



# Use of Satellite Data in Emergency Situations in CMA

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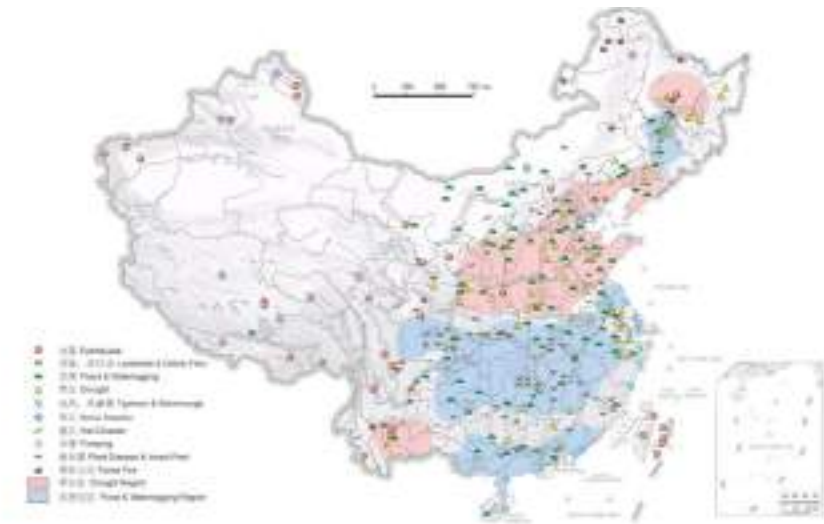


# Outline

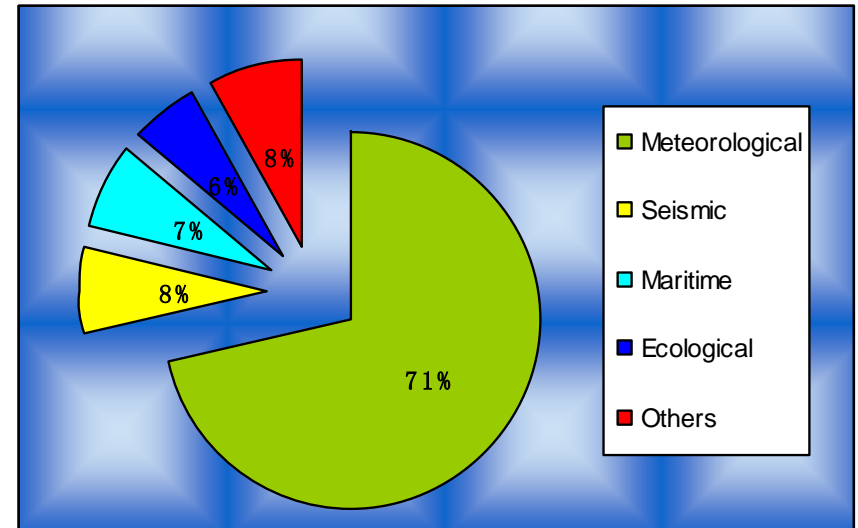
- **Emergency Response to natural disasters in China**
- **Use of Satellite data in Emergency Situations in China**
- **Suggestions**

# Emergency Situations in China

## Natural disaster



Major Natural disasters Map in China



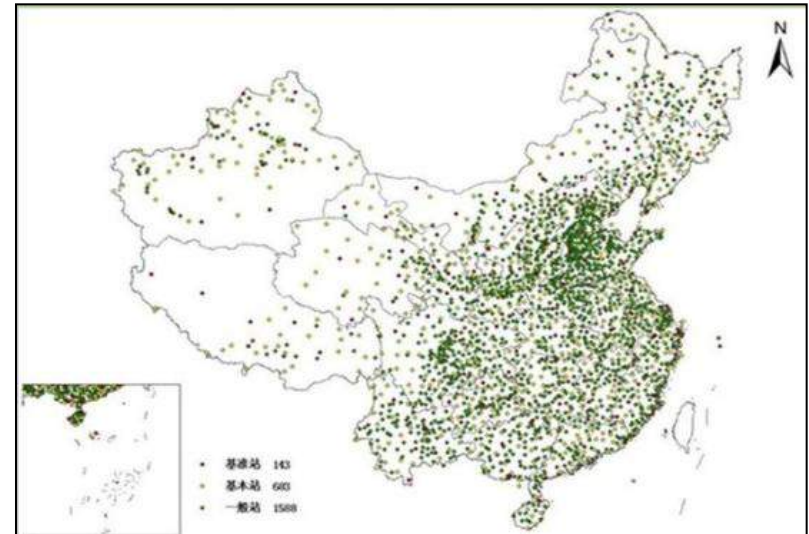
Economic loss of different disasters

## Emergency events in China



# Meteorological Observation Network

- Ground stations
- Doppler Radars
- Meteorological satellites



Ground station network



New generation Doppler Radars network

In the west of China, the natural disasters happened frequently, but the ground stations and radar sites are quite scarce and not enough in this large area.

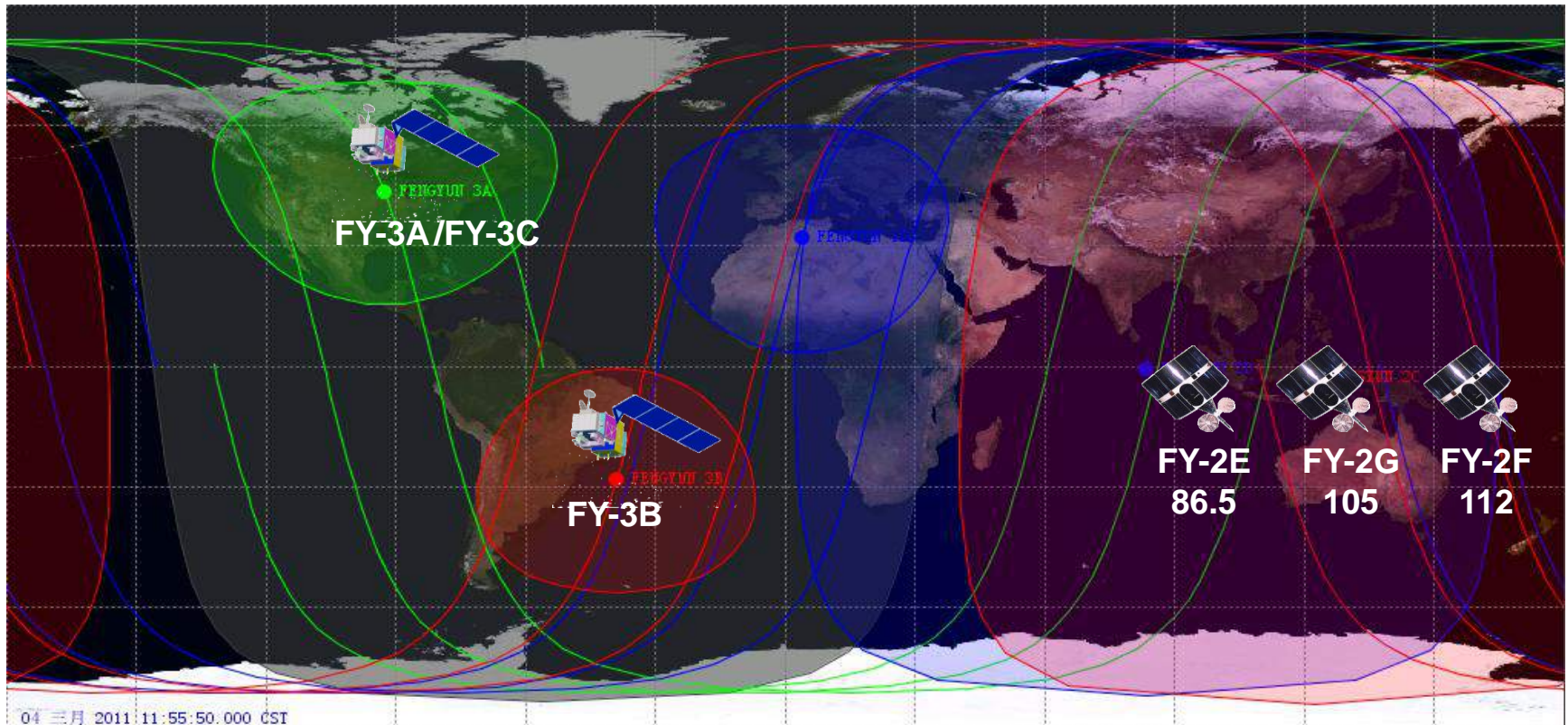
# The advantages of satellite data in emergency events

- ✓ Full area coverage
- ✓ High spatial-temporal resolution
- ✓ Plentiful observation information



