



**Fengyun International
User Conference**

2019

Overview of Fengyun satellite global
data sharing and application service

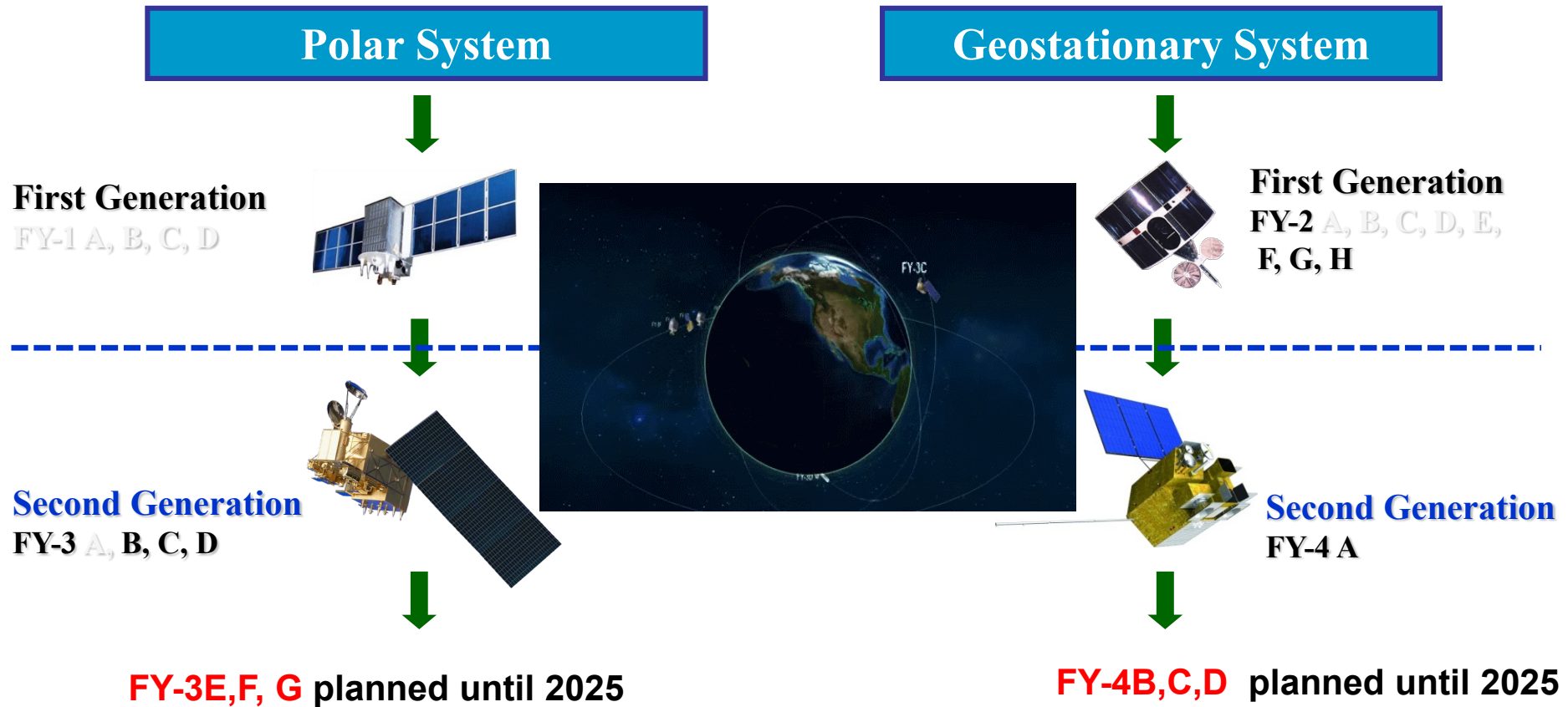
Tang Shihao

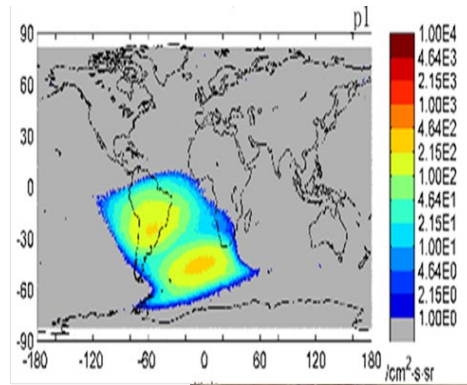
(tangsh@cma.gov.cn)

**Center of Remote Sensing Applications&Services,
National Satellite Meteorological Center,CMA
Nov. 15-17 , 2019,Haikou, China**



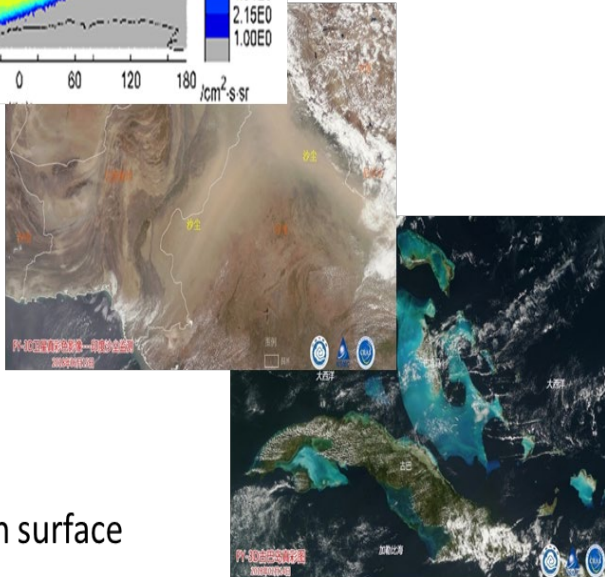
Overview of Chinese FENGYUN Meteorological Satellites





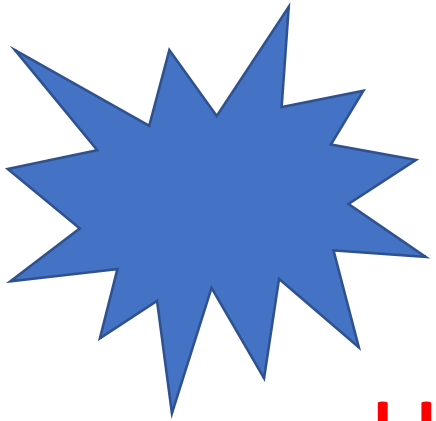
Space weather

Atmosphere



Earth surface

FY-3D				
<p>Cloud Cloud mask, Cloud Amount, cloud type, cloud phase, cloud top temperature/height, cloud optical depth, Cloud Physical Parameters, cloud water content,</p>	<p>Atmosphere Atmospheric Total Precipitable Water, Dust Storm Index, Aerosol optical depth, rain detection, Atmospheric Humidity/temperature Profile(GNOS,VASS), Precipitation, Ice Water Path, Microwave Rain Rate, Cloud Liquid Water, Fog detection, Outgoing longwave</p>	<p>Land surface Global Fire detection, Land Cover, Land Surface reflectance, Land Surface Temperature, Soil moisture, NDVI, Snow Cover, Snow cover Fraction, LAI, FPAR, NPP, Albedo, Snow depth/Snow Water Equivalent</p>	<p>sea surface SST, Sea-Ice cover, Ocean Color/Chlorophyll, Sea surface wind speed</p>	<p>Space weather radiation flux of high energy particles, surface electric potential, radiation dose, GNOS Electron Density Profile, Ionospheric O/N2 Column Ratio, Aurora Mapping Products</p>



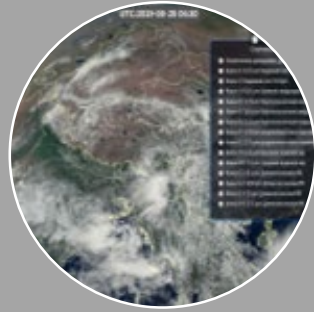
How to get the data?

How to use the data?

How about our future service Plan?



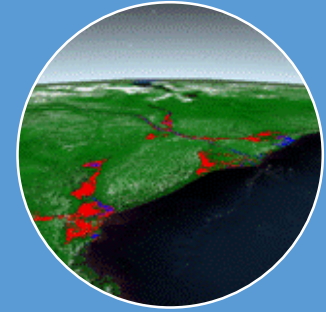
1. Data service



2. Software service



3. application service



4. Communication and training service





1. Data service



Integrated Space and Ground Based FY Satellite Data Service System

Type	User	Time
DB station	Agreement user	Real-time dataset
CMAcast	Agreement user	Real-time dataset
Webpage	All user	Nonreal-time
Cloud service	All user	Nonreal-time
FTP: traditional method, Green Channel, Data download toolkit,	All user	Nonreal-time





1. Data service



Web portal

Home | SATELLITES | DATA | IMAGES | PRODUCTS | DOCUMENTS | TOOLS

FY Satellite Data Download Toolkit is released!

Archive

Satellites	File count	Volume(TB)
FY-3D	6814499	1075.7
FY-3C	22618798	596.0
FY-4A	67966354	1546.9
FY-3B	38451982	2421.1
TANSAT	718837	74.2
FY-2H	726267	10.2
FY-3A	32641020	1633.9
FY-2G	3412702	29.9
FY-2F	4780106	46.5
FY-2E	5824013	53.3
FY-2D	4759238	58.3

[Data Overview>>](#)

FY-LEO | **TANSAT** | **FY-GEO**

FY-3D FY-3C FY-3B FY-3A FY-1D

[L1 DATA](#) | [Image](#) | [Atmosphere](#) | [Land](#) | [Ocean](#) | [Radiation](#)

More...

Data Name:

Start Date: Start Time:

End Date: End Time:

Time Range: Each Day

Spatial Sel:

Coverage: Intersect Entirely Within

[Availability](#) [Search](#)

Sign In

User ID:

Password:

Verify:

Stay Signed In

[Forget Password?](#) [SIGN UP](#)

[Sign In](#)

Satellite Weather Application Platform

<http://satellite.nsmc.org.cn>
<http://data.nsmc.org.cn>



1. Data service



FY Satellite Data Download Toolkit

FY Satellite Data Download Toolkit

Data to a user-specified directory, so that users can get rid of the trouble of data download and data management.

Main Functions

Data Search
You can view the real-time data classification list, and conduct data retrieval according to satellite, product, time range, space range, etc.

Subscribe
In order to make a data reservation, you can choose the name of the data product, date and time range, space range, data download directory, download priority, etc.

Break-point Continuation DownLoad Monitor
If the software was closed in an unwanted situation, the data downloading will continue from the break-point once the software has been restarted. You can view the downloading status, including the current data download completion ratio, data download real-time speed, data download time calculation, data

Main Functions

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1. Data service

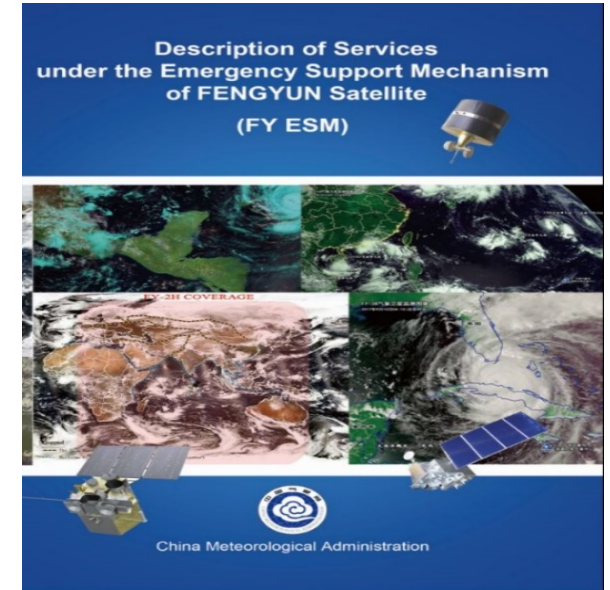


Emergency Service

Establishment of the Emergency Support Mechanism of FENGYUN Satellite (FY_ESM)

China provides timely and efficient observation of extreme weather, climate and environmental events regionally and globally by operating both geostationary and polar-orbiting meteorological satellites. China Meteorological Administration (CMA) issued the Emergency Support Mechanism of FENGYUN (FY) Satellite (FY ESM) in 2018.

Open to all WMO members.





1. Data service



How to join FY_ESM

- A Permanent Representative with WMO presents a written application to the Permanent Representative of China with WMO and designates a focal point as an authorized user.

The application form can be download from the website.

https://fy4.nsmc.org.cn/download/documents/FY_ESM_registration_EN.doc

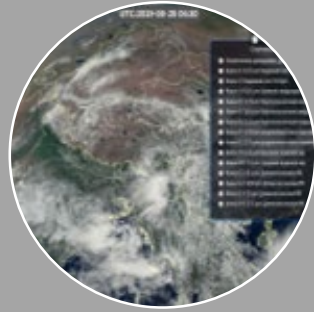
Benefits

FY_ESM users can start this mechanism when suffered such **extreme events as typhoon, heavy rain, severe convection, forest or grassland fire and sand and dust storm.**

Once the request is approved, CMA will command the on-duty FY satellite for frequent and targeted observation over affected areas.



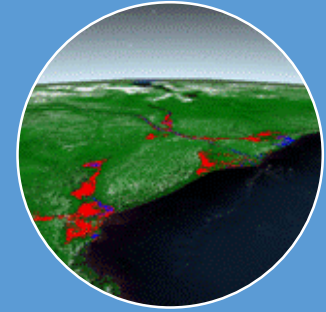
1. Data service



2. Software service



3. application service



4. Communication and training service



2. Software service



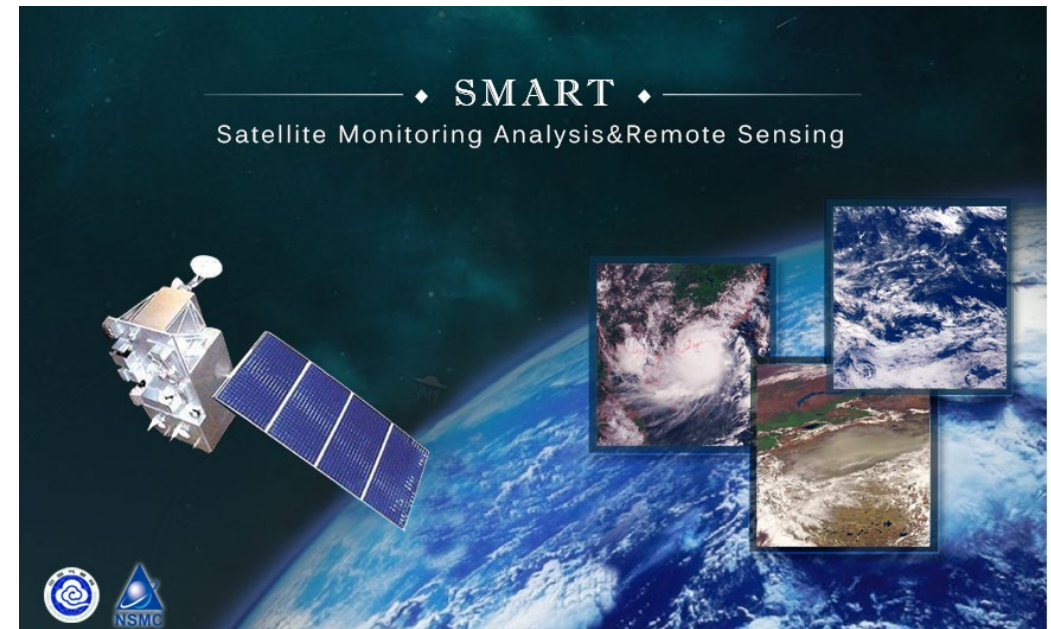
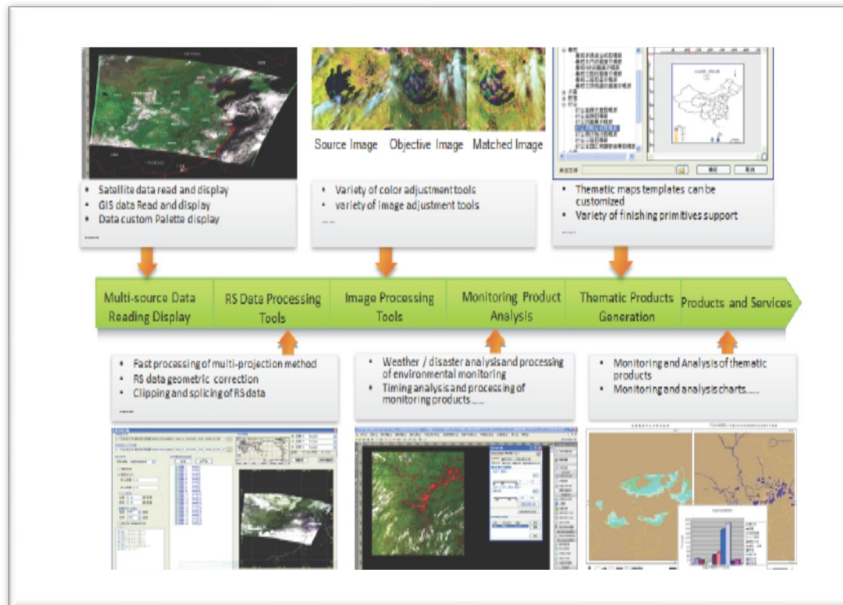
Application tools

Satellite Weather Application Platform - **SWAP**

Weather monitoring and analysis
---**Geostationary Satellite data (FY-2/FY-4)**

Satellite Monitoring Application Remote sensing Toolkit -**SMART**

Natural disaster and environment monitoring and analysis
---**polar orbit Satellite data**



