - Mexico Gulf Oil Overflows

Monitor in 10th.Apr



Monitor in 13th.Apr



International Service - Asia-Pacific

巴基斯坦伊斯兰共和国卫星影像图
HJ-1 Satellite Image of the Islamic Republic of Pakistan



孟加拉人民共和国卫星影像图
HJ-1 Satellite Image of the People's Republic of Bangladesh



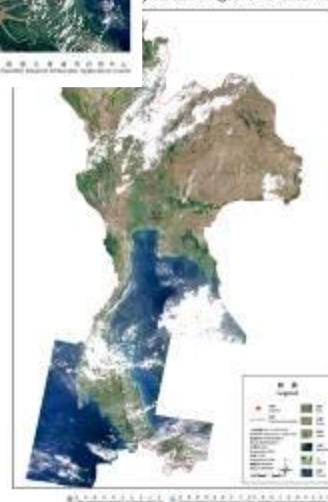
印度尼西亚共和国极乐鸟半岛卫星影像图
HJ-1 Satellite Image of Cendrawasih in the Republic of Indonesia



秘鲁共和国伊卡卫星影像图
HJ-1 Satellite Image of Ica in the Republic of Peru



卫星影像图
Satellite Image of the Kingdom of Thailand



伊朗伊斯兰共和国卫星影像图
Satellite Image of the Islamic Republic of Iran

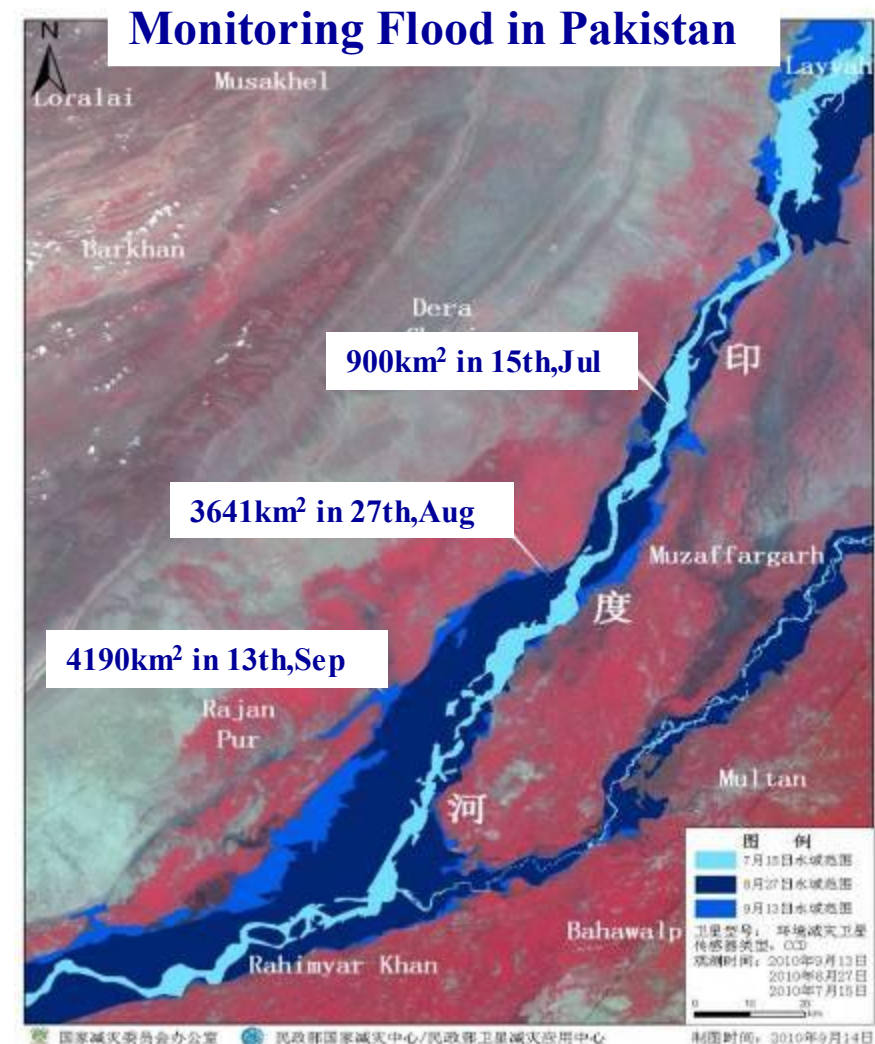


Background map

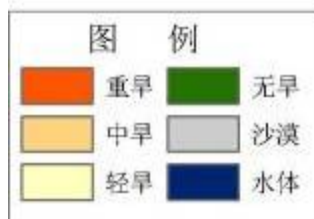
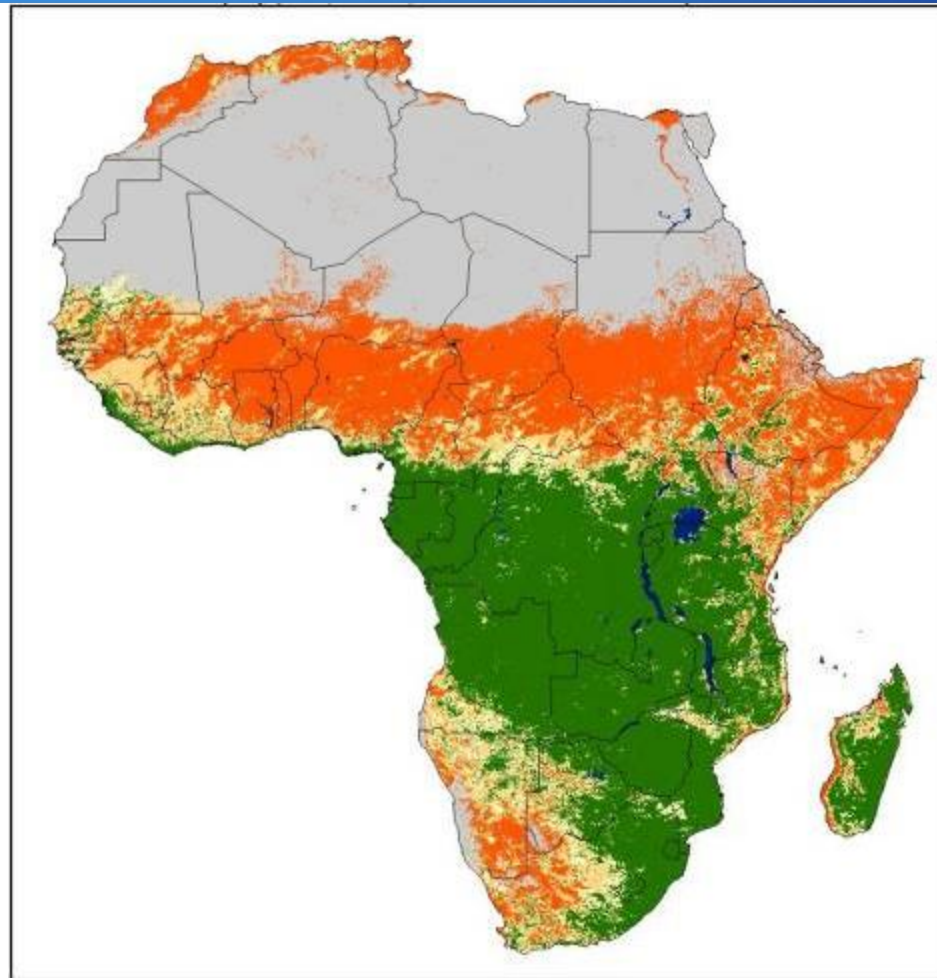
International Service - Pakistan Landslide and Flood

On Jan. 4, a massive landslide broke out in northern Pakistan, and it resulted in forming quake lake afterwards.

Since late July, Pakistan suffered a serious flood disaster. NSDR provided multi-temporal monitoring on flood change.



International Service – Africa Drought Risk



数据源: 环境减灾卫星, Metsat
Data source: HJ-1-A/B, Metsat

0 365 730 1,460 km



国家减灾中心/民政部卫星减灾应用中心/国际减轻旱灾风险中心
NDRCC, <http://www.nstdr.cn>; ICDRR, <http://www.icdrr.com>

分析: 刘三超 时间: 2010年3月21日14:00