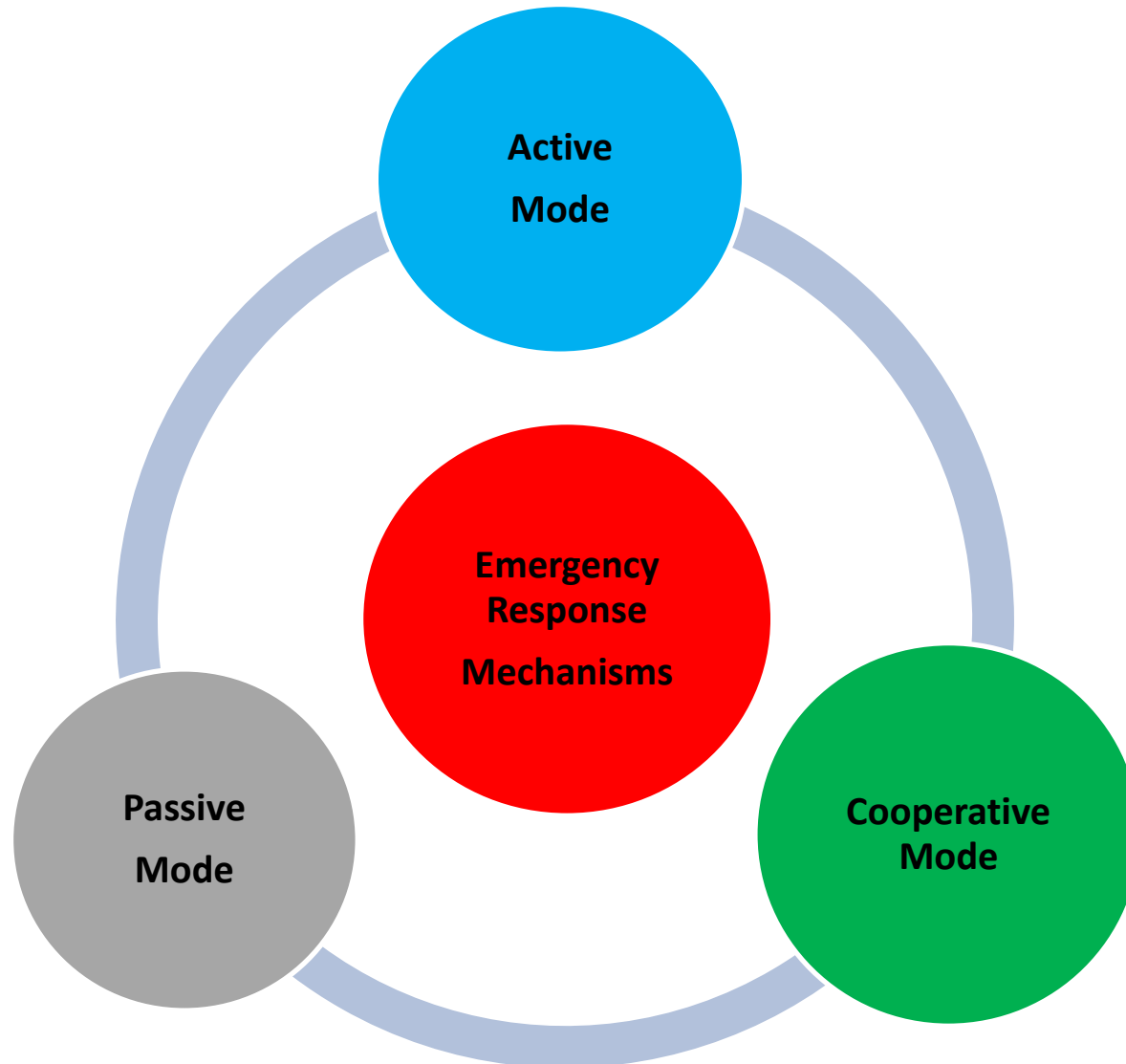
# The Observation and Data service of FY Satellites

- Global observation---FY-3 series
- High frequency and Specific regional rapid scan mode- ---FY-2 series
- Real-time data dissemination via CMACast ,Website ....



# Use of Satellite data in Emergency Situations in China

## Multi-mode emergency response mechanisms

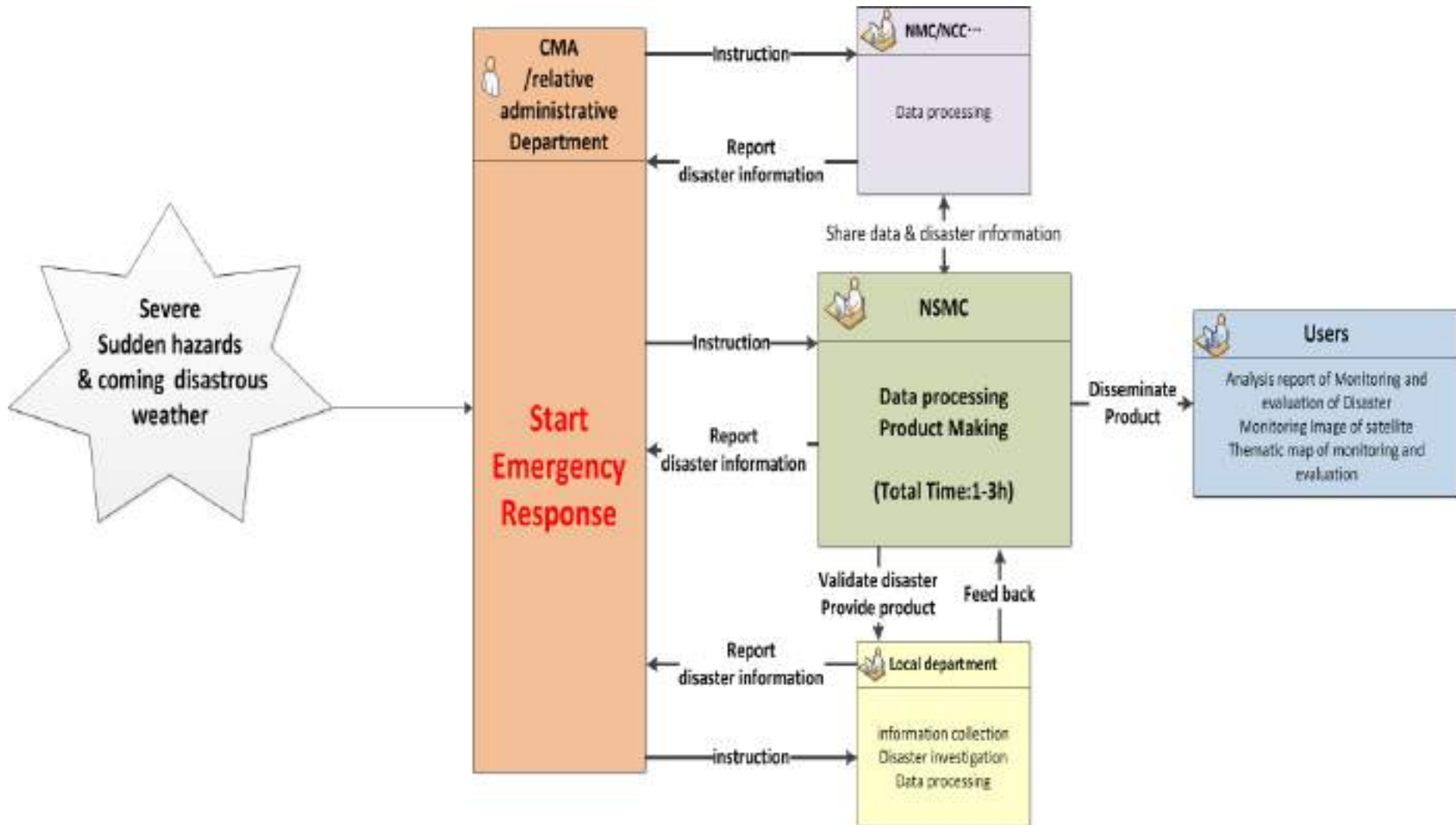


# Passive Emergency Response Mode

Users Requirement

Prepare Data

Distribute Data and Products

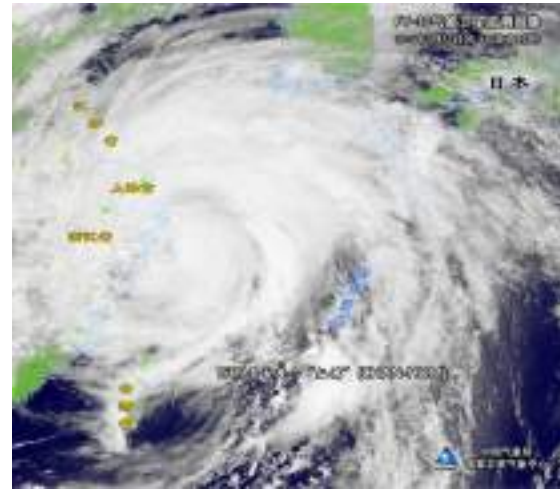




# Passive Emergency Response Mode

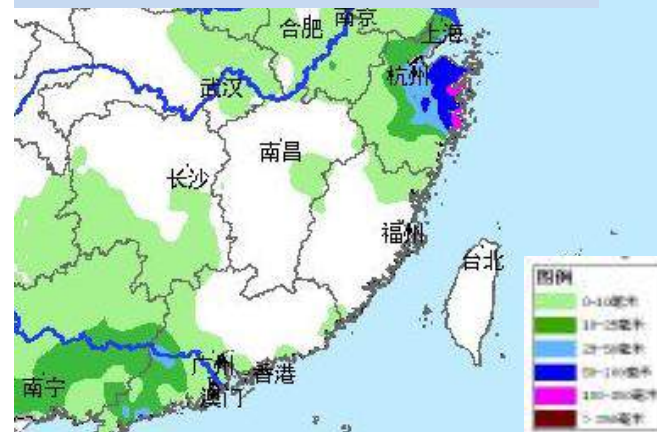
## — Typhoon Chan-hom (No.9,2015)

Chan-hom landed to Zhejiang province on Jul. 10<sup>th</sup> , brought heavy rainfall and disasters.