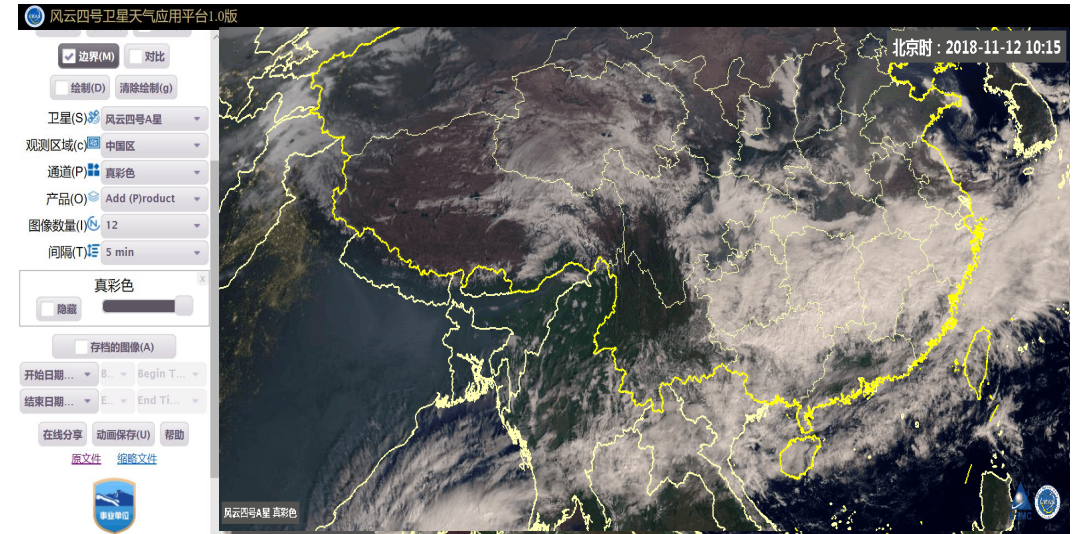
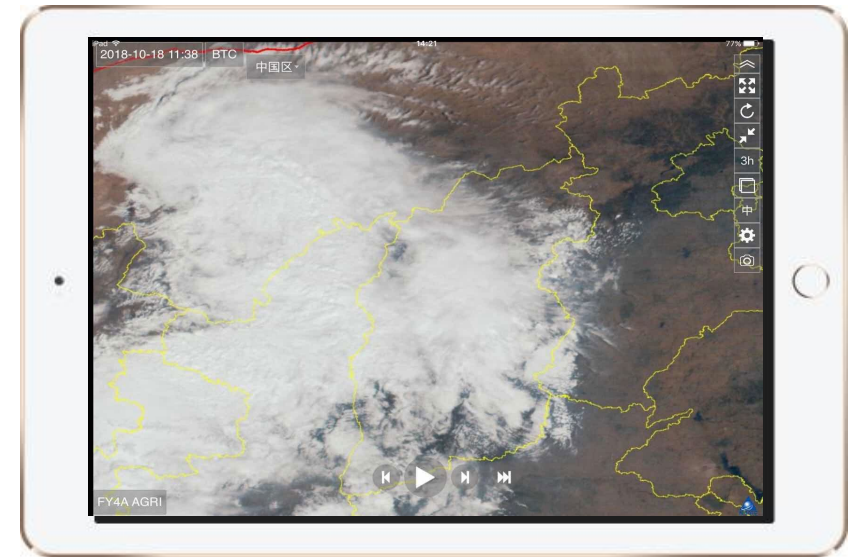
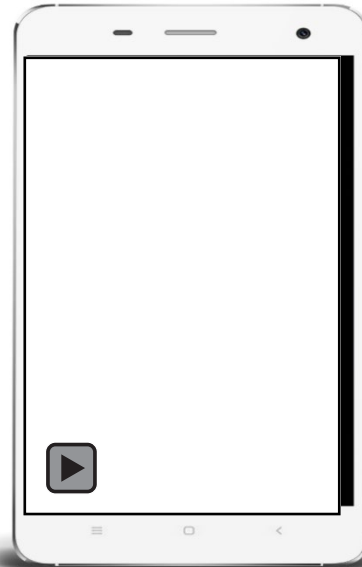
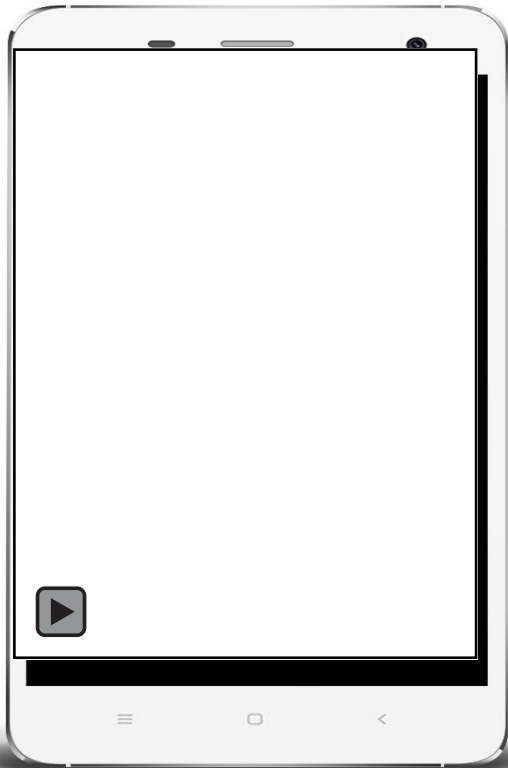


2. Software service



Satellite Weather Application Platform -SWAP

Provide versions for different terminals,
users can browse the latest cloud images
anytime and anywhere (within 10 minutes)