Mapping: Liu Sanchao Time: 14:00 on Mar. 21, 2010



Background map from Google

International Service – Haiti Earthquake

海地地震灾区遥感监测 (3) Haiti Earthquake monitoring using HJ-1 of China



卫星型号(Satellite): HJ-1B
获取时间(Data Acquired): 14/01/2010
投影(Projection): UTM

传感器类型(Sensor): CCD
分辨率(Spatial resolution): 30m
椭球体(spheroid): WGS84



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0 3 6 12 Km



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民政部国家减灾中心 / 民政部卫星减灾应用中心
National Disaster Reduction Center of China



Development Plan



国家减灾委员会
National Committee for Disaster Reduction



民政部国家减灾中心
National Disaster Reduction Center of China, MCA

Development Plan

- ❖ HJ-1-A and HJ-1-B have great application capability and potential in disaster reduction. HJ-1-C will be launched in 2012. The Stage1 objective will be achieved.
- ❖ During the coming years, other satellite of HJ will be launched in China.
- ❖ China is willing to make more contributions to improve the capacity on disaster reduction by using HJ-1 for other Countries, and to build Emergent Service Mechanism in order to provide more regular service.
- ❖ Strengthen the international exchange and cooperation on space technology application for disaster reduction with other countries.



Thank you!