**CMA start  
emergency  
response I**

24hour precipitation  
Jul.10 00:00 to 11 00:00, 2015

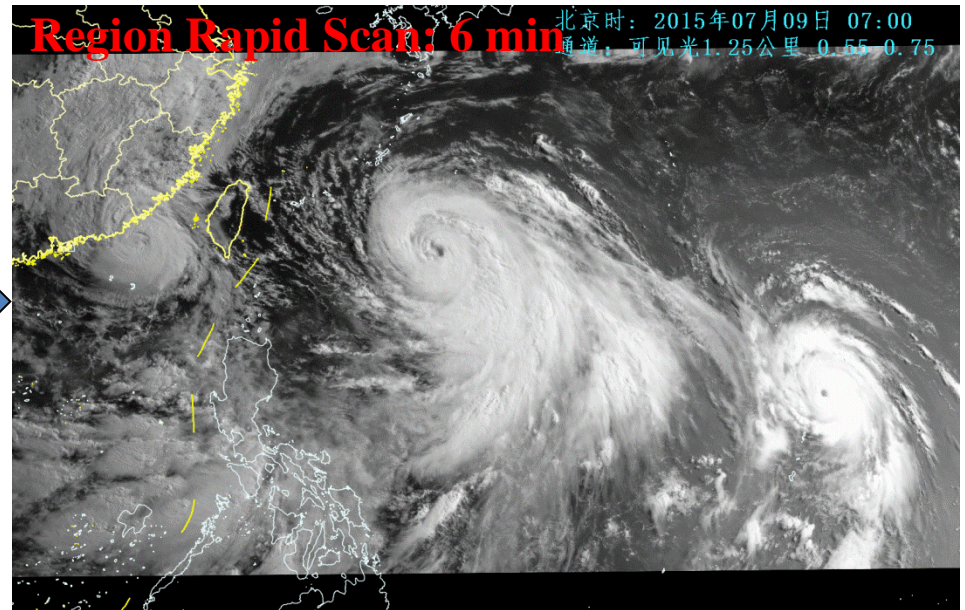
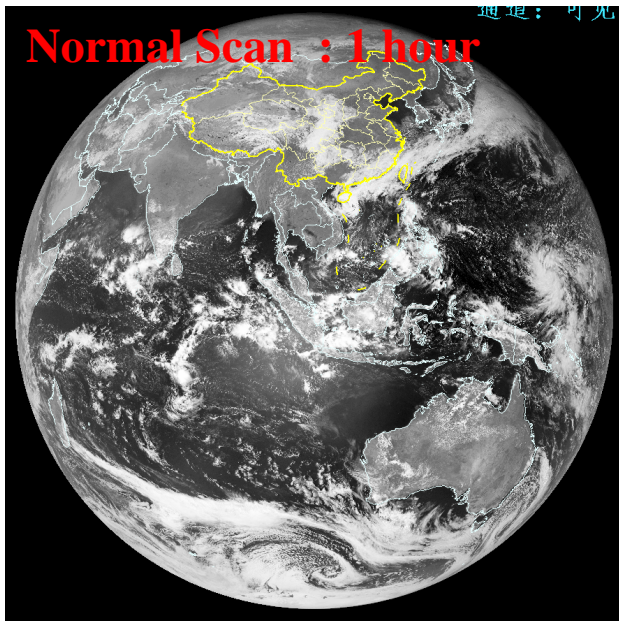


# FY-2F Observation mode adjustment for Chan-hom

NMC request Rapid Scan mode



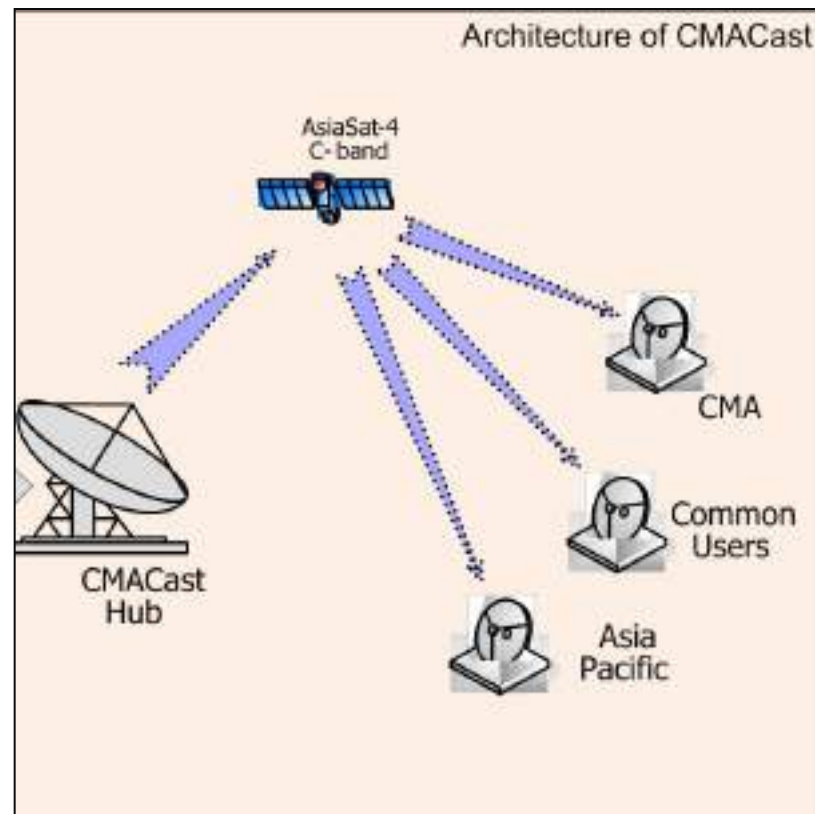
NSMC adjust FY-2F observation to Regional Rapid Scan (RRS) — **within 1 h**



- Improving the accuracy of Typhoon center location.
- Enhancing the time effectiveness of typhoon position in 10-15 minutes.
- Promoting the precipitation forecasting accuracy.

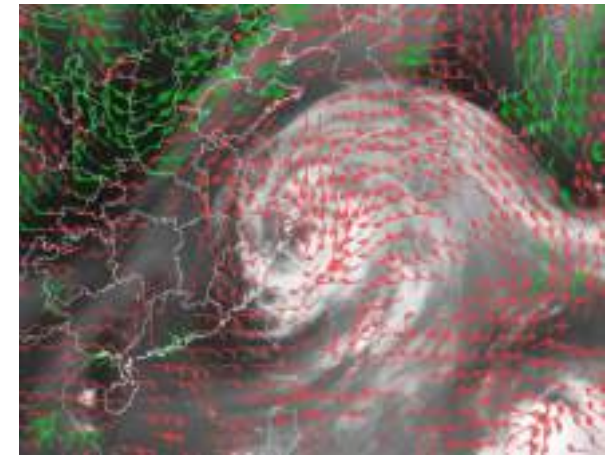
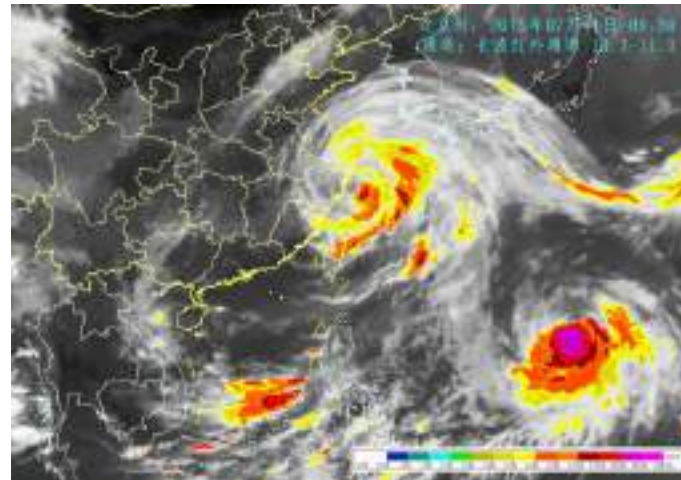
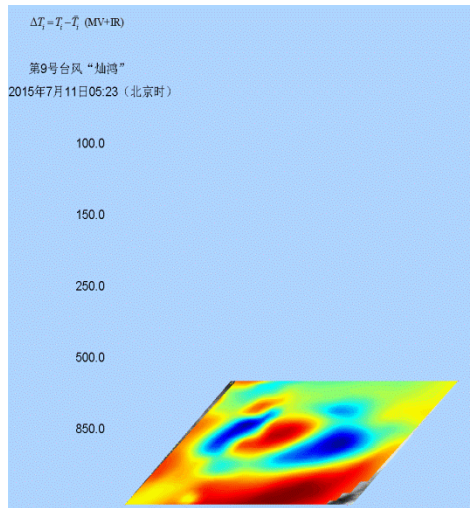
# Rapid Data Distribution for Chan-hom

- FY-2F RRS data compressed from 200M to 10M
- Broadcasted through special channel of CMACast
- Users receive data no more than 2 min.