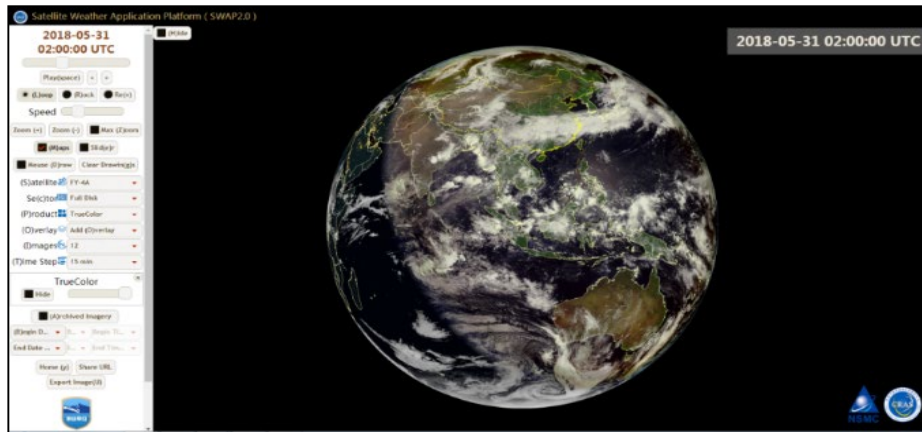




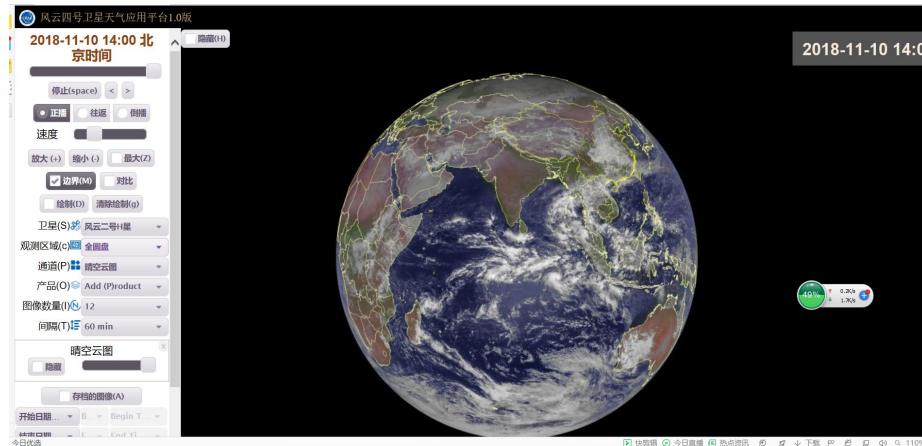
2. Software service



Provide Chinese, English and Russian versions



<http://rsapp.nsmc.org.cn/geofy/en>



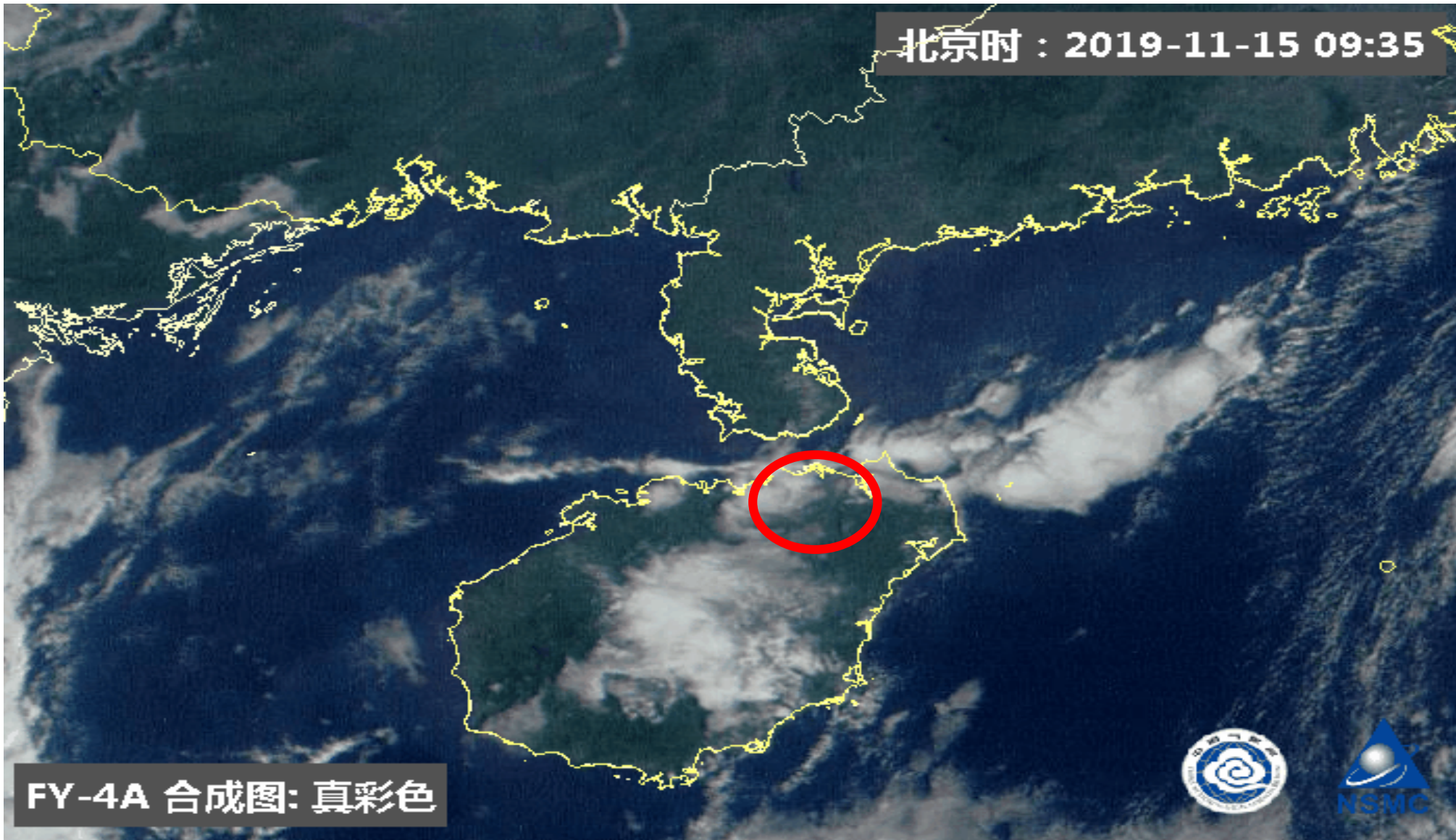
<http://rsapp.nsmc.org.cn/geofy>



<http://rsapp.nsmc.org.cn/geofy/ru>



2. Software service

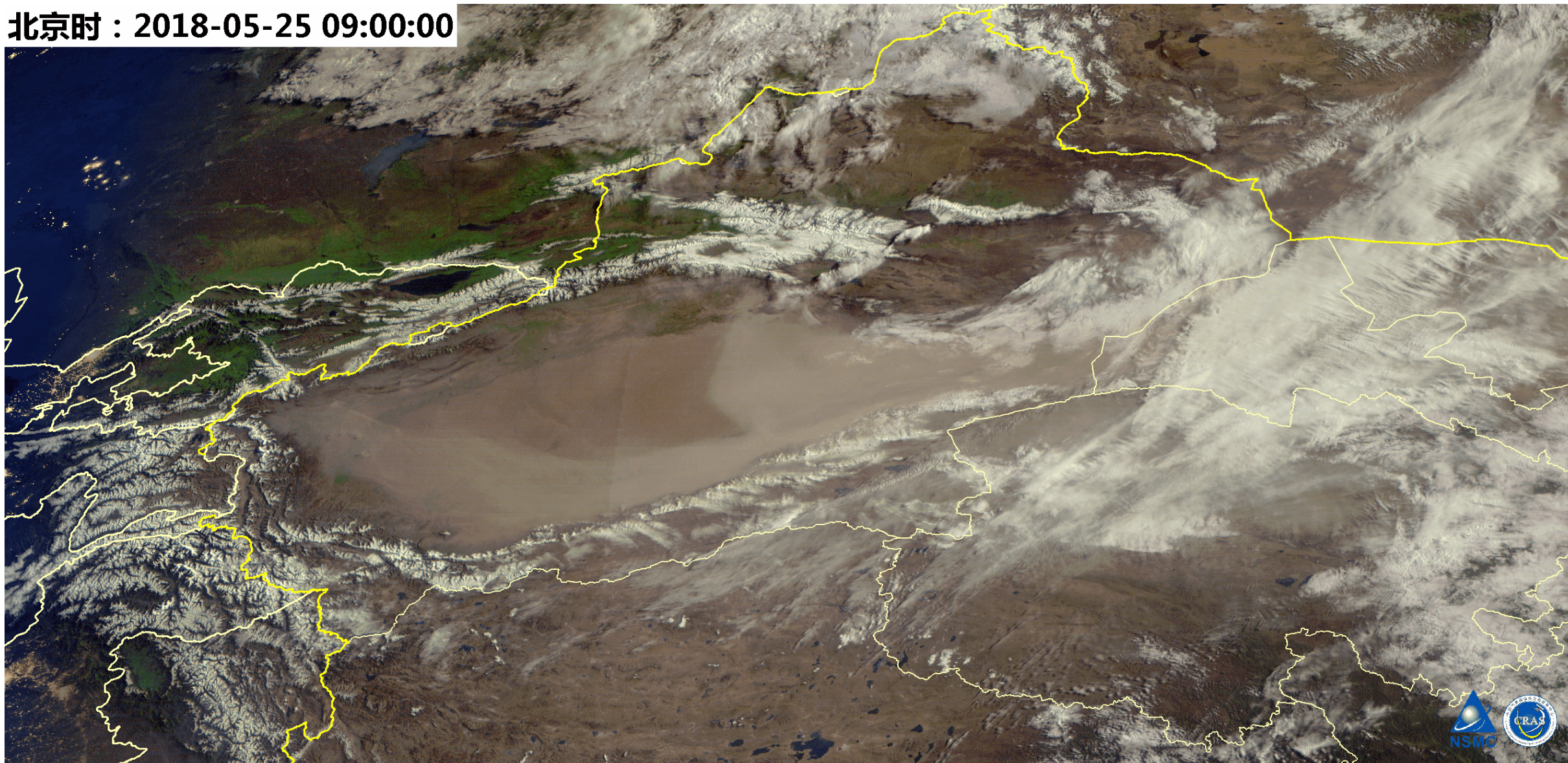




2. Software service



北京时：2018-05-25 09:00:00

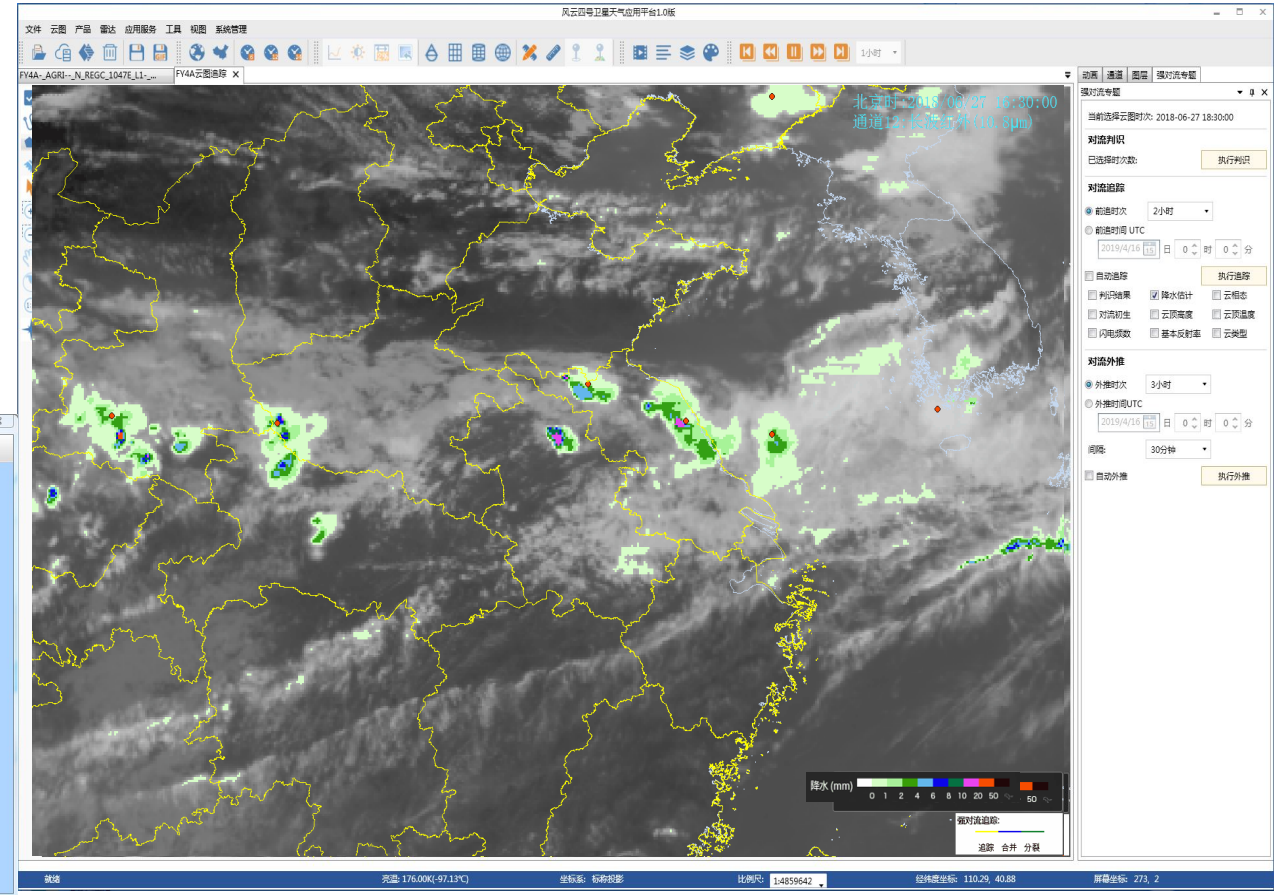
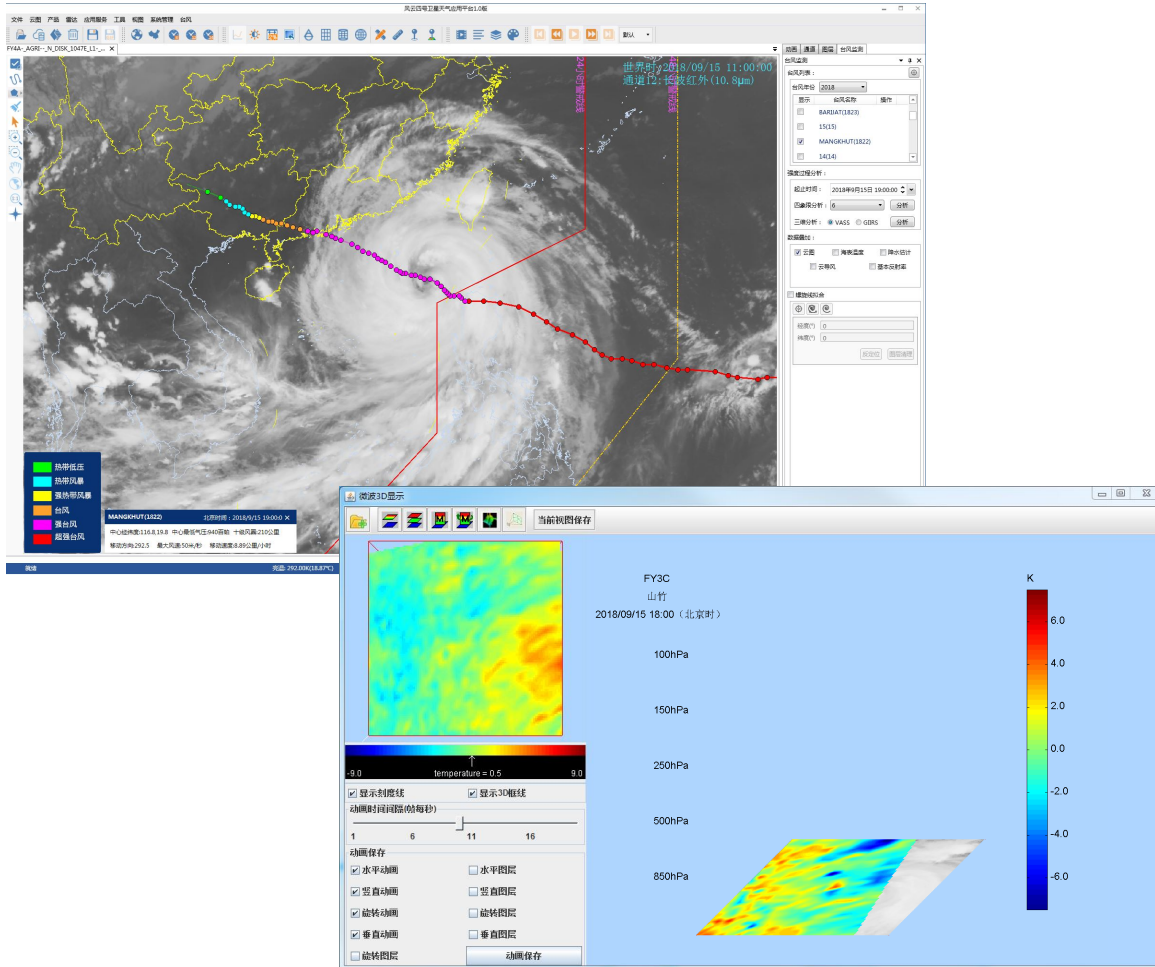




2. Software service

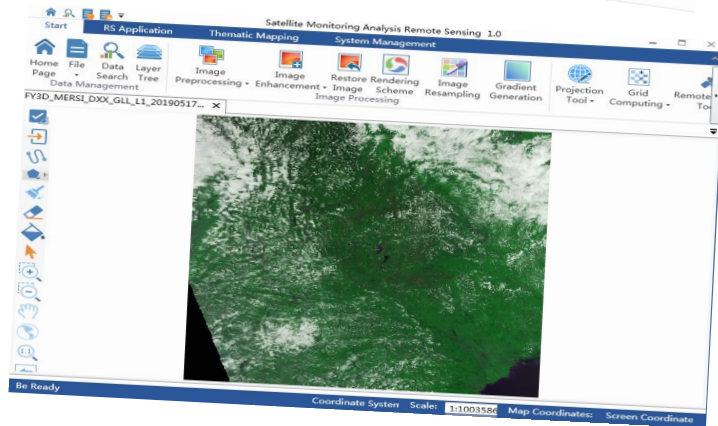


Realize the overlay of cloud animation and different quantitative products





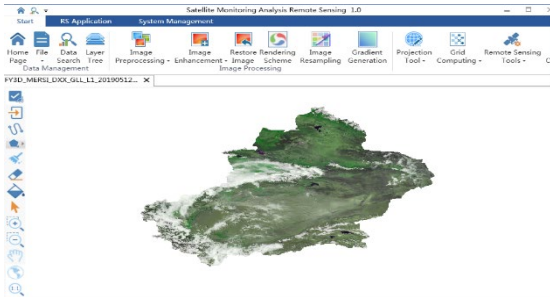
2. Software service



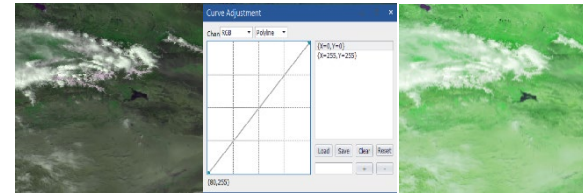
Satellite Monitoring and Analyzing Remote-sensing Toolkit (SMART) is a comprehensive application platform for remote sensing monitoring and application using FY-3 and other meteorological satellite Data.



Main Functions

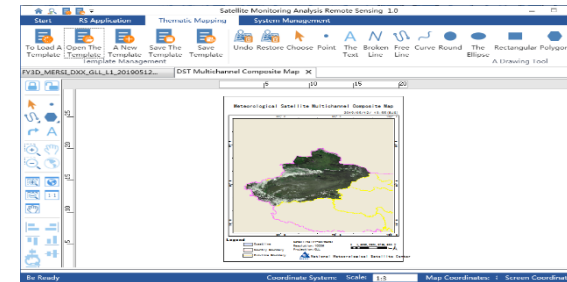


- Reading and displaying Satellite data
- Reading and displaying GIS data
- Customizable color palette for data displaying



Source image Image adjustment Adjusted image

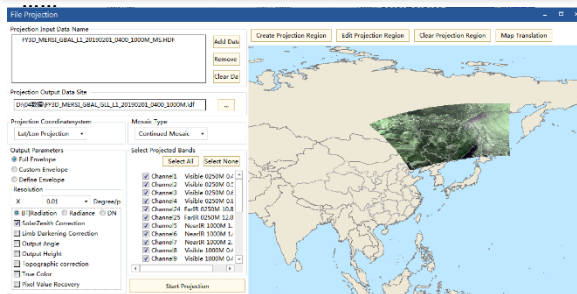
- Multiple functions of color adjustment
- Multiple image adjustment functions
- Multiple auxiliary tools including magnetic lasso etc.



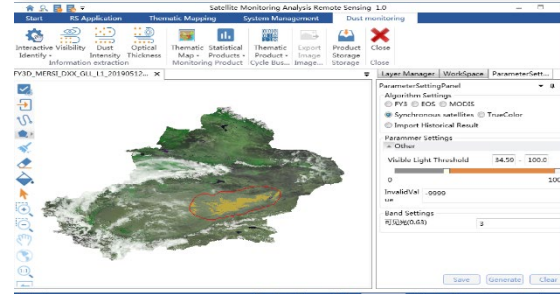
- Customization of thematic map templates
- Label for thematic map



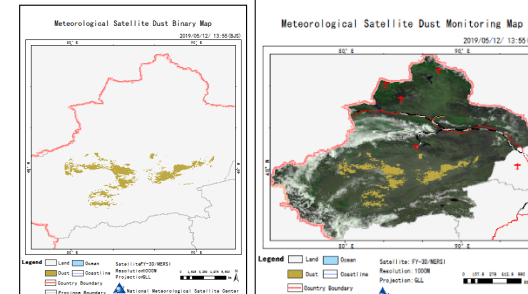
- Multiple projections which are fast processing
- Image geometrical correction functions
- Image split or mosaic



- Analyzing and processing of environmental change monitoring
- Temporal analysis function of monitoring products



- Thematic map of monitoring product
- Statistic table





2. Software service



To simplify operational application, SMART provide some special features, such as

One-Key Generation of Thematic Maps

ParameterSettingPanel

Algorithm Settings

Easy Judgment Visible Judgment

Night Judgment

Middle and Far Difference Judgment

Threshold Judgment

Parameter Settings

▲ Other

Visible Band Threshold 28.00 - 100.0

0 100

Far Infrared Band Threshold 263.0 - 350.0

200 350

▲ Output Map Configuration

Binary Map

Multichannel Composite Map

Monitoring schematic diagram

Traffic Impact Map

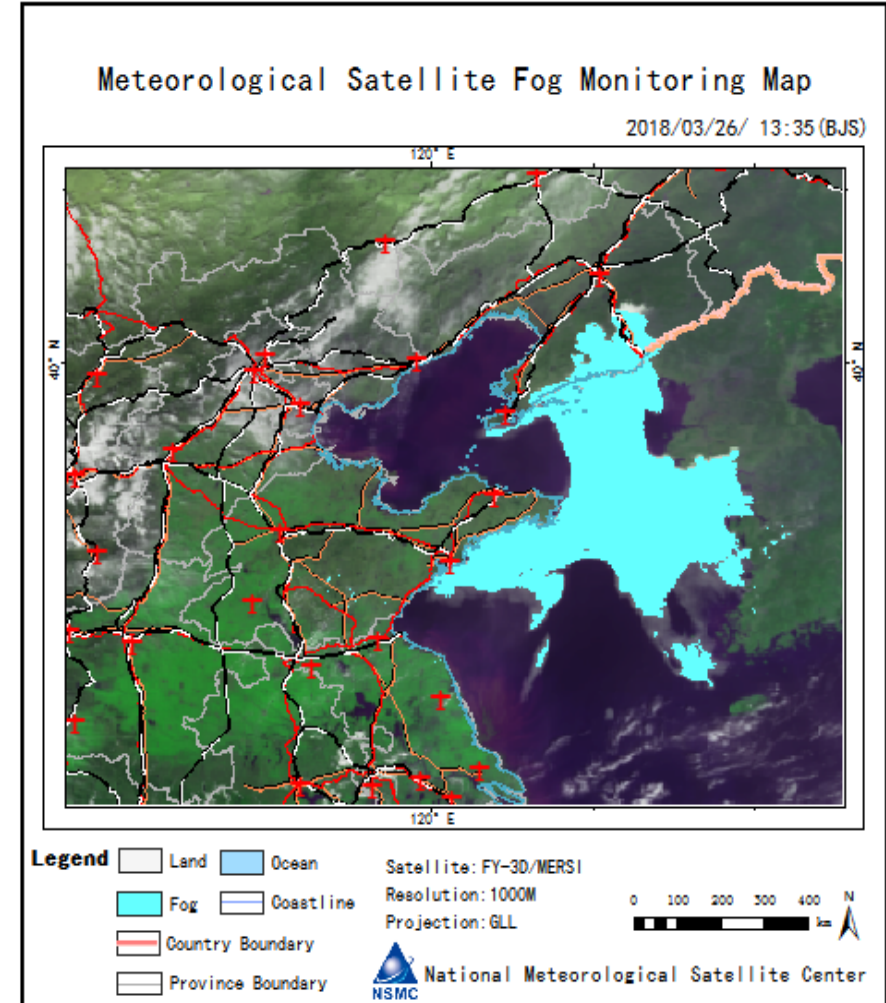
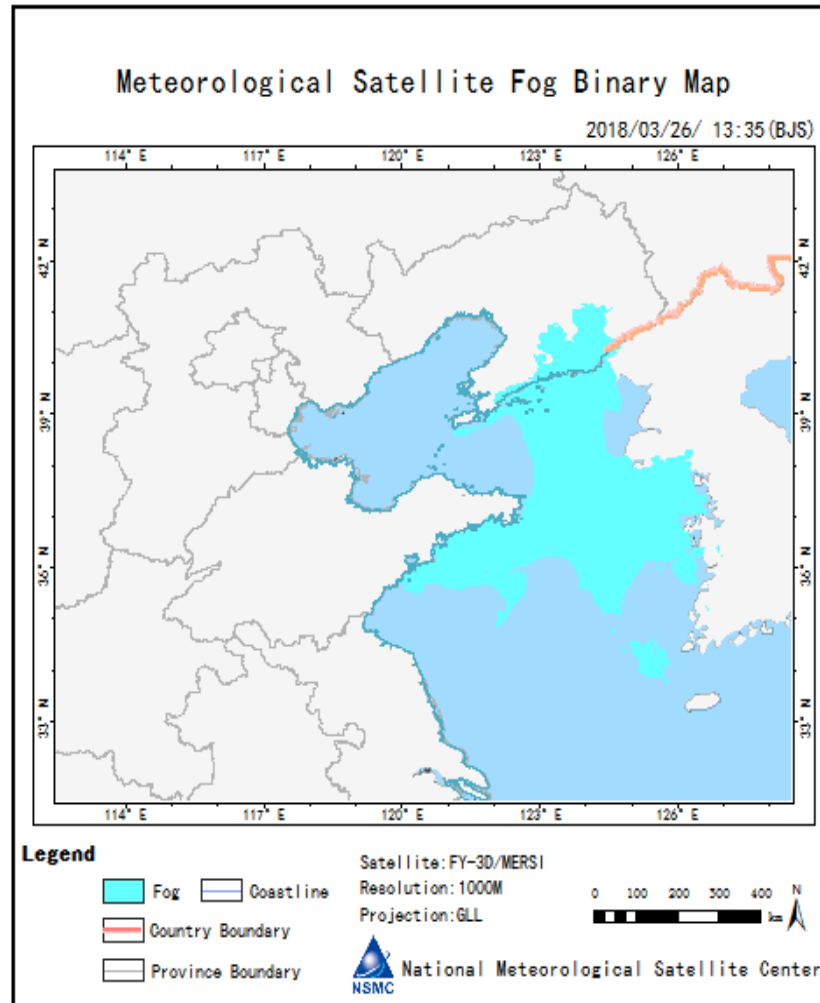
Band Settings

Visible Light(0.63) 3

Far Infrared(10.8) 5

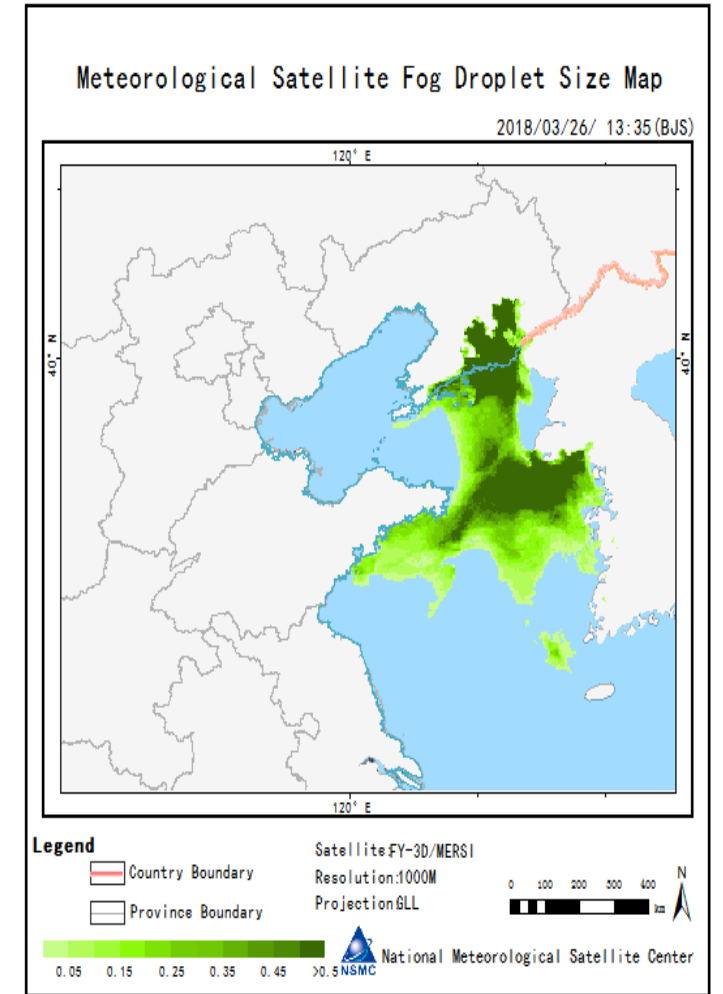
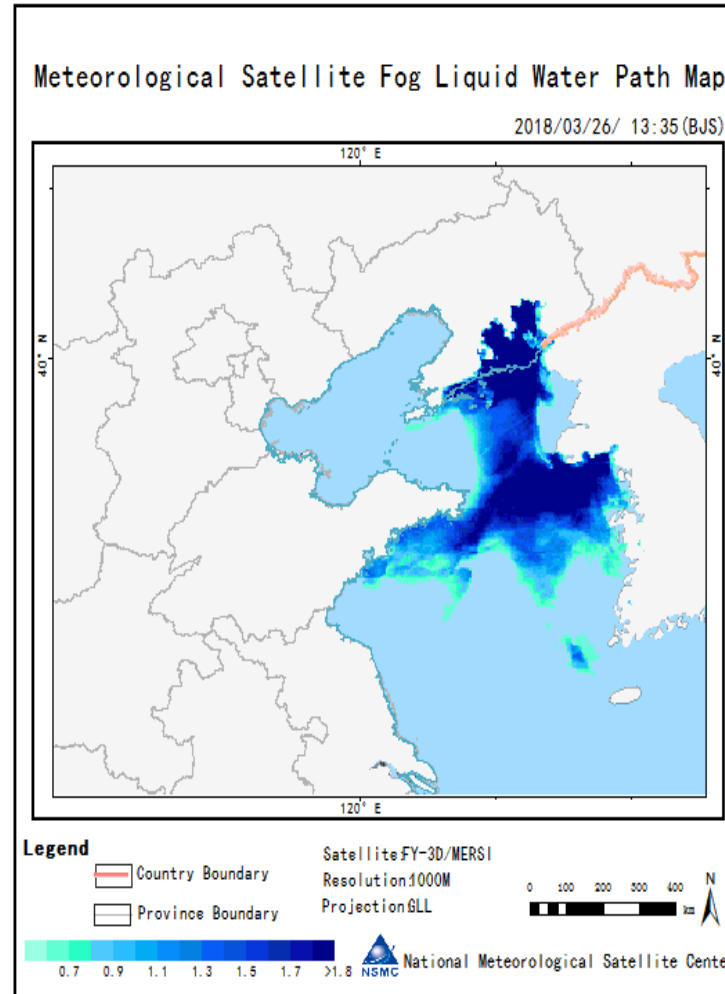
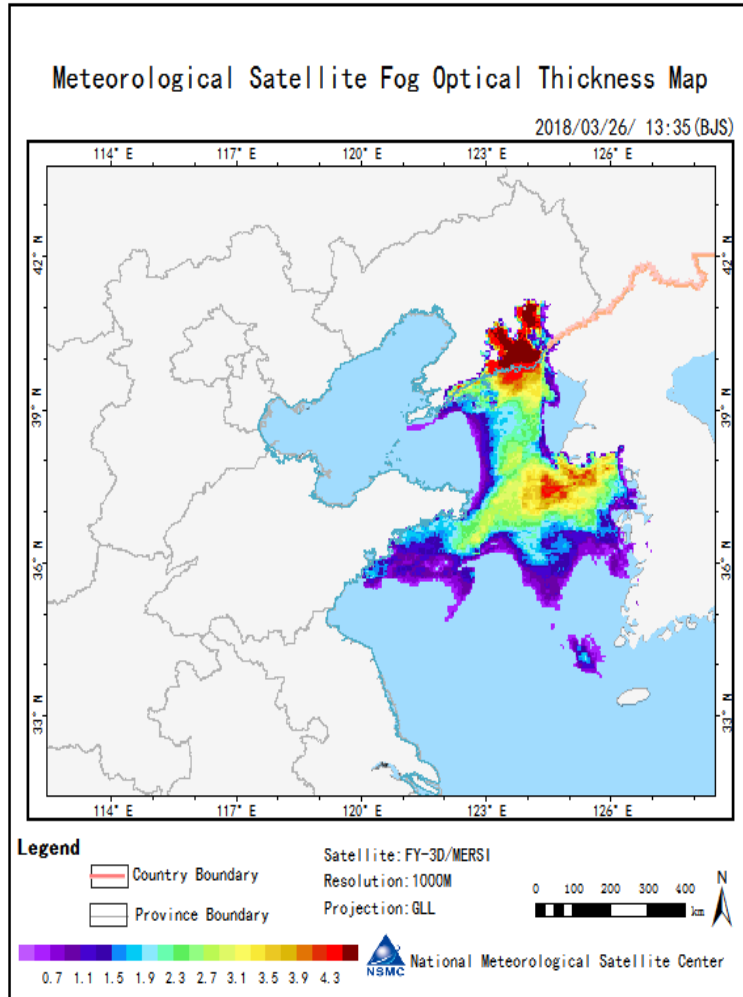
Auto Generate Thematic map

Save Gener Clear



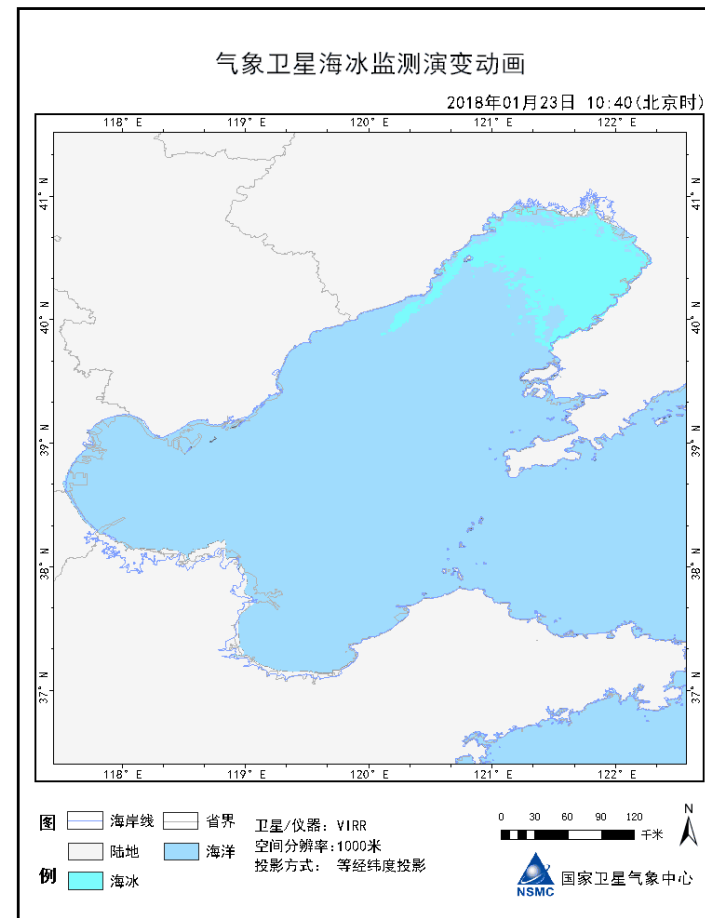
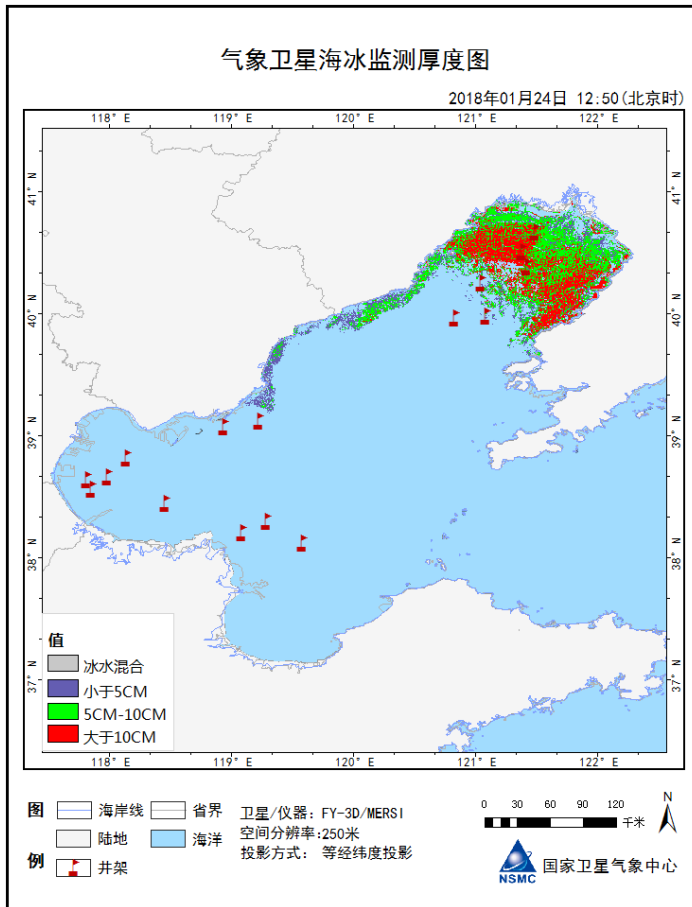
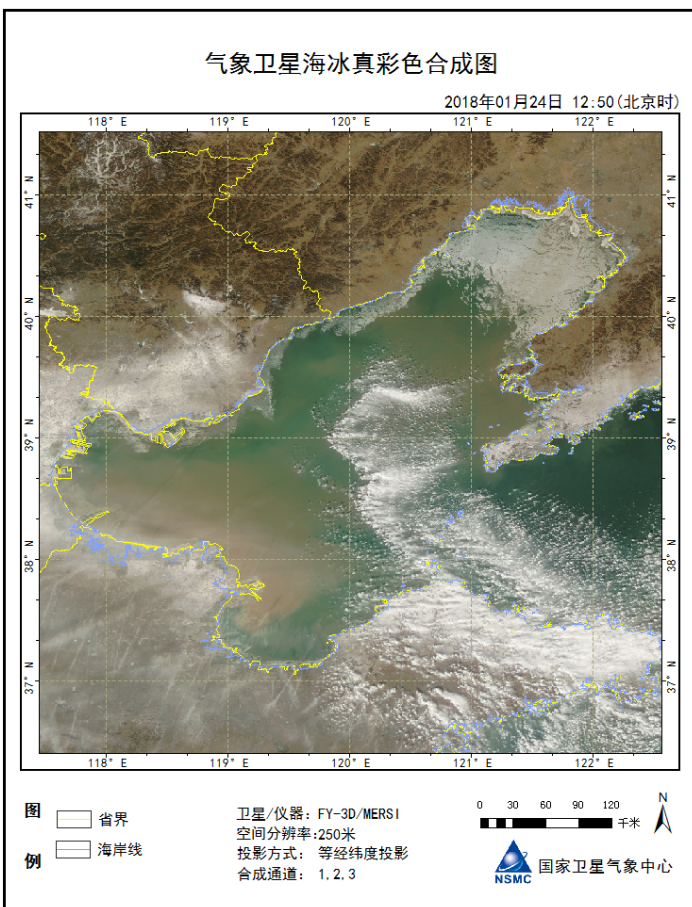


2. Software service



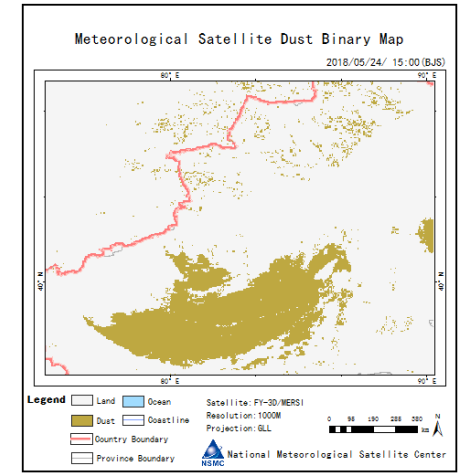
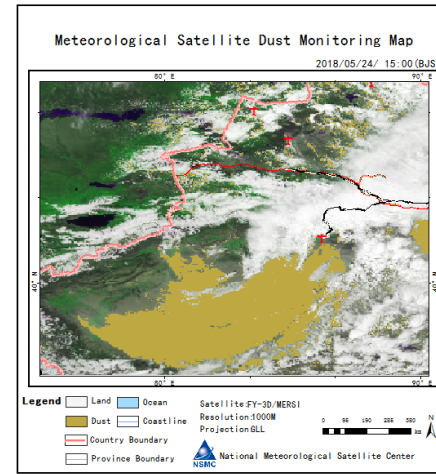
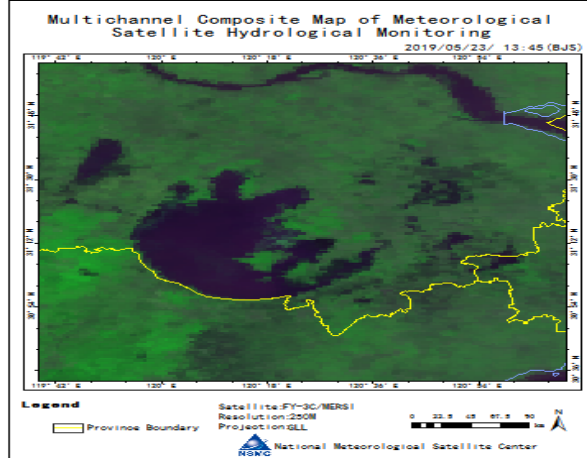
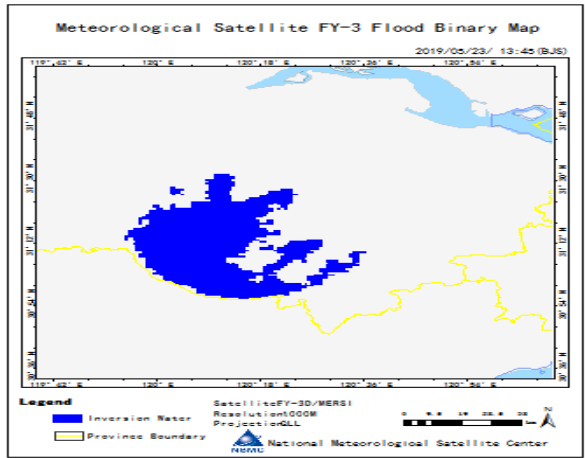
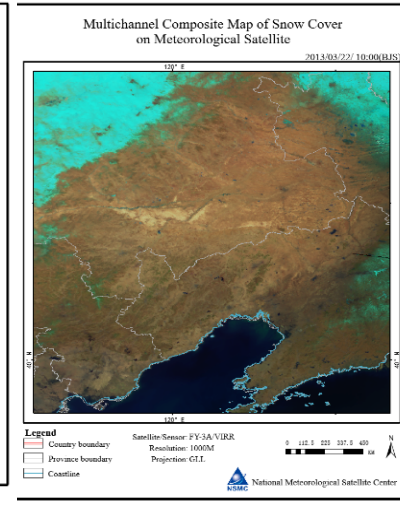
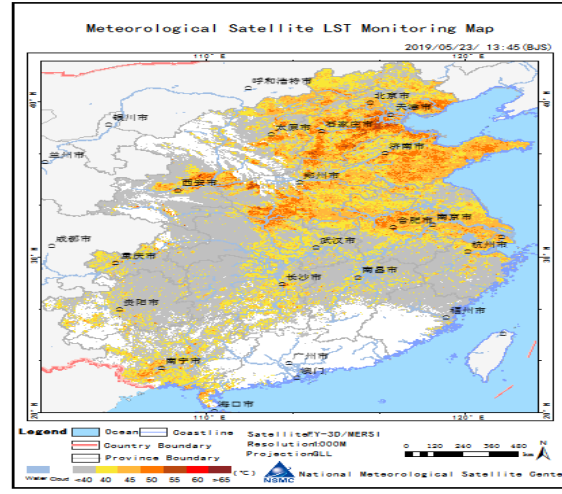
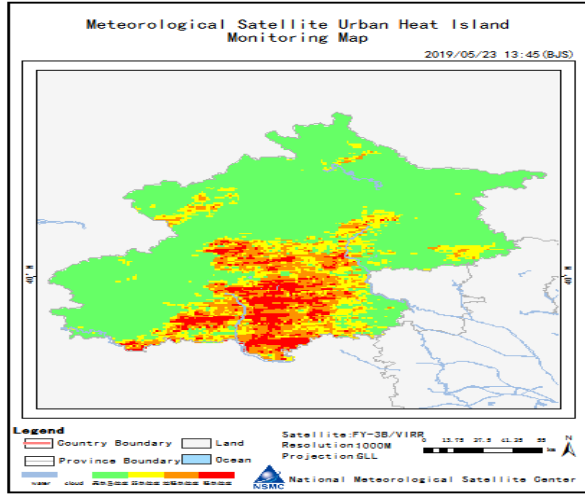


2. Software service





2. Software service





2. Software service



Both SWAP and SMART use **open architecture**, and **provide secondary development function**. All thematic modules in the systems are plug-ins. For every plug-in, the system provides unified registration management, version control, upgrade and installation service.