# Compositive analysis for Chan-hom

NSMC supply compositive analysis products for typhoon forecasting



Three-dimension thermal structure

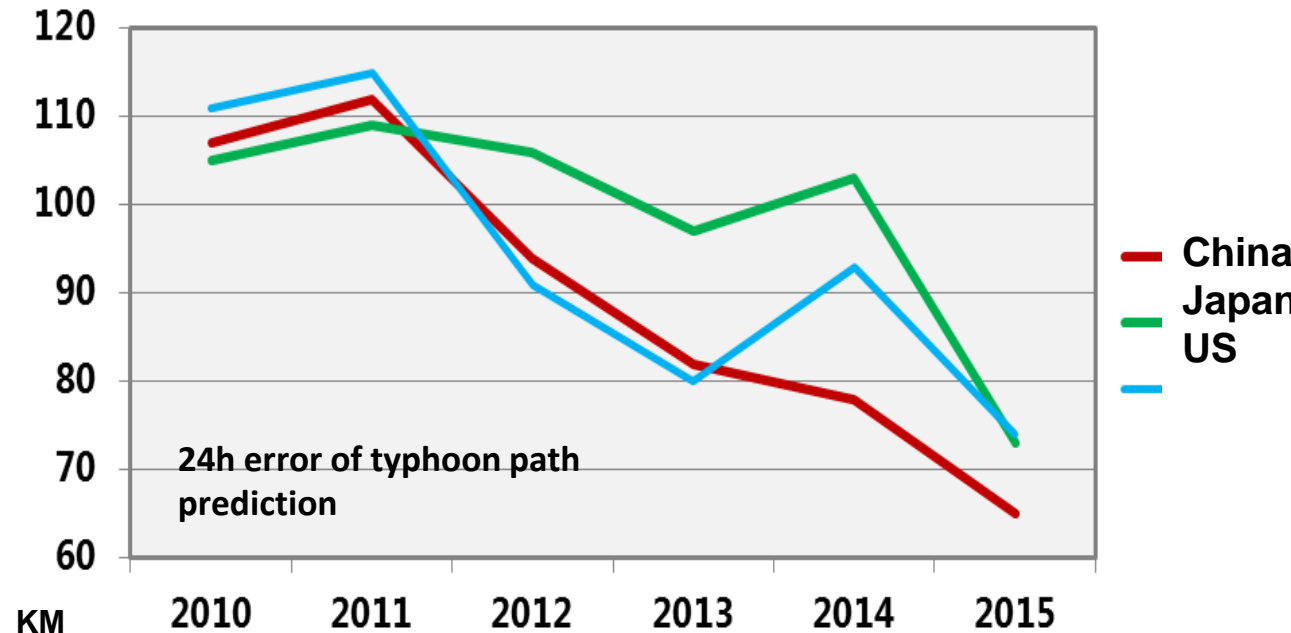
Precipitation estimation

Atmospheric motion vector

# Passive Emergency Response Mode in 2015

- During 2015, CMA started **21 times passive Emergency response** for severe weather events (typhoon and rainstorm).
- Meteorological Satellite provided powerful support.
- 24h forecasting error of typhoon reduced to **67km**.

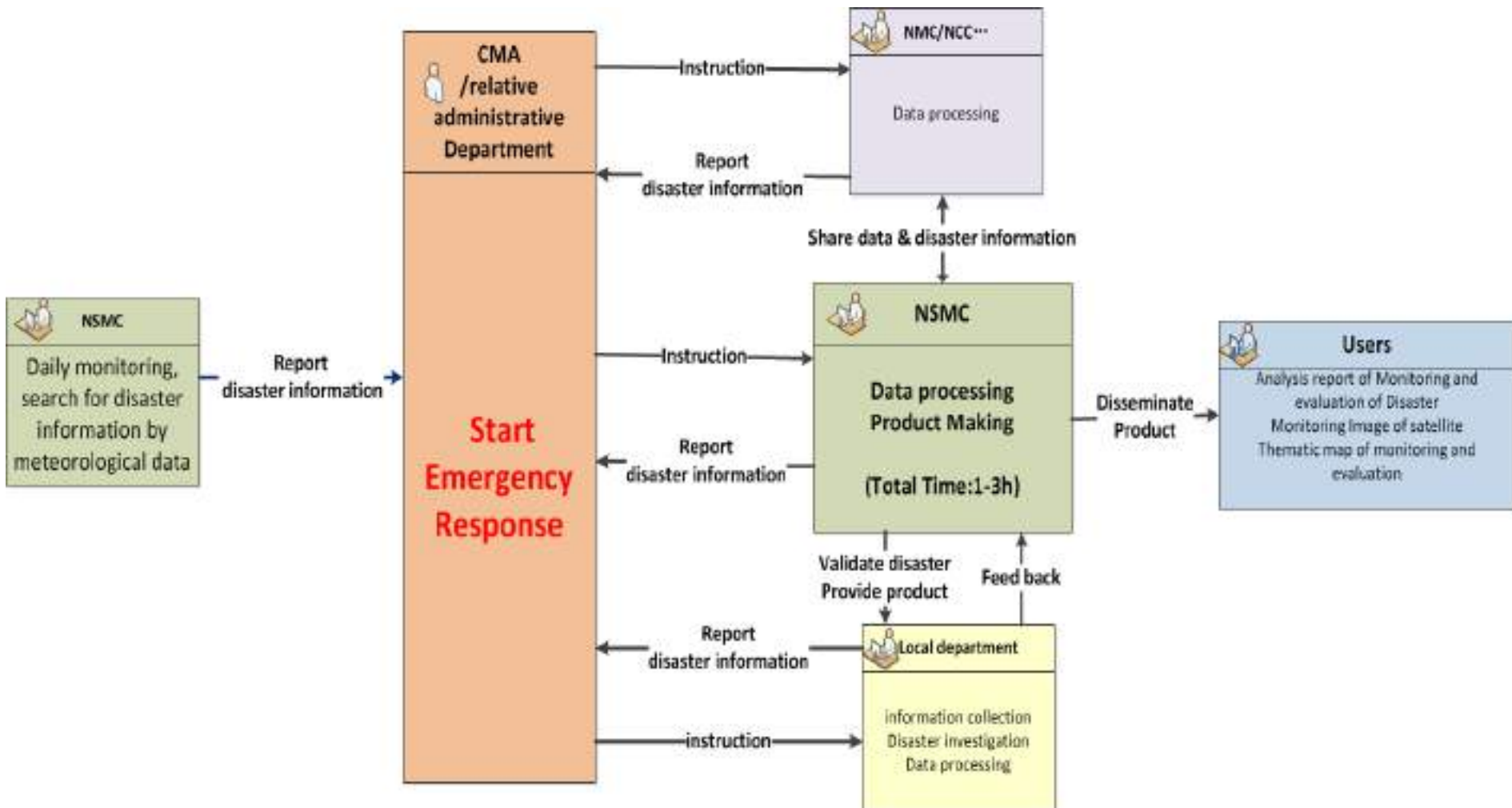
Date	Possible Emergency of CMA
25-27, May	Rainstorm III
26-28, June	Rainstorm III
1-3, July	Typhoon III
8-10, July	Rainstorm III
11-14, July	Typhoon I
16-19, July	Rainstorm III
18-19, July	Typhoon IV and Rainstorm III
1-2, August	Typhoon IV
12-15, August	Typhoon II
12, August	Rainstorm IV
21-22, August	Typhoon III
19-22, September	Typhoon II
29-30, September	Typhoon IV
4-7, October	Typhoon II
12-15, October	Typhoon III
1-5, November	Typhoon III
8-11, November	Typhoon III



Forecasting distance errors comparison

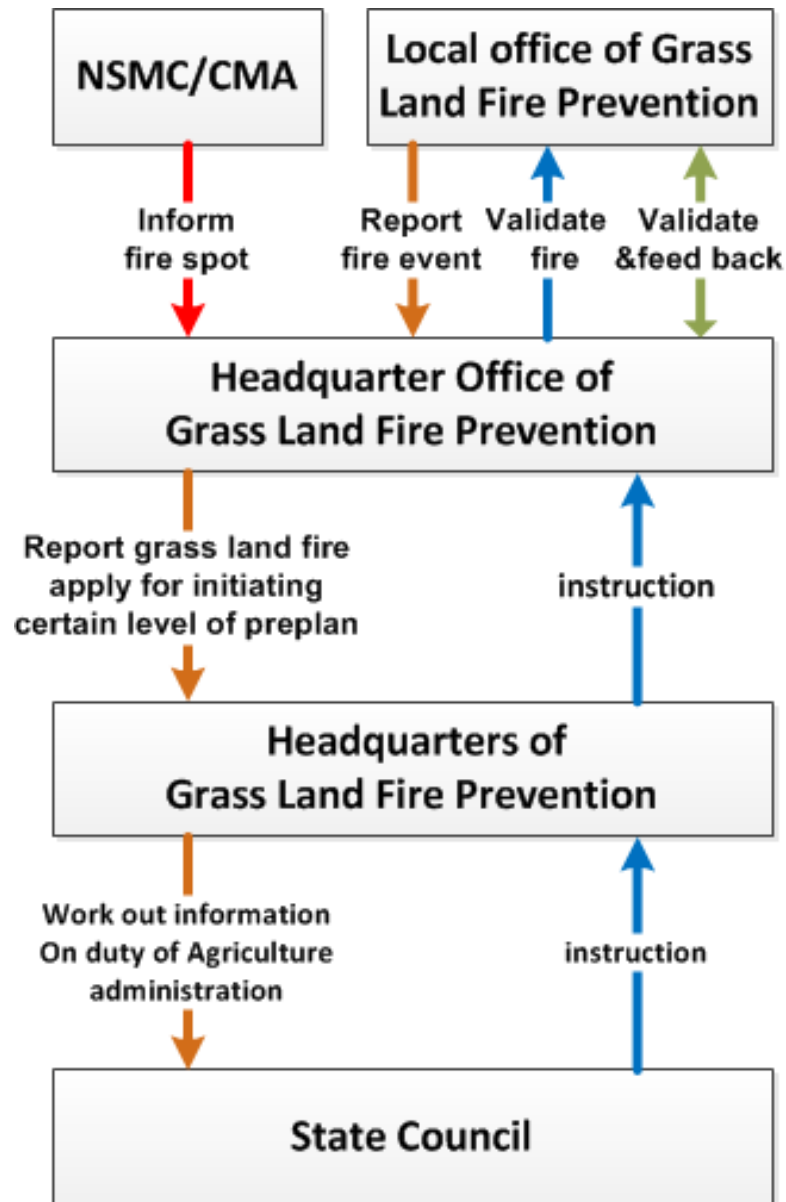
# Active Emergency Response mode

Daily monitoring → detect disasters → start emergency response → products distribution

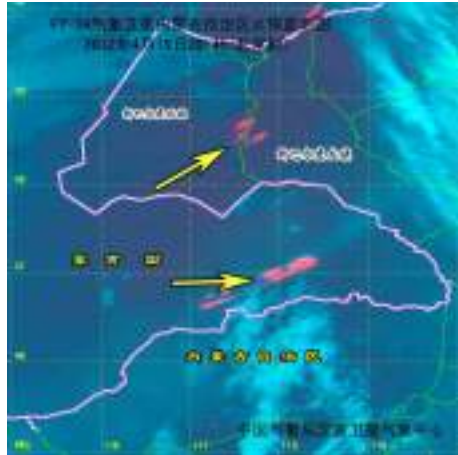


Generally, The whole information preparation is no more than 3 hours.