Plug-in market management on the server side



Plug-in version management



New plug-in entry for the client

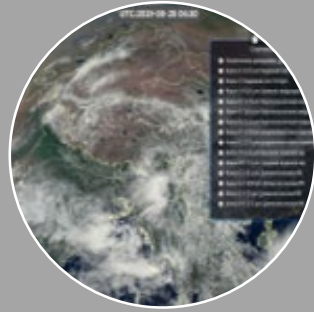


Plug-in installation/upgrade/uninstall

Open architecture



1. Data service



2. Software service



3. application service



4. Communication and training service

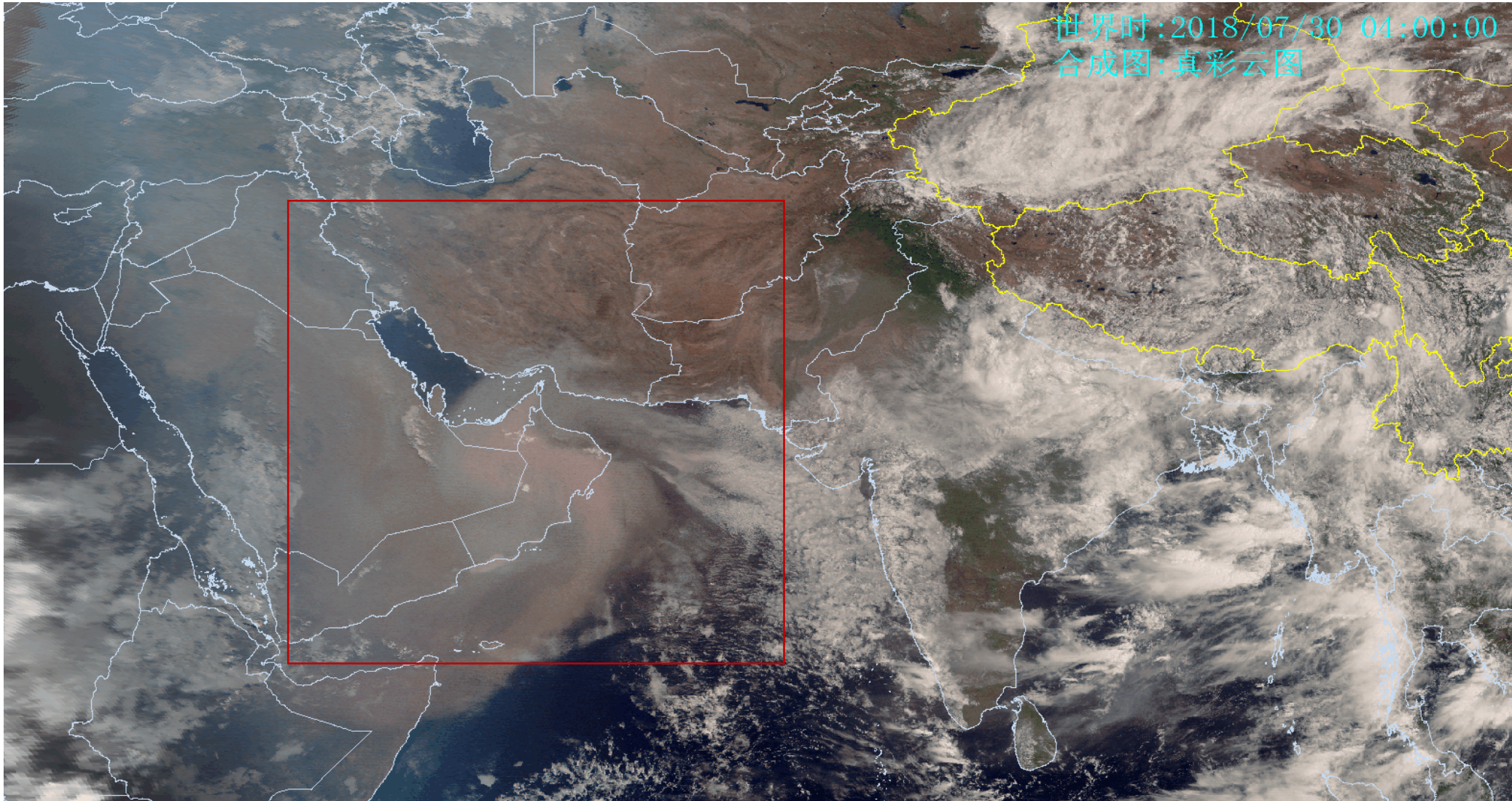




3. Application service



On July 30, 2018, an extremely strong sand dust storm occurred in the Arab region

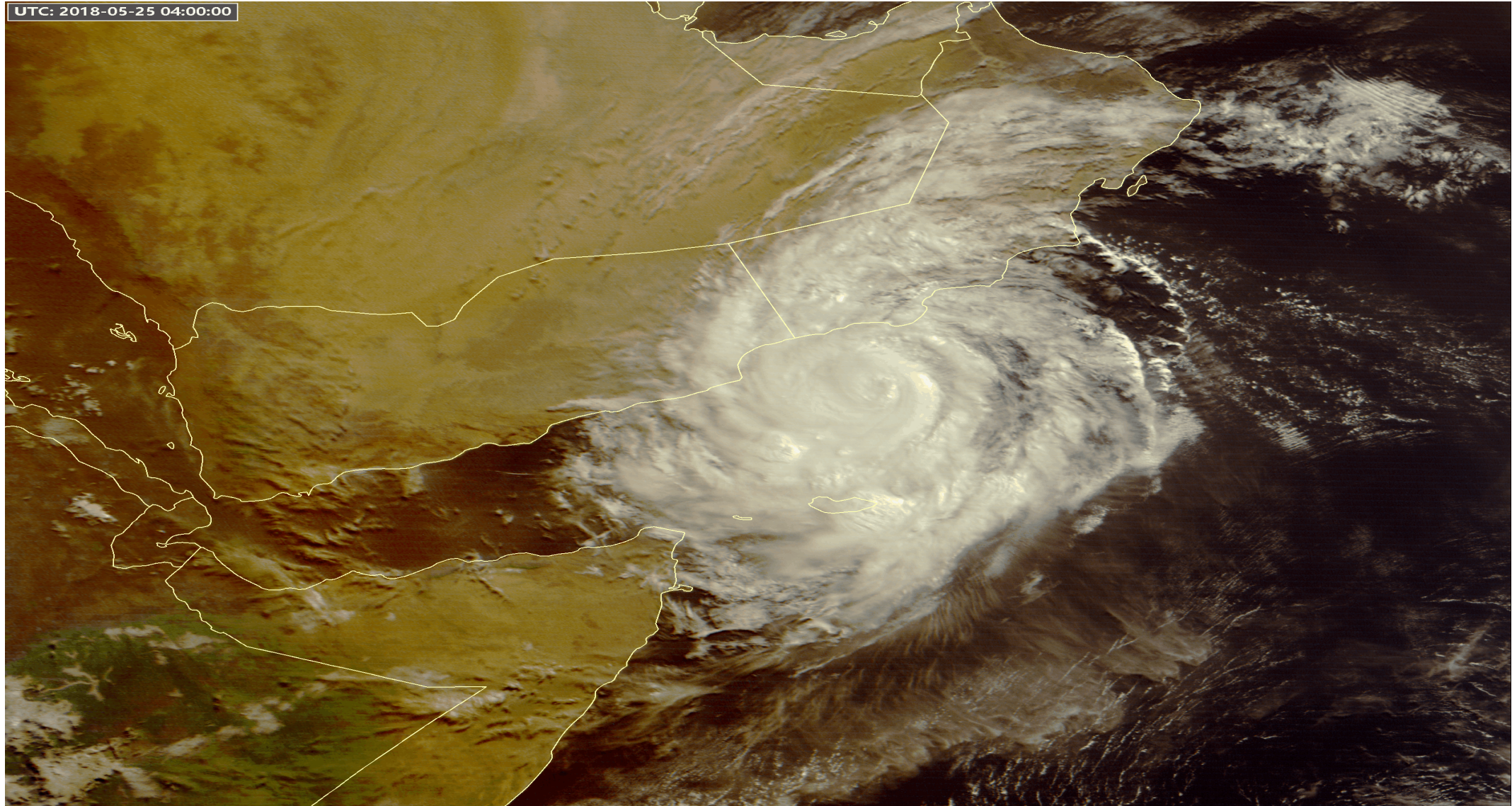




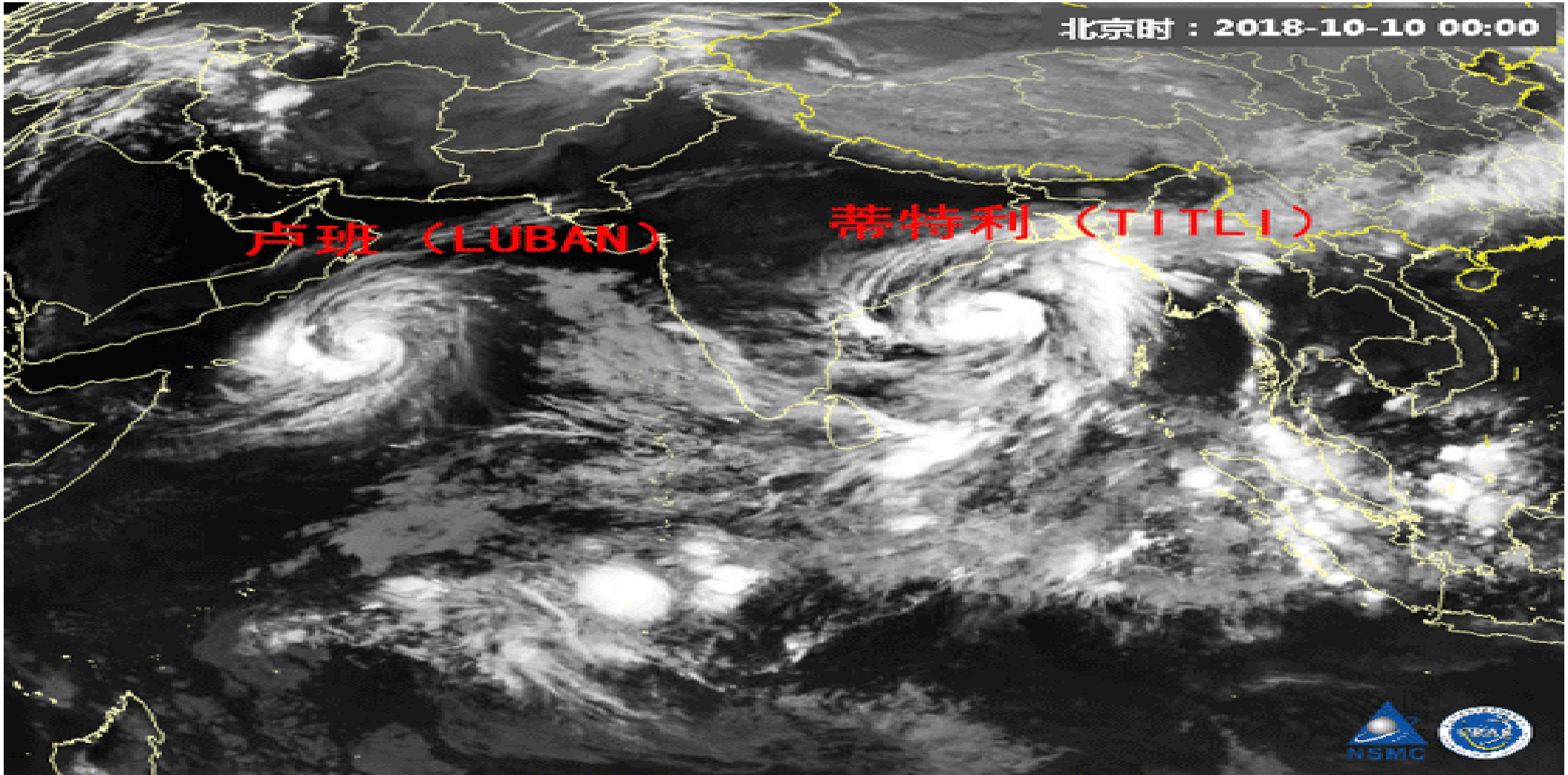
3. Application service



Cyclone in Arabian peninsula



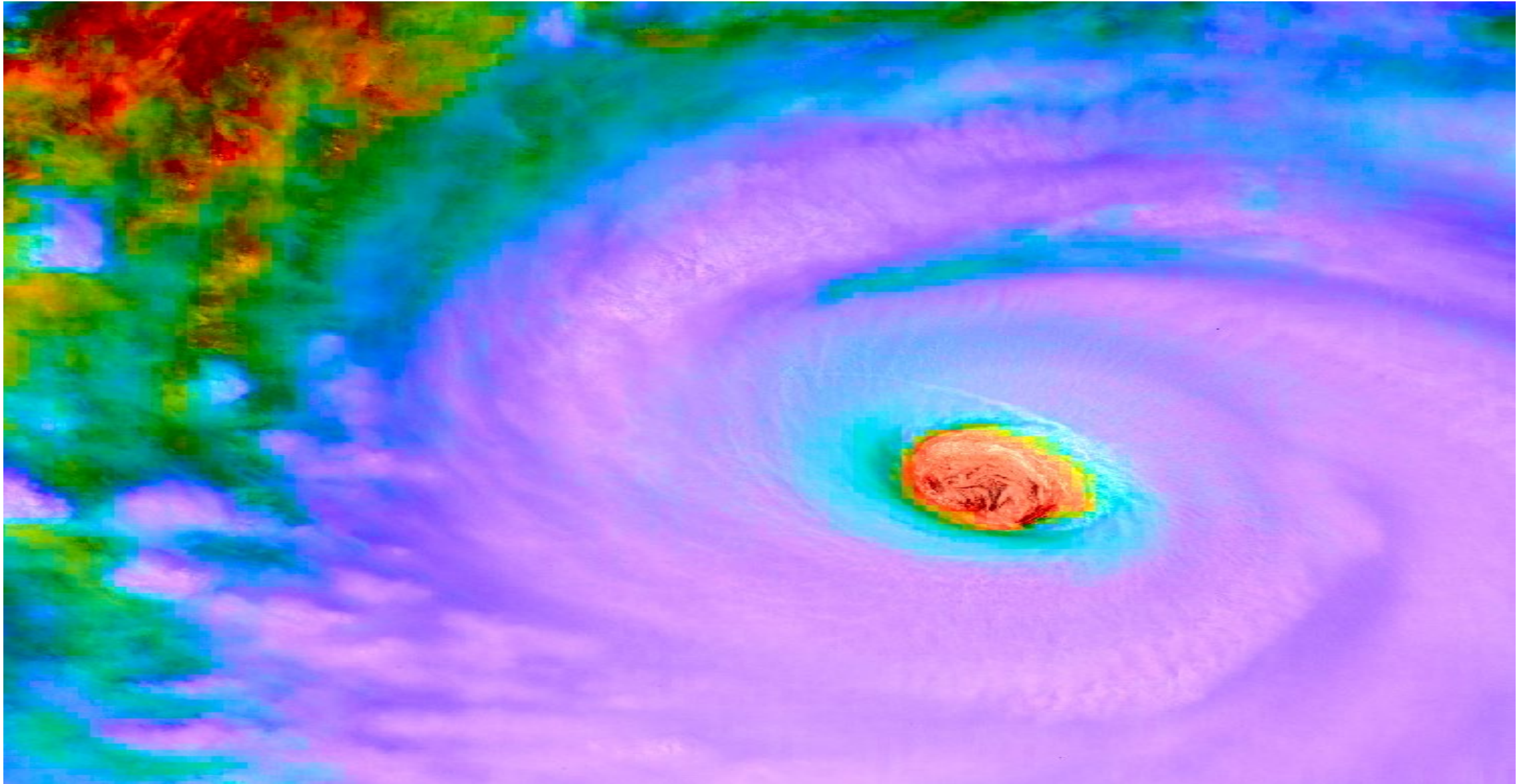
3. Application service



Cyclone storm in the west Arabian sea (05A- "LUBAN") cyclone storm in the bay of Bengal (06B- "TITLI")



3. Application service

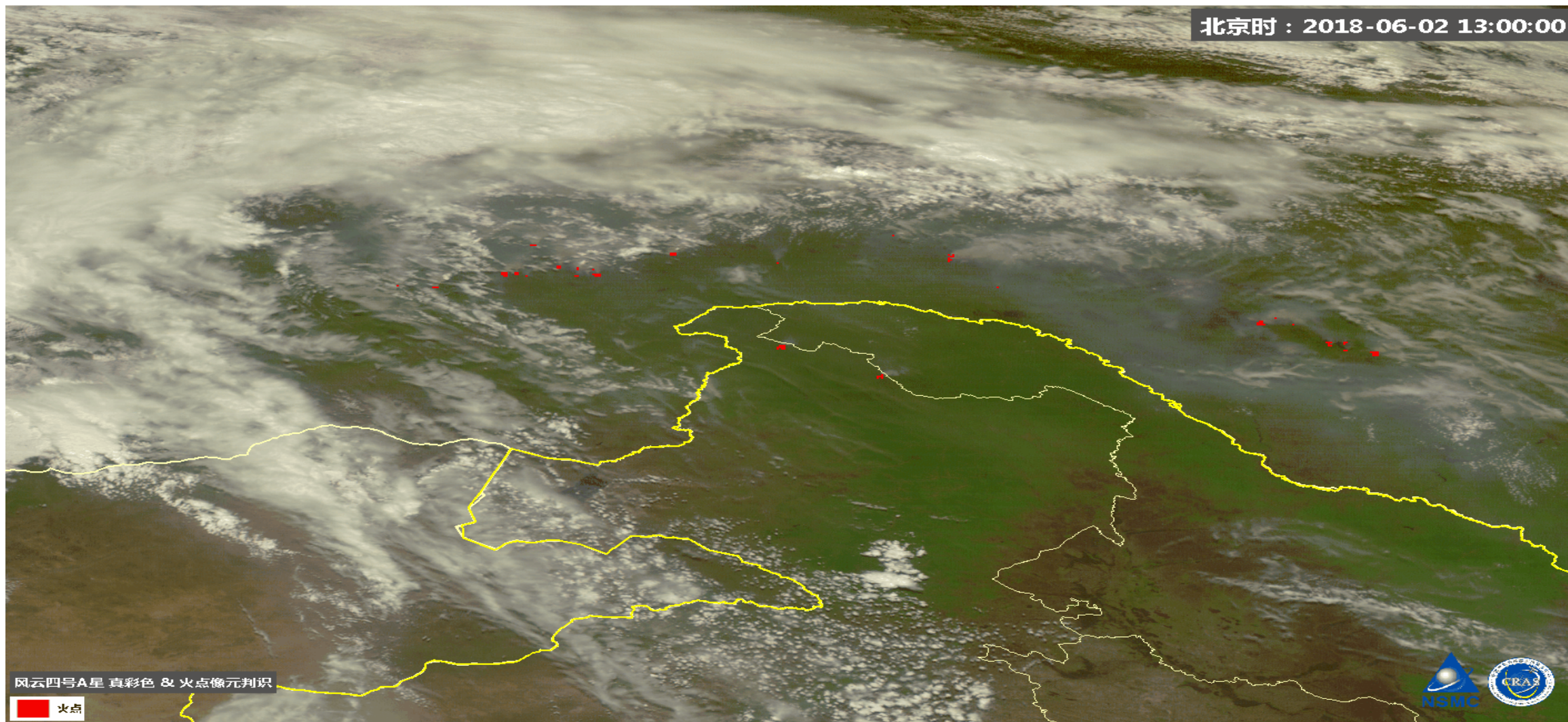




3. Application service



Fire monitoring



3. Application service

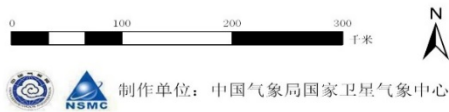


FY-3D气象卫星美国加利福尼亚火情监测图

2018年11月09日05:00 (北京时间)

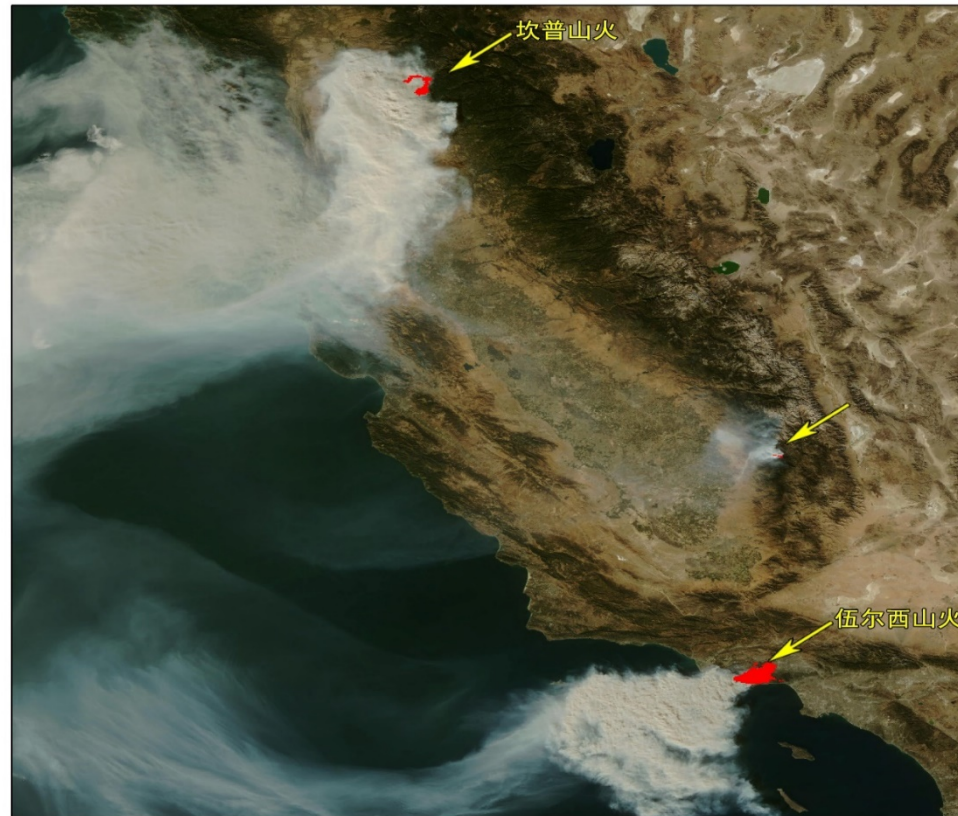


图例 火点

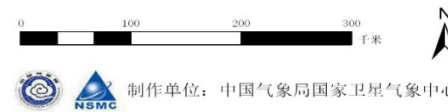


FY-3D气象卫星美国加利福尼亚火情监测图

2018年11月10日04:40 (北京时间)



图例 火点



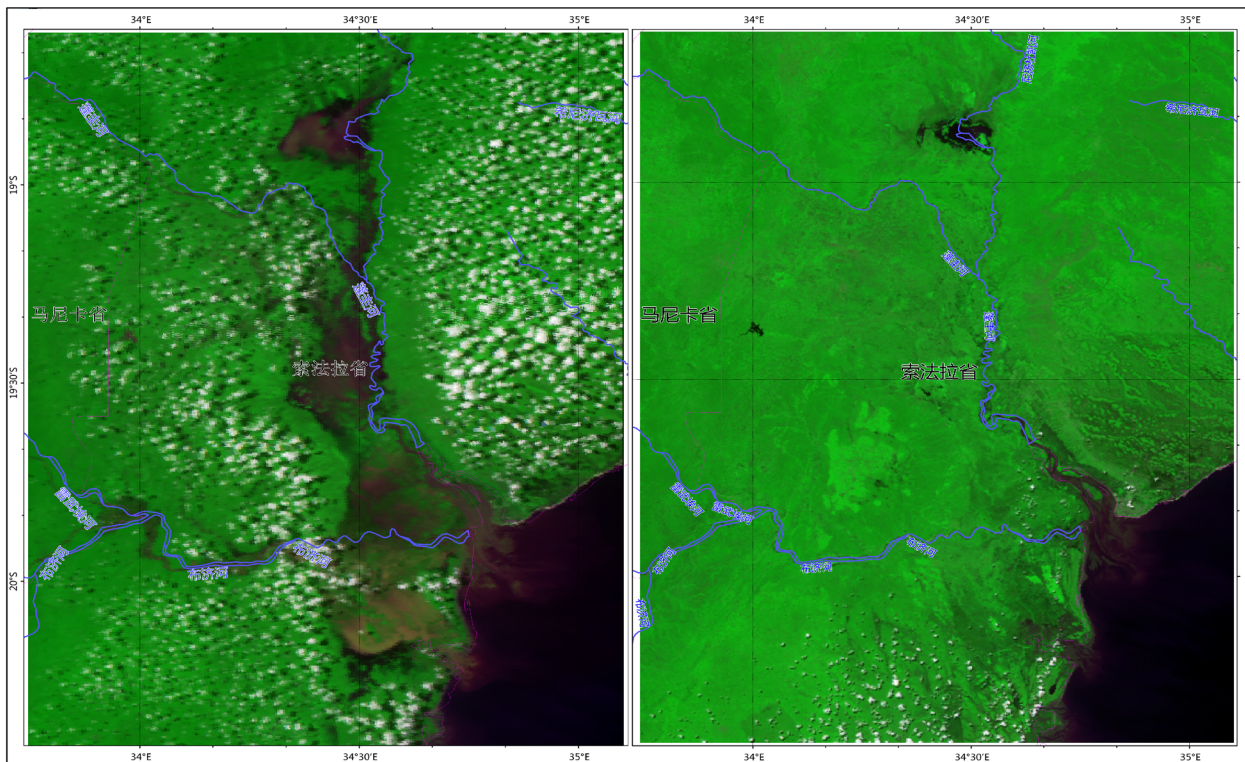


Flood monitoring

FY3D/MERSI莫桑比克索法拉省洪涝监测对比图

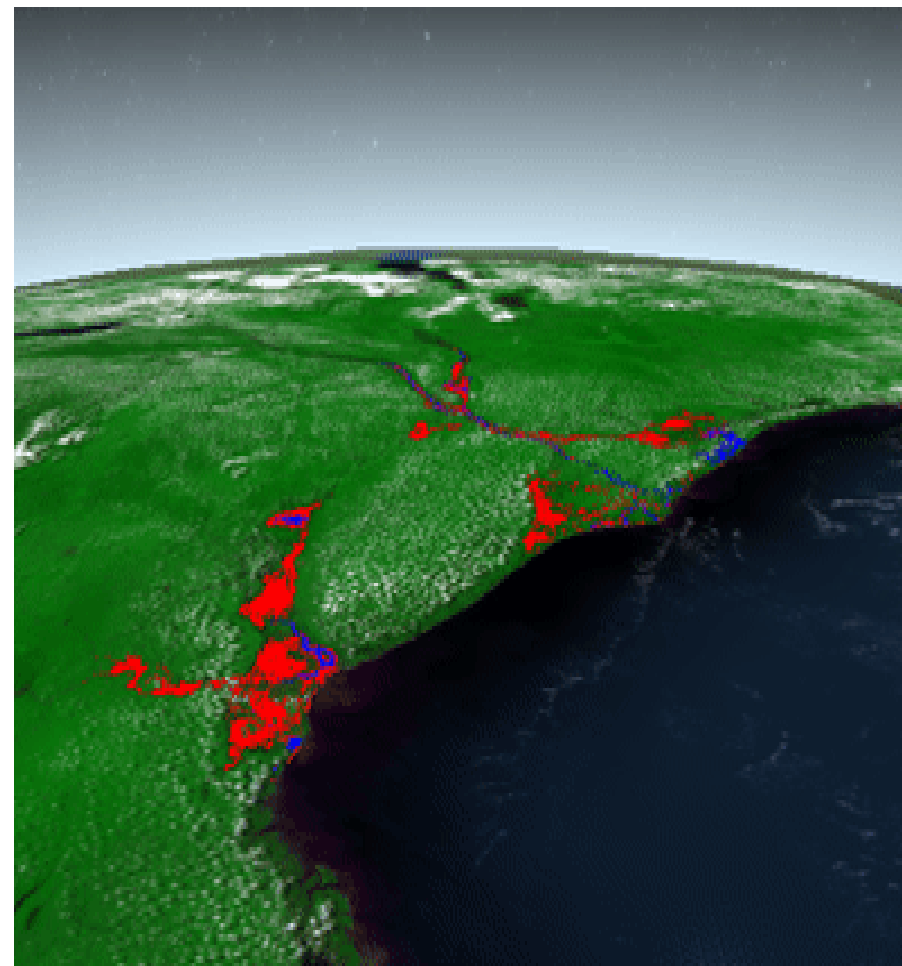
2019年3月25日 18:45(北京时间)

2019年2月24日 19:30(北京时间)



图例
— 国界
— 省界
— 河流

卫星/仪器 :FY3D/MERSI
空间分辨率 :0.0025度
合成通道 :3,4,2
投影方式 :等经纬度
制作单位: 中国气象局国家卫星气象中心





3. Application service



高分资料应用软件系统

开始 遥感应用 专题制图 系统管理

首页 文件 数据检索 图层树 图像预处理 图像增强 恢复图像 渲染方案 图像重采样 投影工具 栅格运算 遥感工具 影像分类 缓冲区分析 平移校正 图像量算 基础矢量 高分底图 地图服务 常规观测资料 数值预报 三维视图 卷带 视图输出 Micaps显示控制

数据管理 图像处理 基本工具 基础数据 视图控制

GF1_WFV2_E110.4_N32.6_20170414... 三维地球 X

图层管理器 工作空间 三维视图... 三维图层...

图层管理器

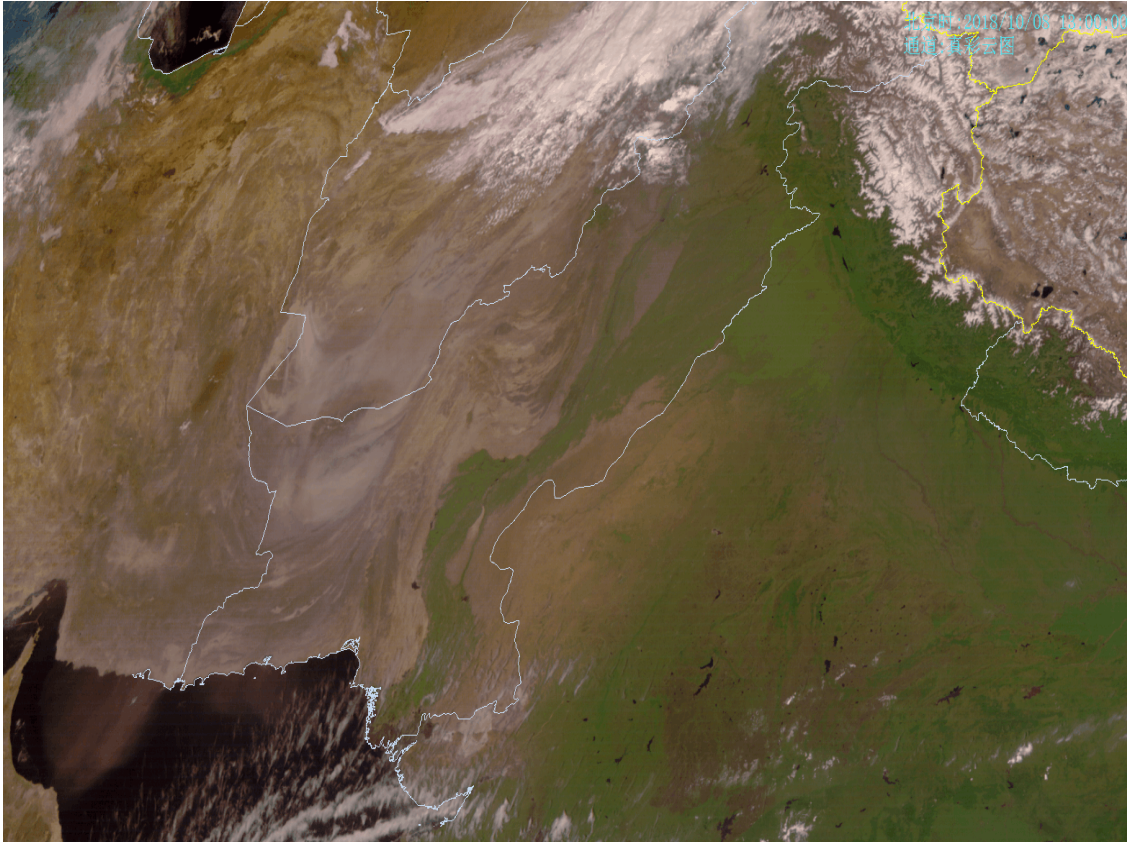
就绪 坐标系: 等经纬度投影 比例尺: 1:44790 地图坐标: 111.39, 32.54, 200.00 屏幕坐标: 15, 827