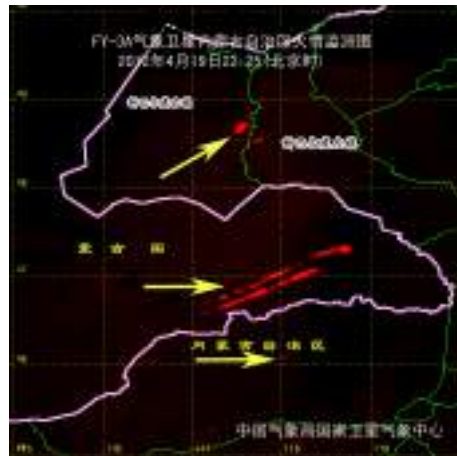
# The preplan of grass land fire emergency response from Agriculture Ministry



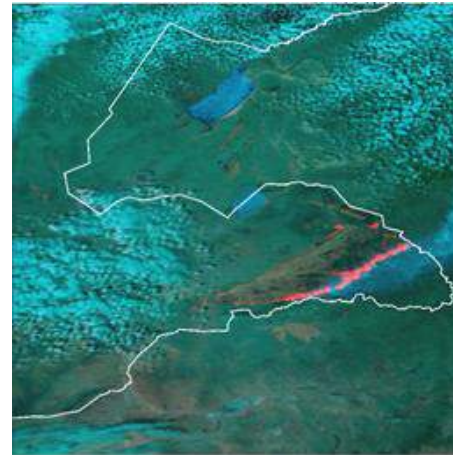
# Grass land fire Emergence Response to a big grass land fire April 19, 2012



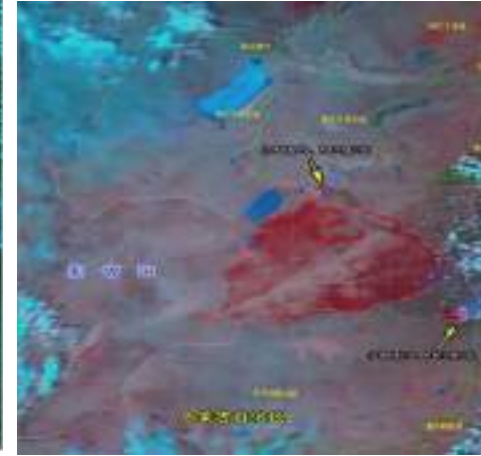
20:46 of April 19



22:25 of April 19



13:33 of April 20

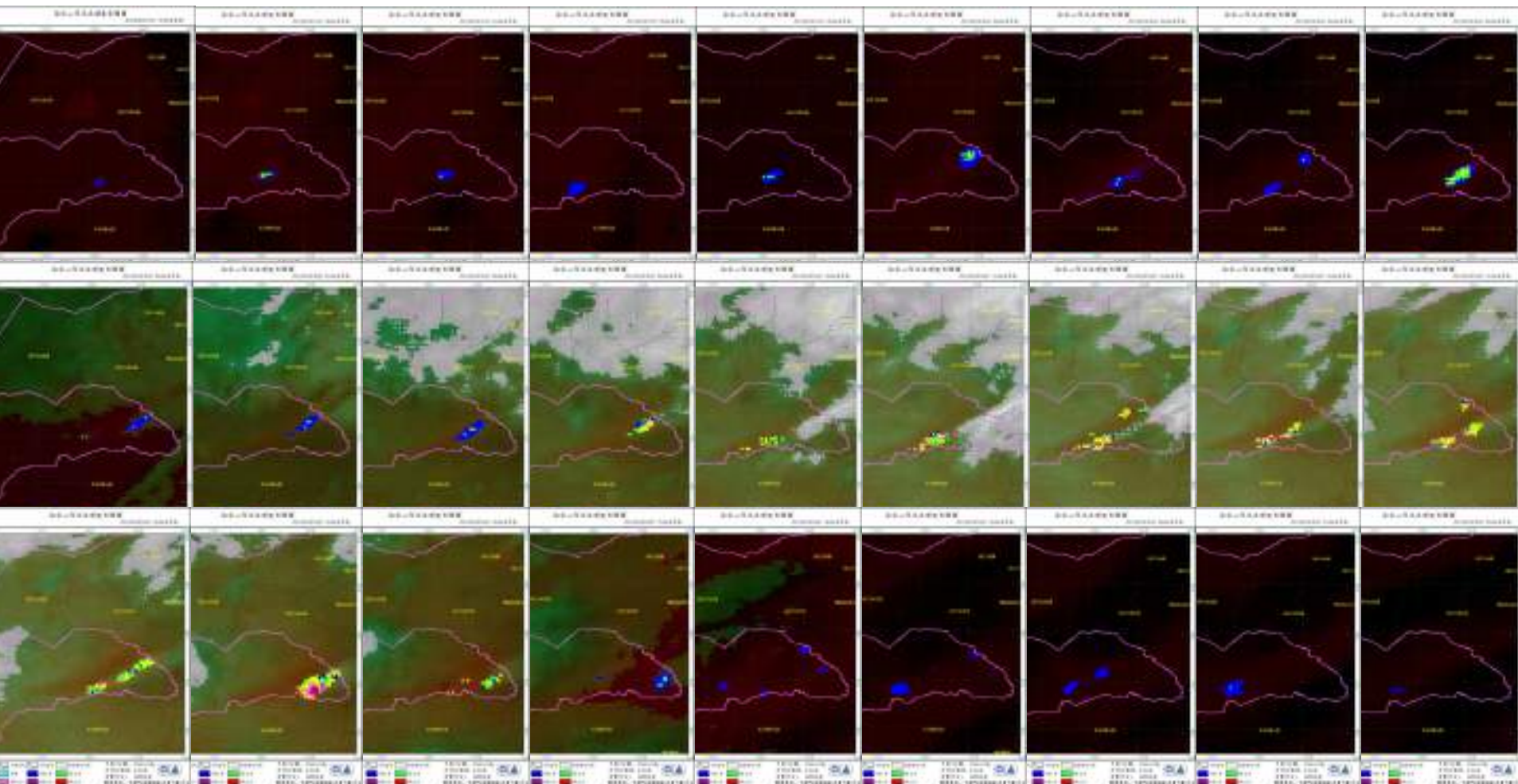


13:14 of April 22

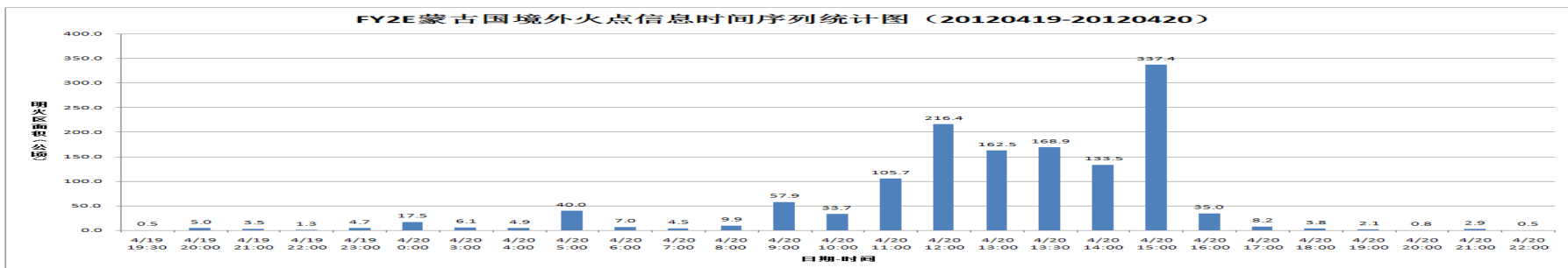
FY-3A found a big grass land fire in the east part of Mongolia, it spread very fast, 2 hours later, it was quite close to the boundary. NSMC soon informed the grass land fire prevention office, they start the emergency response immediately, then the local fire fighting department received the instruction and went to the boundary to prevent the fire spreading.