3. Application service

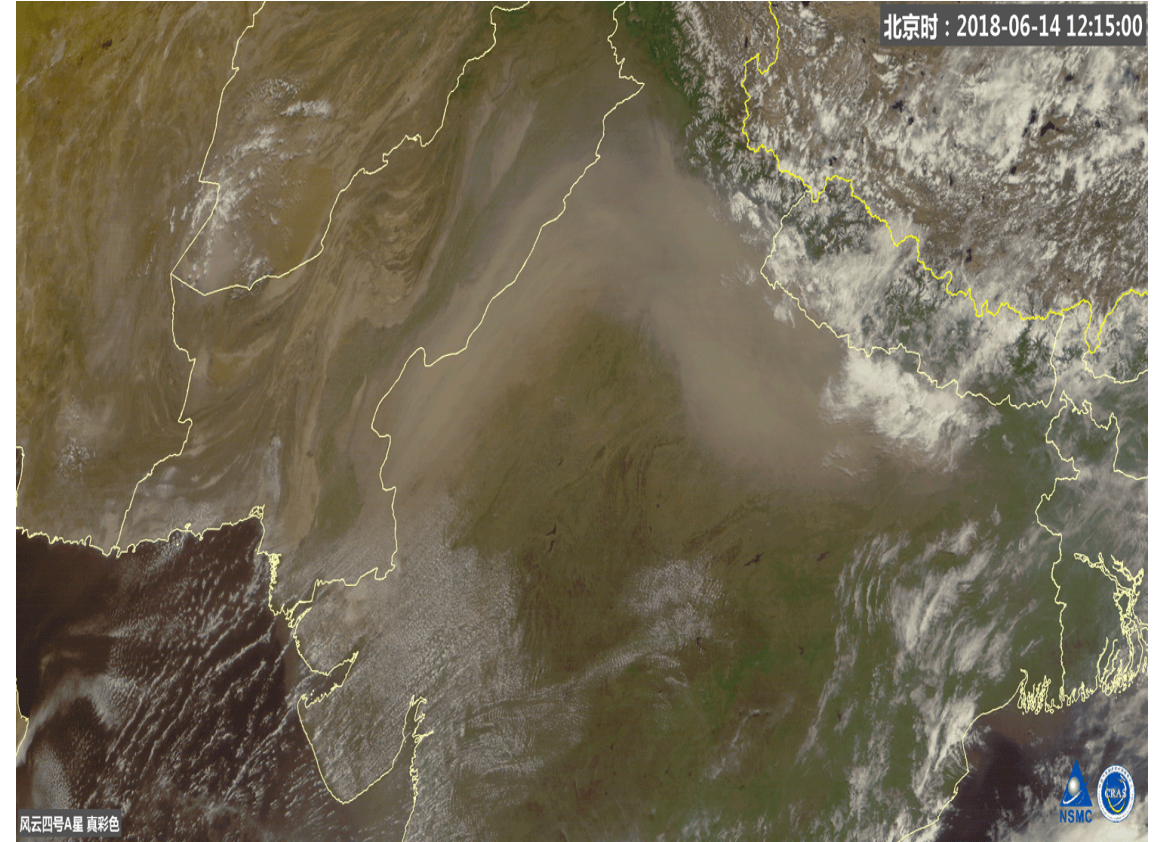


Sandstorm monitoring

Sandstorm monitoring in Afghanistan on October 8, 2018



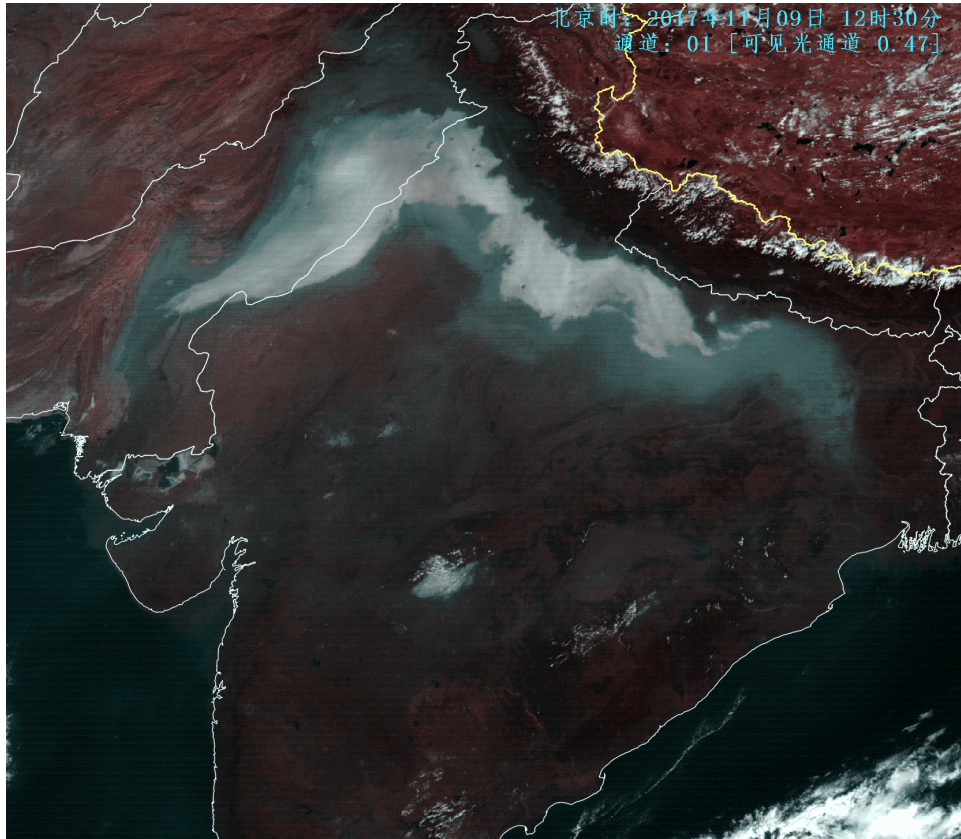
• Sandstorm monitoring in India on June 14, 2018



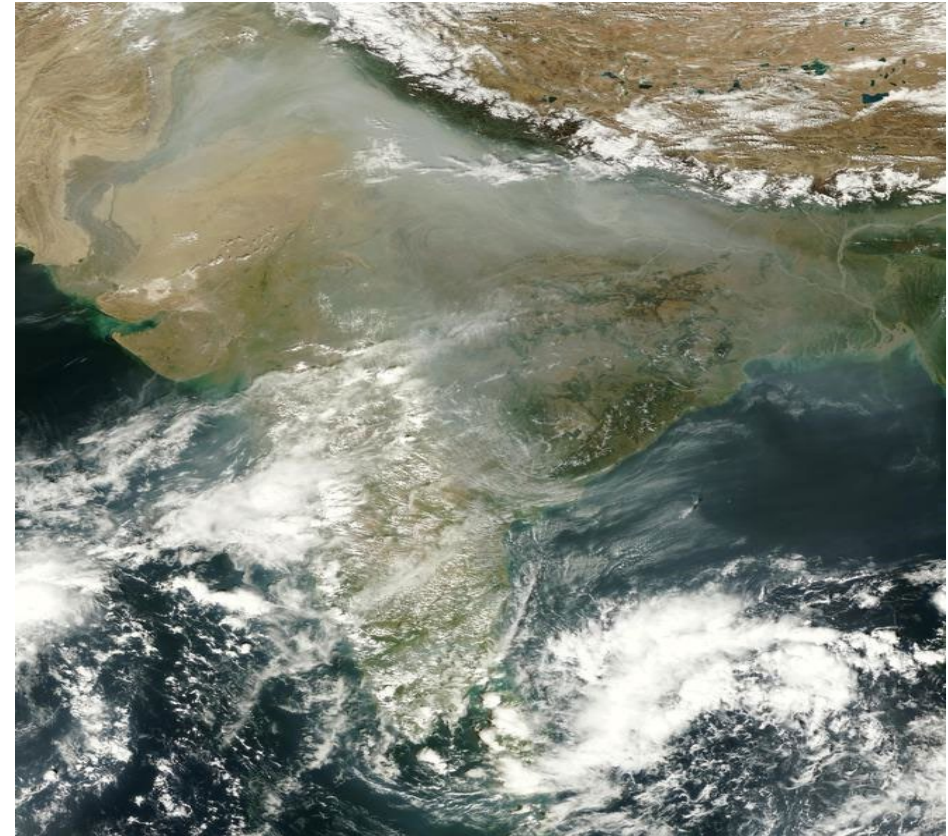
3. Application service



Haze monitoring



FY-4A haze monitor (09/11/2017)



FY-3D haze monitor(19/11/2018)



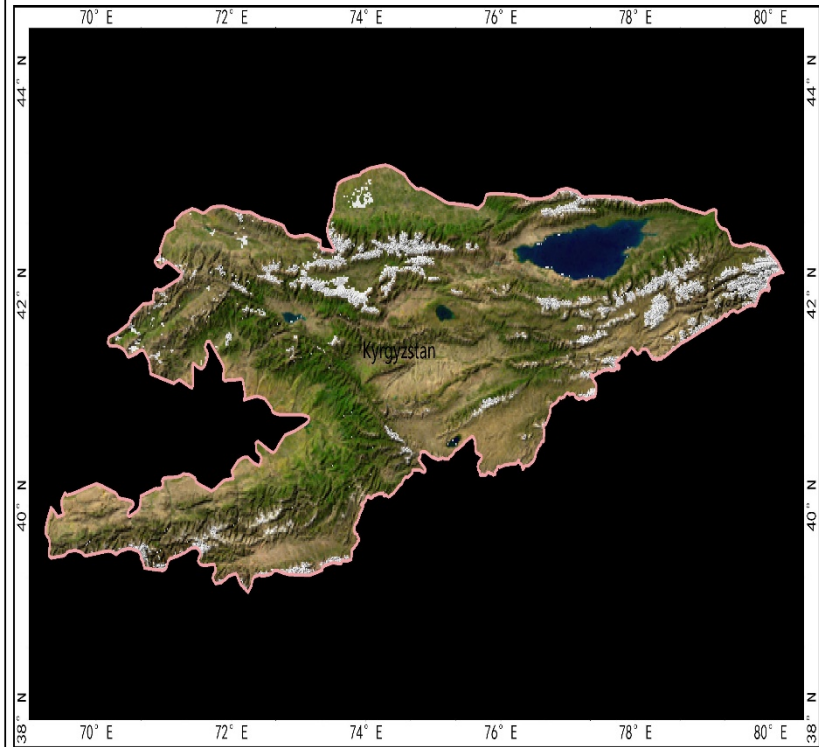
3. Application service



Provide customized product for International users

Meteorological Satellite Snow Cover Map

September 16, 2019 - September 25, 2019



Legend

- National Boundary
- Snow
- Water
- Cloud
- Land

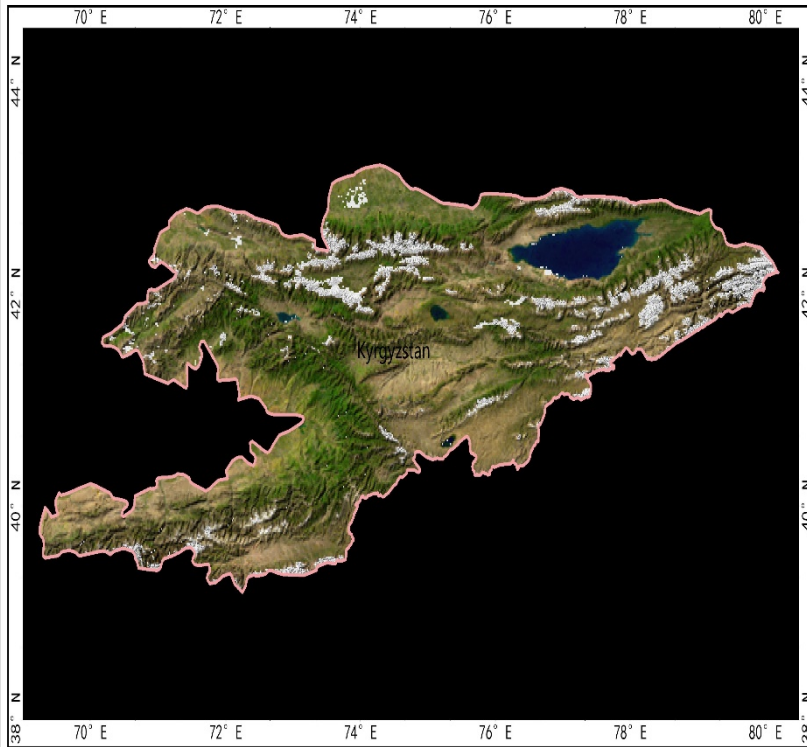
Satellite/Sensor: FY-3C/MULSS
Resolution: 1000M
Projection: GLL

0 40 80 160 240 320 km

National Satellite Meteorological Center

Meteorological Satellite Snow Cover Map

September 17, 2019 - September 26, 2019



Legend

- National Boundary
- Snow
- Water
- Cloud
- Land

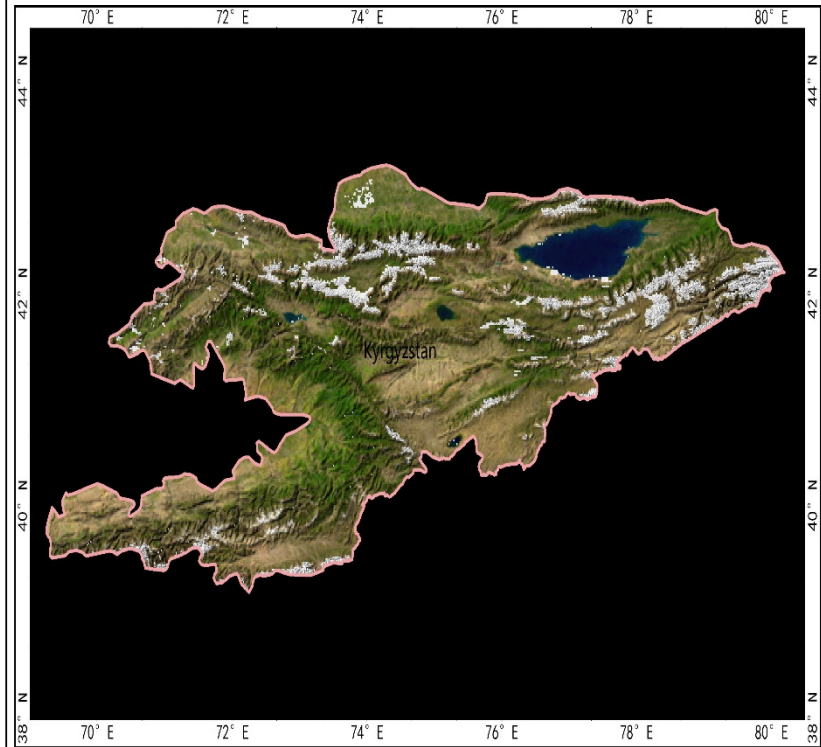
Satellite/Sensor: FY-3C/MULSS
Resolution: 1000M
Projection: GLL

0 40 80 160 240 320 km

National Satellite Meteorological Center

Meteorological Satellite Snow Cover Map

September 18, 2019 - September 27, 2019



Legend

- National Boundary
- Snow
- Water
- Cloud
- Land

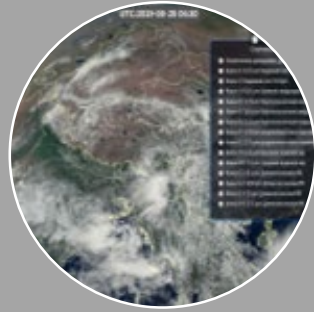
Satellite/Sensor: FY-3C/MULSS
Resolution: 1000M
Projection: GLL

0 40 80 160 240 320 km

National Satellite Meteorological Center



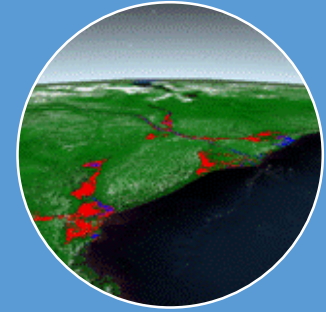
1. Data service



2. Software service



3. application service



4. Communication and training service





4. Communication and training service



International Cooperation

CMA has conducted close cooperations with WMO, APSCO, GCC and other international organizations to jointly promote meteorological satellites application for international users in B&R countries including arabic





4. Communication and training service

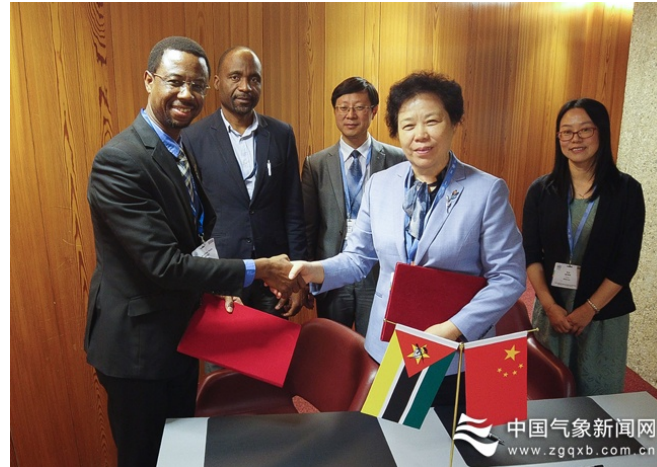
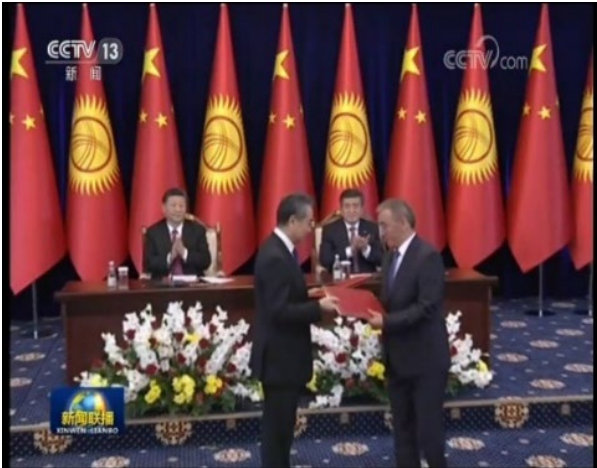


4. Communication and training service



Cooperative Agreements on Met. Satellite

International cooperation agreements on meteorological satellites have been signed with **Oman, mozambique, kyrgyzstan** and other countries. According to the cooperation agreement, the two sides will carry out practical cooperation in fengyun meteorological satellite data transmission, reception and sharing, satellite remote sensing application platform construction, satellite product development and application, satellite disaster prevention and reduction and emergency support services, personnel training and technical exchange.

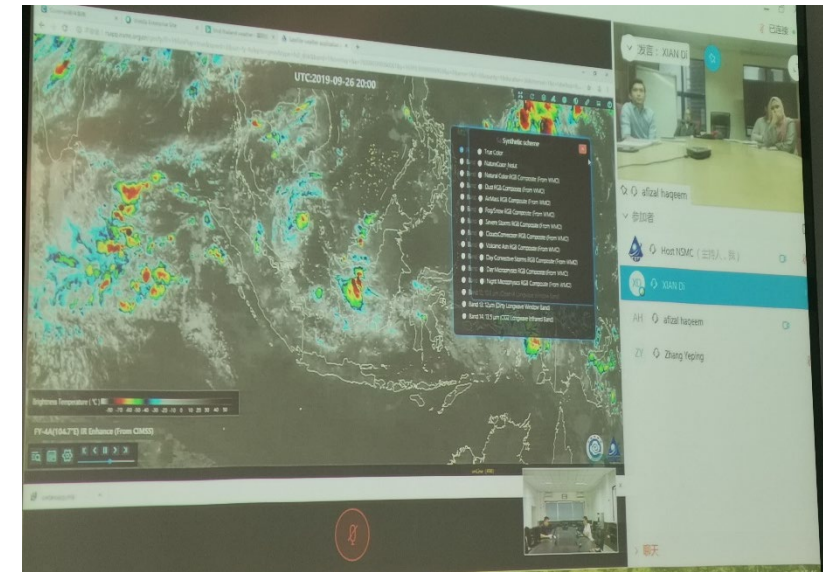
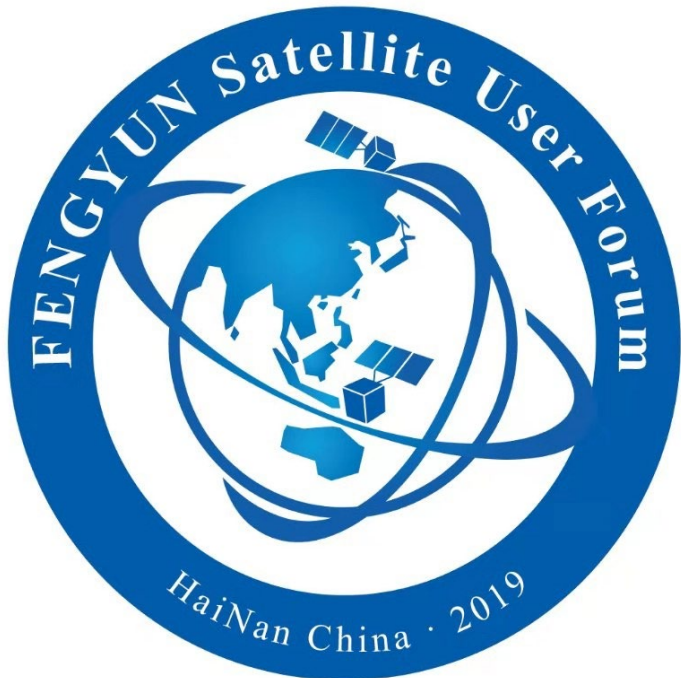




4. Communication and training service



- ◆ Organize training courses on remote sensing applications for B&R countries
- ◆ Organize Video conference
- ◆ Held Fengyun Satellite User Conference





4. Communication and training service



Fengyun meteorological satellite has become an important infrastructure for the construction of "one belt and one road".



Former Secretary-General of the World Meteorological Organization, Michel Yarrow

China's work in the WMO space program is one of the most important contributions. At present, Fengyun satellite data has been freely available to all WMO members, providing valuable information for global numerical prediction, disaster prevention and mitigation, climate research and many other fields.



Secretary-General of the World Meteorological Organization, Petteri Talas



Future Plan



Future plan of Fengyun meteorological satellite serving for Belt and Road initiative

- Provide application supporting platform
- Developing adaptive products
- **Equipped with mobile terminal**
- Open up the path from data receiving to TV showing
- International Training
- Scholars exchange visits
- **Routine Video Conference**
- **Establishment of Fengyun Satellite International Cooperation Fund(TBD)**

- Satellite direct receiving station
- CMACast
- Public Cloud
- Green Data service Channel
- Emergency service

Enhancing Data Dissemination Capability

Improving Data Application Capability

Encouraging scientific and technological cooperation



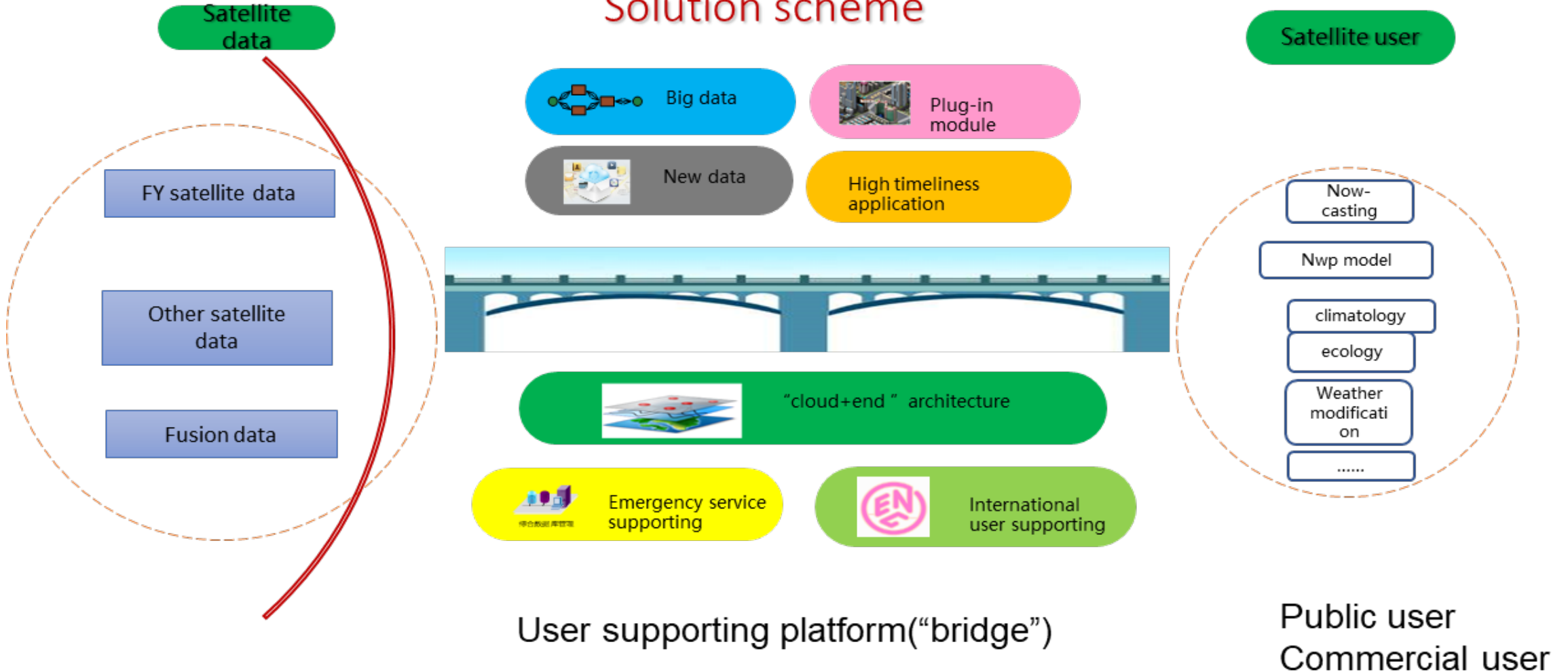


Future Plan



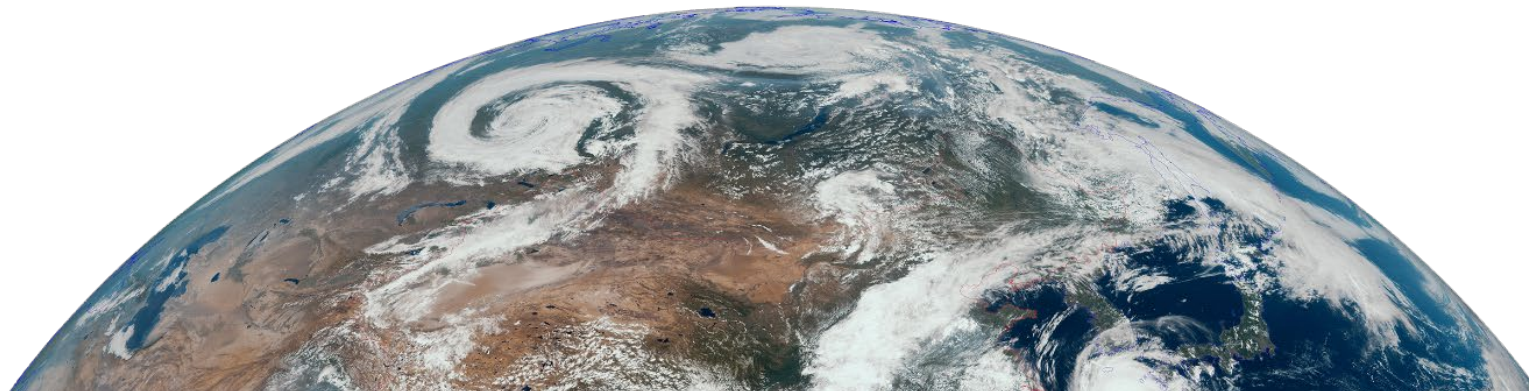
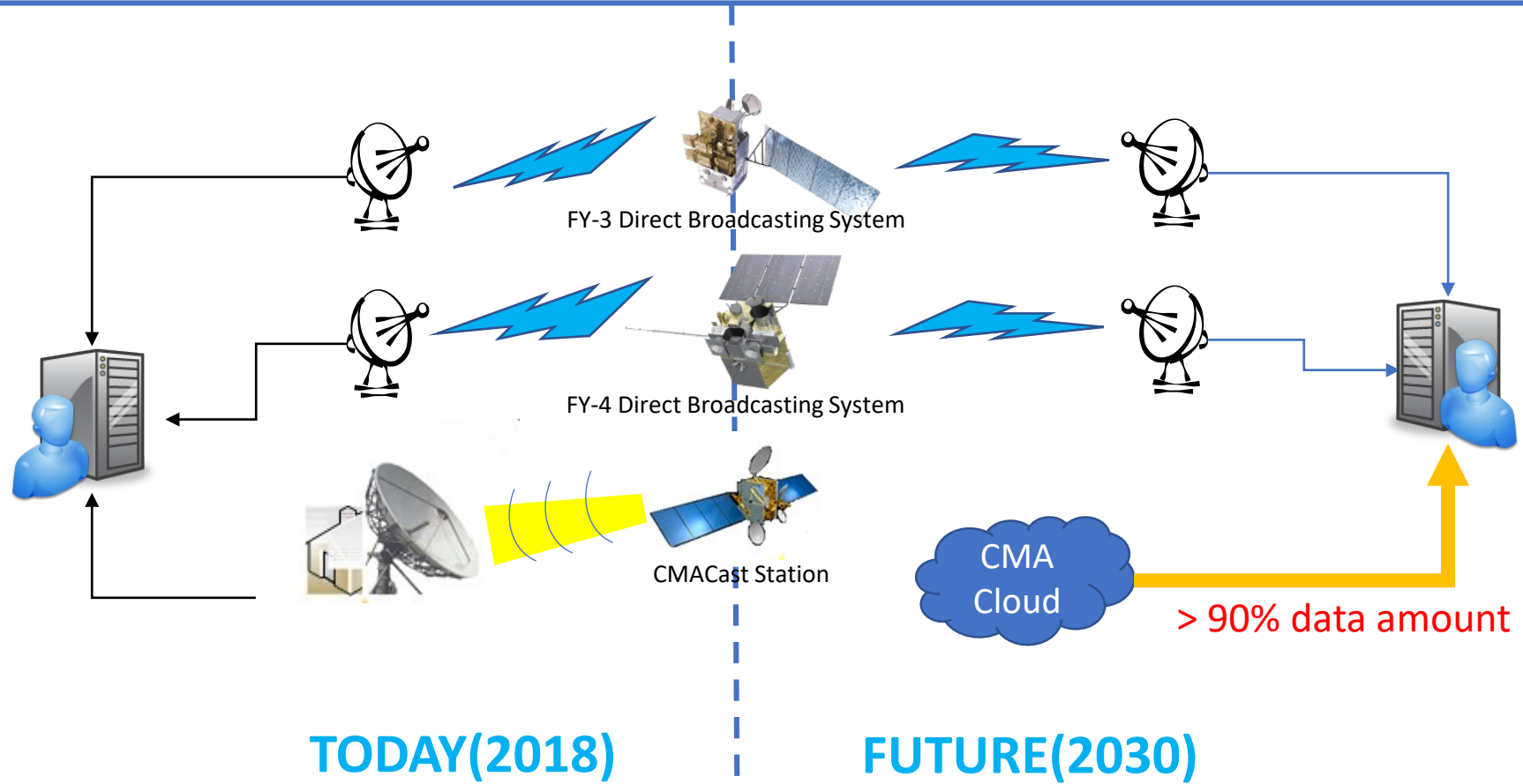
Cloud-based Community user supporting system

Solution scheme





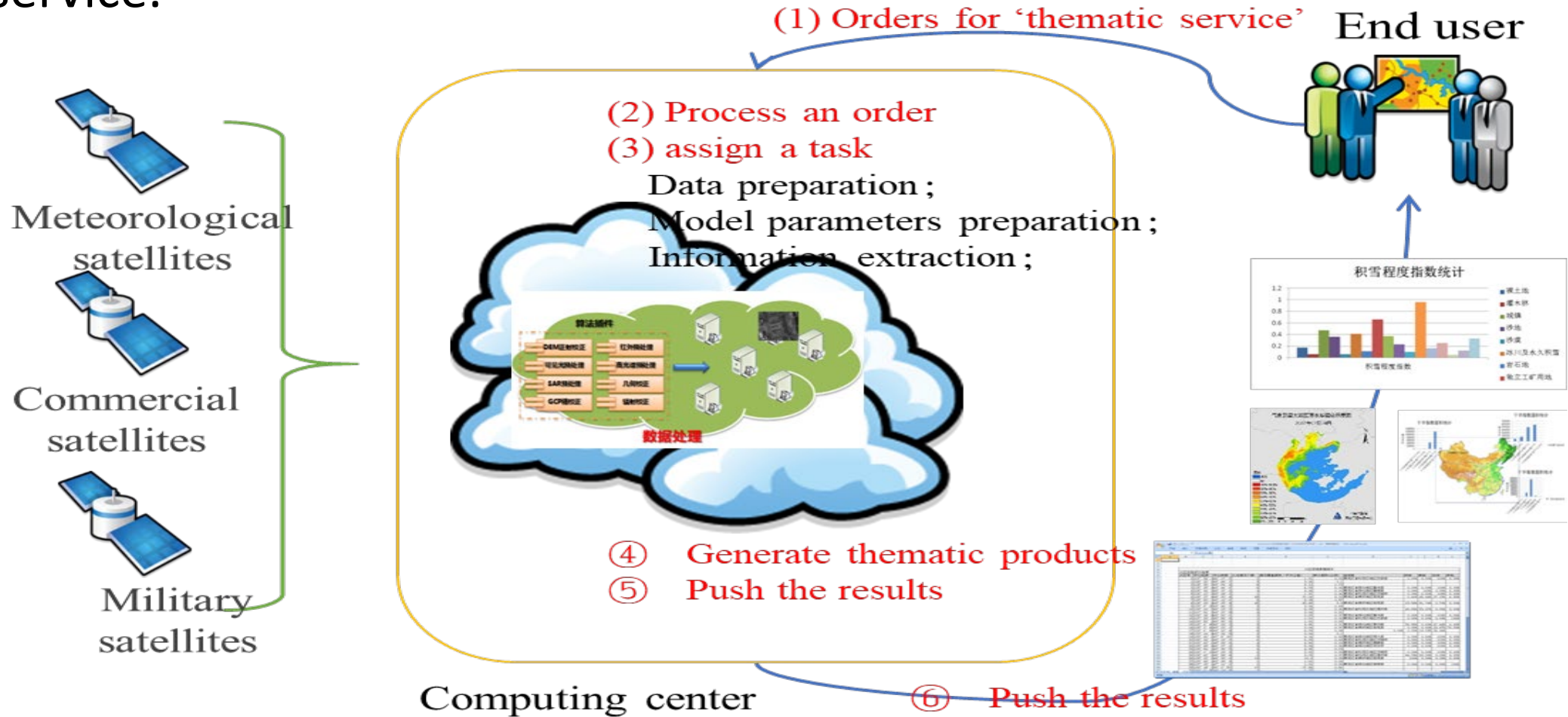
Future Plan



Future Plan



Not only satellite data service, but also compute and decision-making service.





Thanks for your attention

欢迎访问下列网址获取更多信息：

<http://rsapp.nsmc.org.cn/geofy>

<http://satellite.nsmc.org.cn>