# FY-2E monitor a grassland fire in one hour frequency (April 19 to 20)



FY2E蒙古国境外火点信息时间序列统计图 (20120419-20120420)



# Distribution of satellite information for emergency response

During the emergency response, the monitoring result of meteorological satellite was distributed to the website of **Management system of Agriculture Ministry for grass land fire prevention.**



国家卫星气象中心草原防火信息发布系统 防火值班 文献管理 热点管理

监测信息发送

已发信息浏览

监测卫星管理

火险预警图发布

## 监测图像浏览

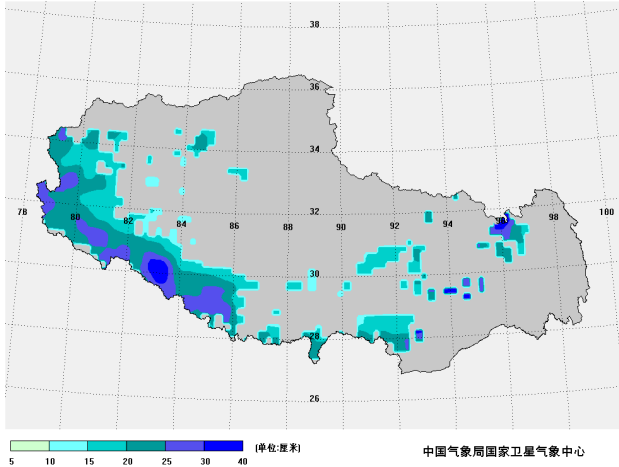
第 1 页 共 1 页 共 5 条

卫星标识	卫星入境时间
<a href="#">NOAA-18</a>	2010-09-26 12:26
<a href="#">NOAA-18</a>	2010-09-26 14:01
<a href="#">NOAA-18</a>	2010-09-26 12:10
<a href="#">NOAA-18</a>	2010-09-25 14:00
<a href="#">NOAA-18</a>	2010-09-01 12:47

**Meteorological satellite plays a significant role in the emergency response of grassland fires . It was estimated, since the beginning of this century, the loss caused by grassland fire on China reduce about 400 million RMB .**

# Thematic Products in Active Mode of Emergence Response

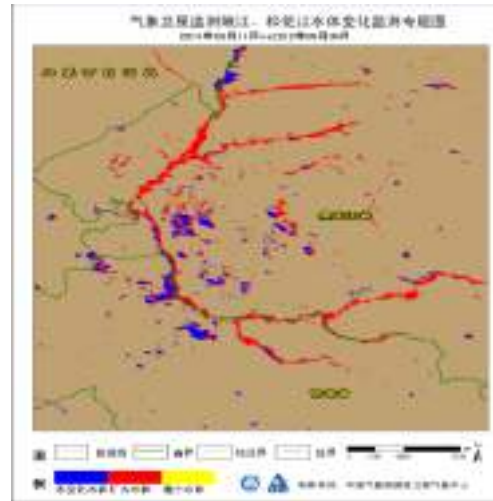
风云三号卫星微波雪深监测图  
2013年2月21日凌晨



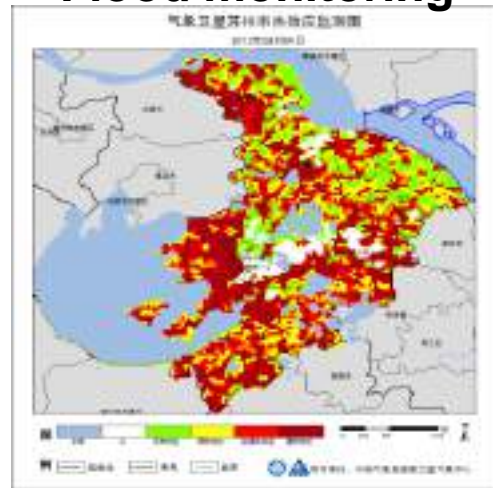
**Snow storm monitoring**



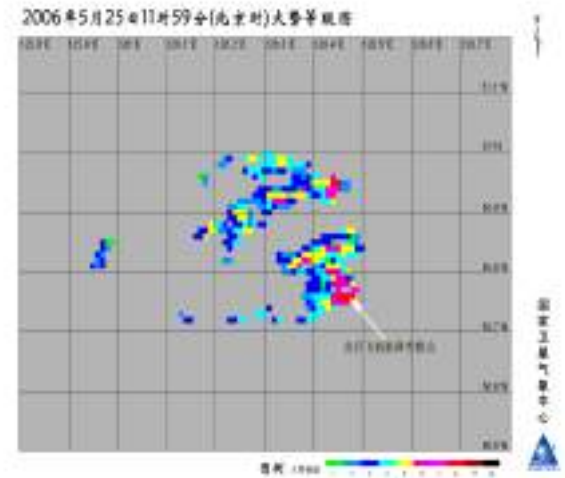
**Volcano ash clouds**



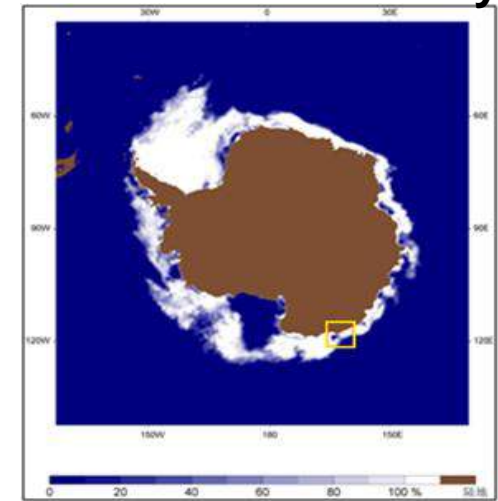
**Flood monitoring**



**High temperature weather**



**Forest fire intensity**



**Sea ice in South Pole**

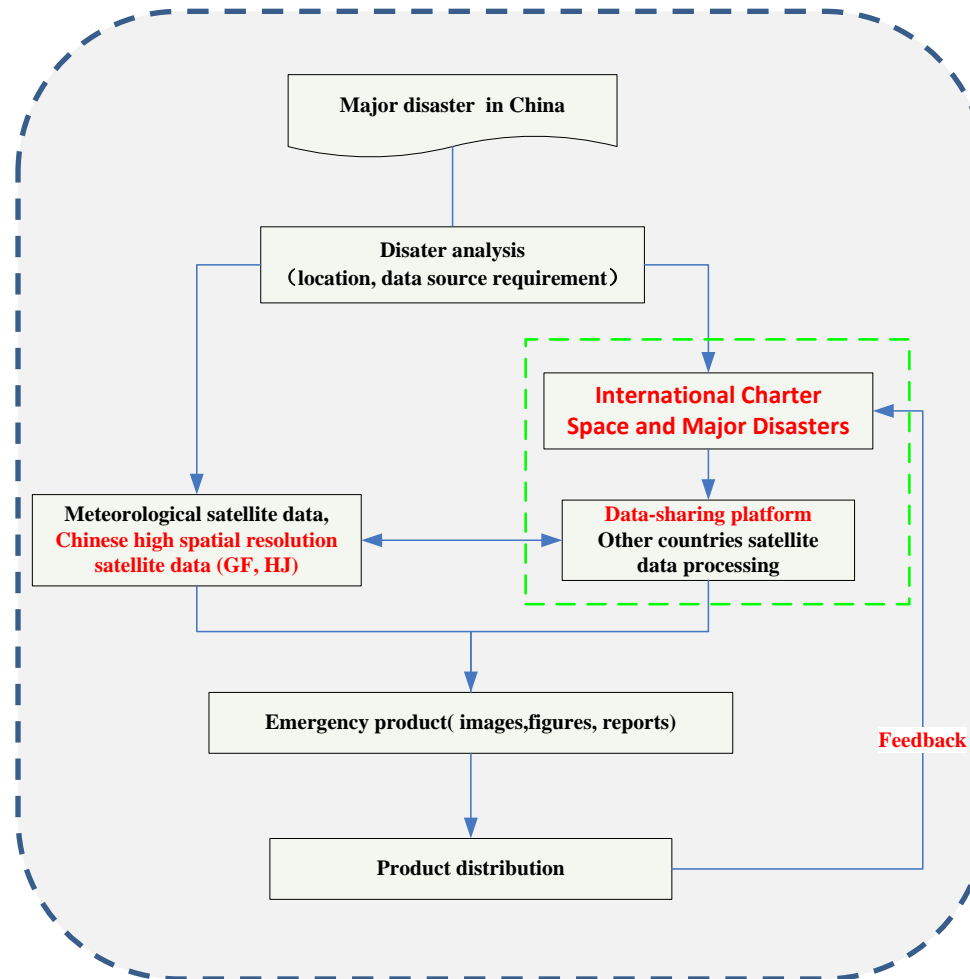
In China, many kinds of disasters, such as snow disaster, flood, drought, volcano eruption can be detected by meteorological satellite in the early stage, administrative departments often start emergency response based on the satellite information.

# Cooperative mode

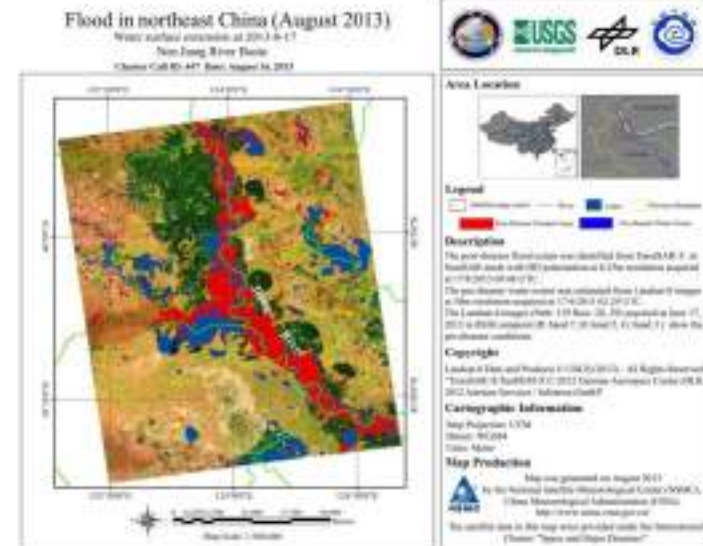
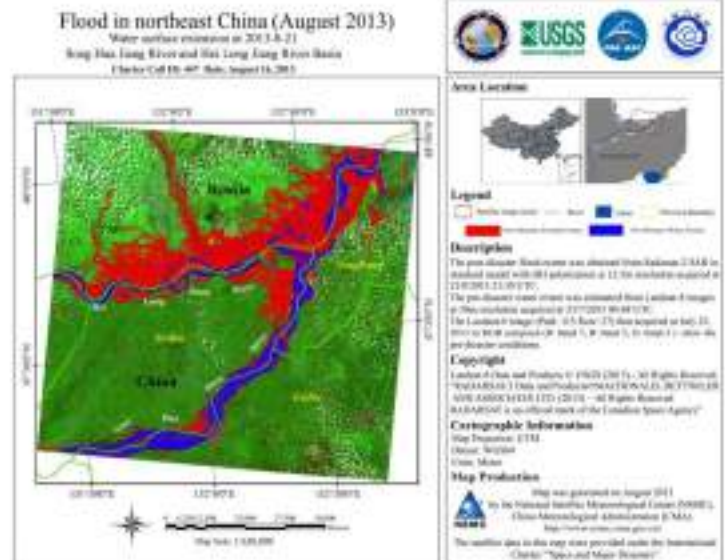
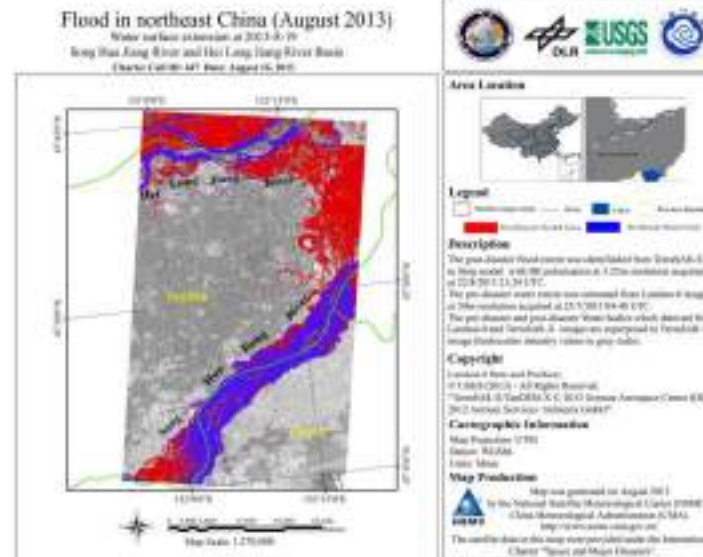
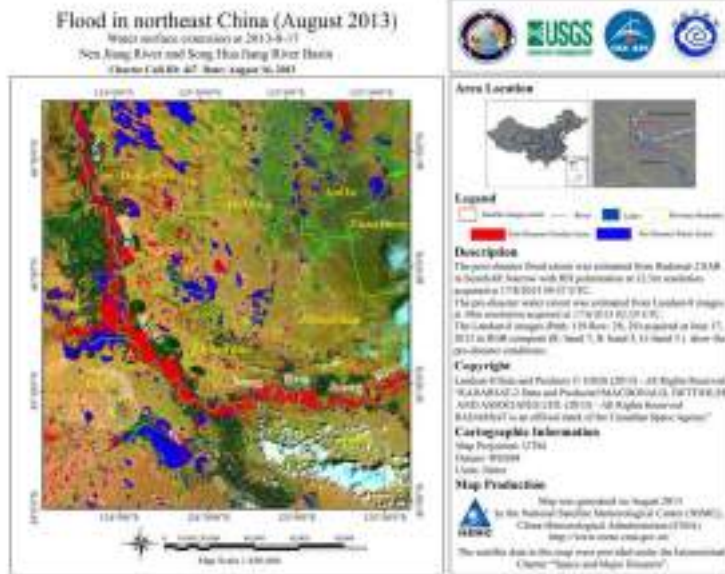


## International Charter Space and Major Disasters

Responding time (<12 hours)

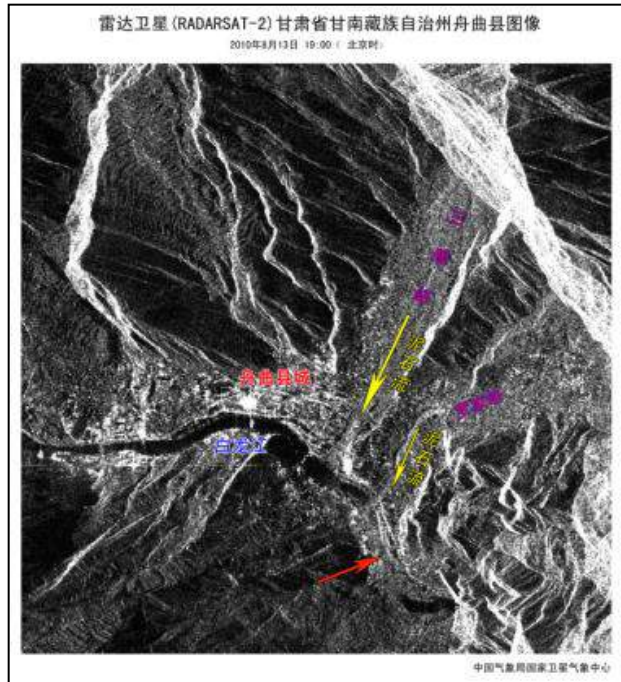
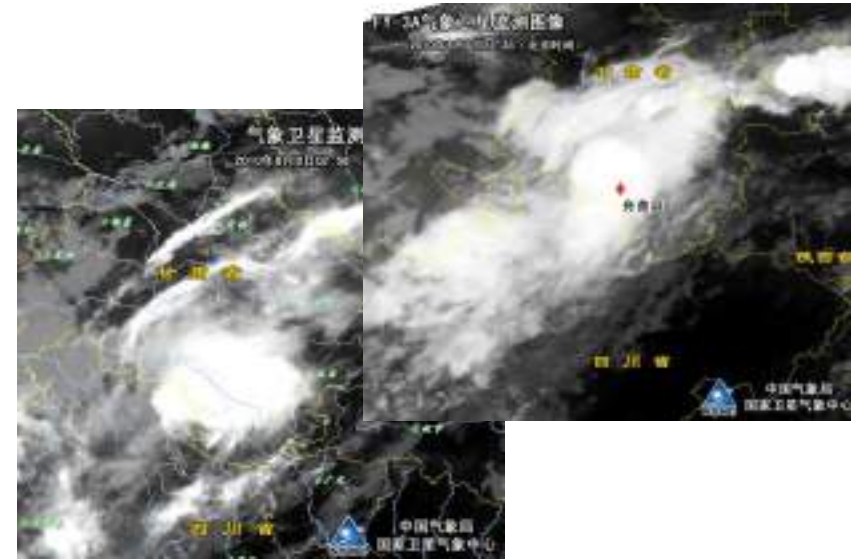
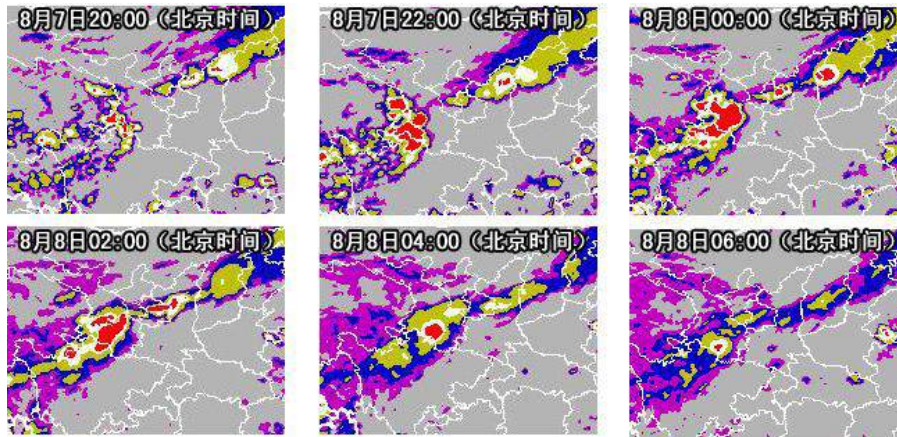


# Quickly response to The flood in Heilongjiang province in 2013



Lots of high spatial resolution data, including Landsat-8, RADARSAT-2, TerraSAR-X, RISAT-1 be used.

# Quickly responding to the Mud-rock Flow in Zhouqu County ,west of China



Barrier lake

甘肃省舟曲县泥石流灾害遥感监测图 (2) Mud-rock Flow Monitoring Map in Zhouqu County (2)



Mud-rock flow body

# Suggestion

## Disadvantages of current emergency response modes

### National issue

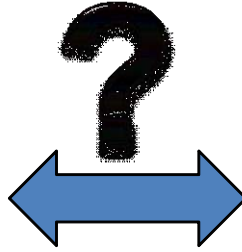
- Products are quite simple
- Data transmission ability is insufficient

### International issue

- Who wants it?
- What do they need?
- How to get it?

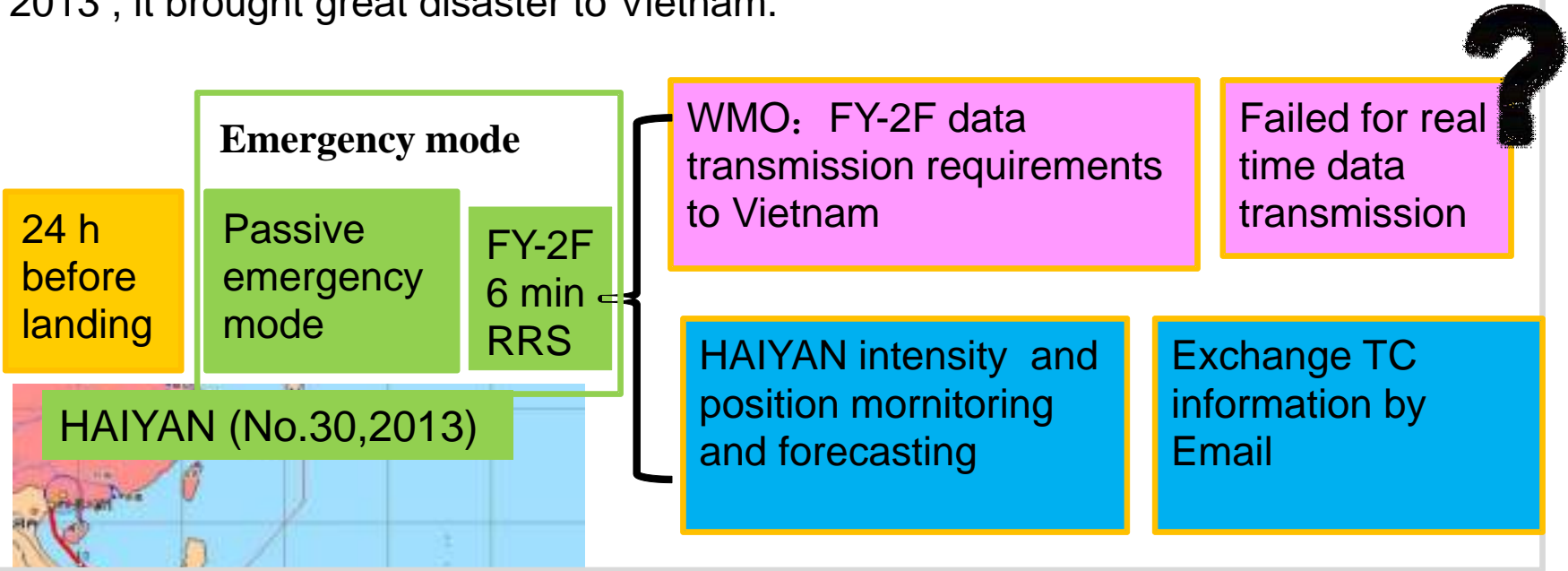
# The issue of international cooperation in typhoon HAIYAN

**Established  
Emergency mode**



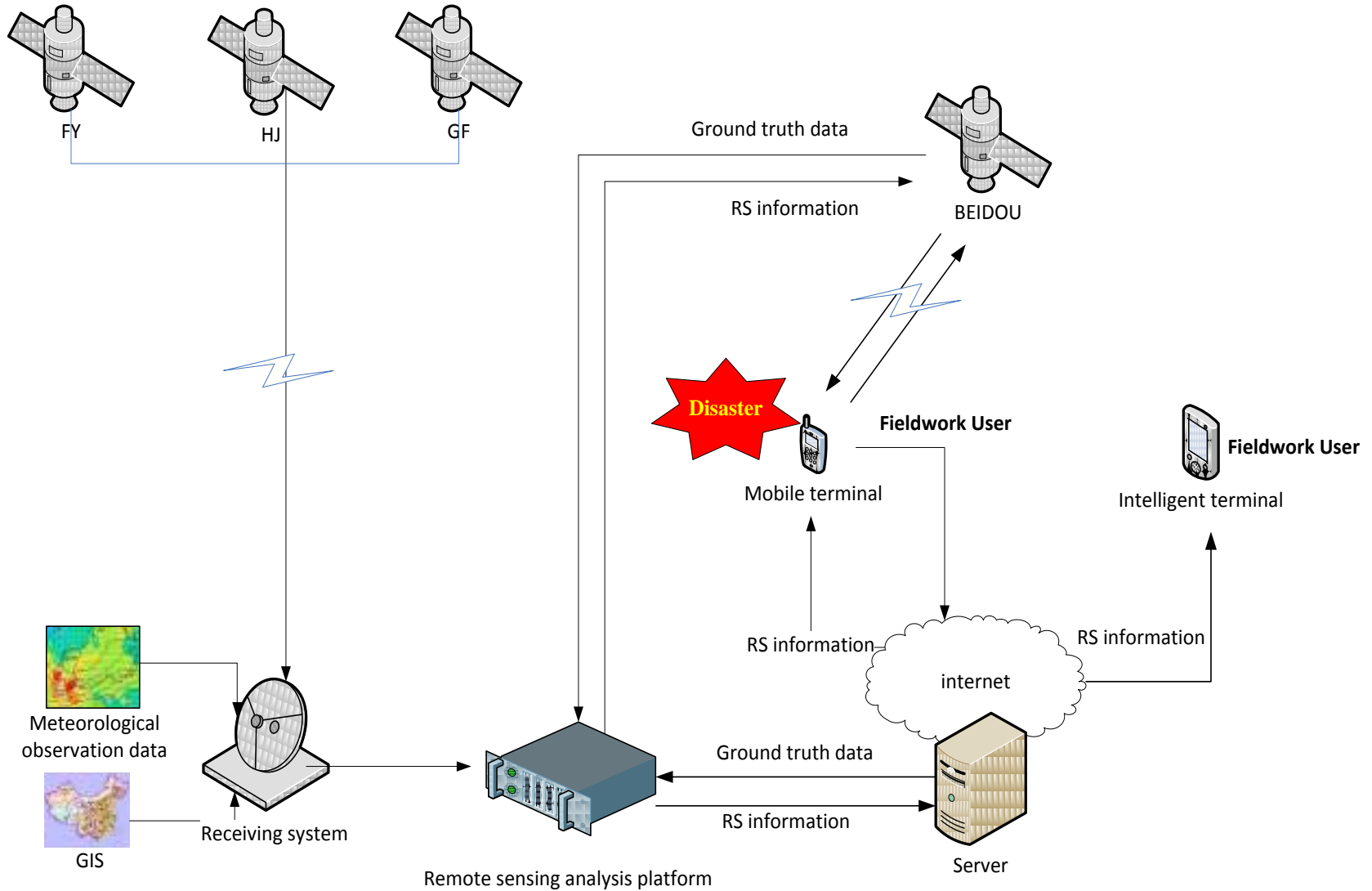
**Users requirement when  
global disasters happened**

Super typhoon HAIYAN landed to the northeast Vietnam at 04:00 on November 11, 2013 , it brought great disaster to Vietnam.



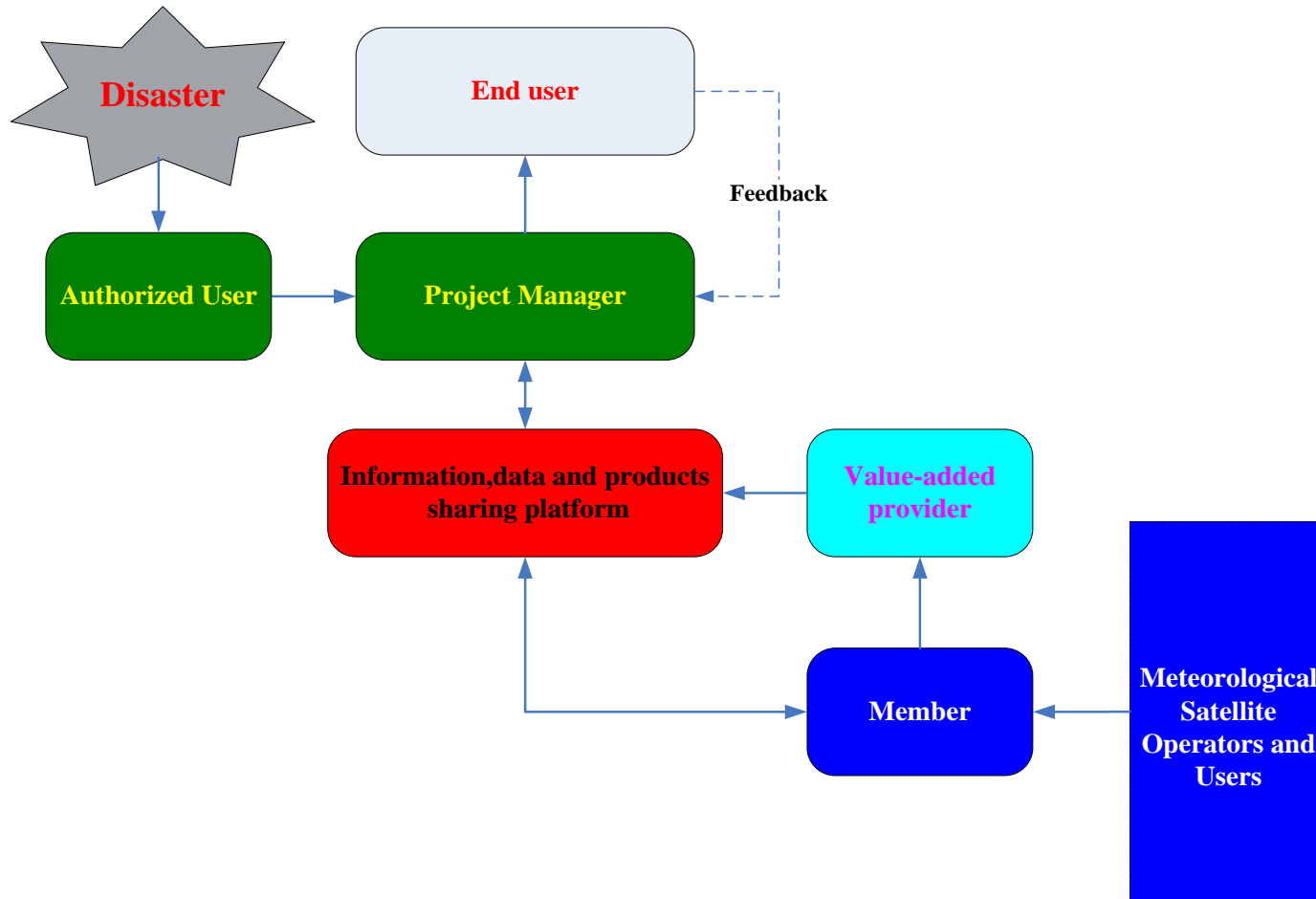


# Future plan for enhancing data transmission ability in China



Mobile terminal will be used for receiving satellite information.  
More professional information will be developed to the features of specific disasters.

# International disaster emergency response mechanism of meteorological satellite



Based on this mechanism, the disaster information and product sharing platform will be built.



*Thank you*