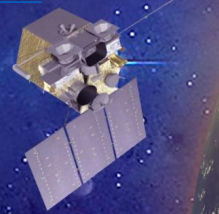
PRACTISE OF RAPID RESPONSE OF CMA FY-4B SATELLITE OBSERVATION FOR TYPHOON MONTORNING

Present by Feng LU
Chief Designer of CMA FY-4 satellite Ground Segment

NATIONAL SATELLITE METEOROLOGICAL CENTER
LUFENG@CMA.GOV.CN

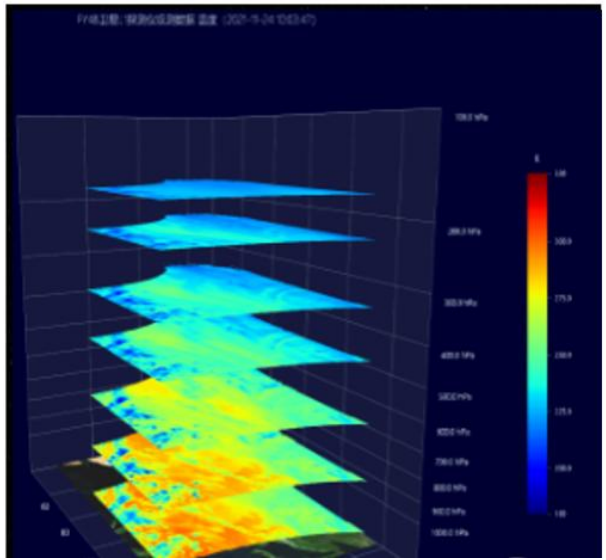


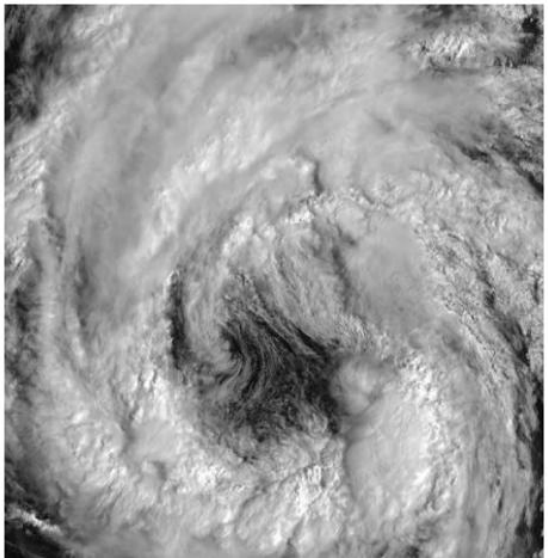
Many thanks to Xiaohu Zhang, Lan Wei, Qi Han, Lu Li, Yixuan Shou, Bo Li, Yu Zhang Ren Suling and other contributors from FY-4B Ground segment development team

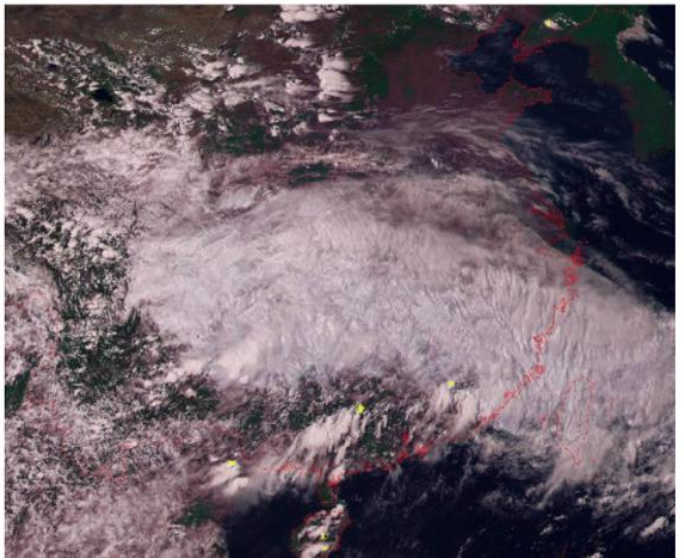
Outline

- **Current status**
- **Observation Capabilities**
- **Rapid response by case**
- **Service**
- **Summary**

MOTIVATION







1、 Support nowcasting and severe weather warning

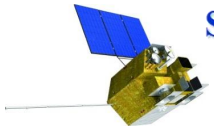
2 、Support NWP, regional and global

3 、Support climate applications

4 、Support environment monitoring and disaster mitigation

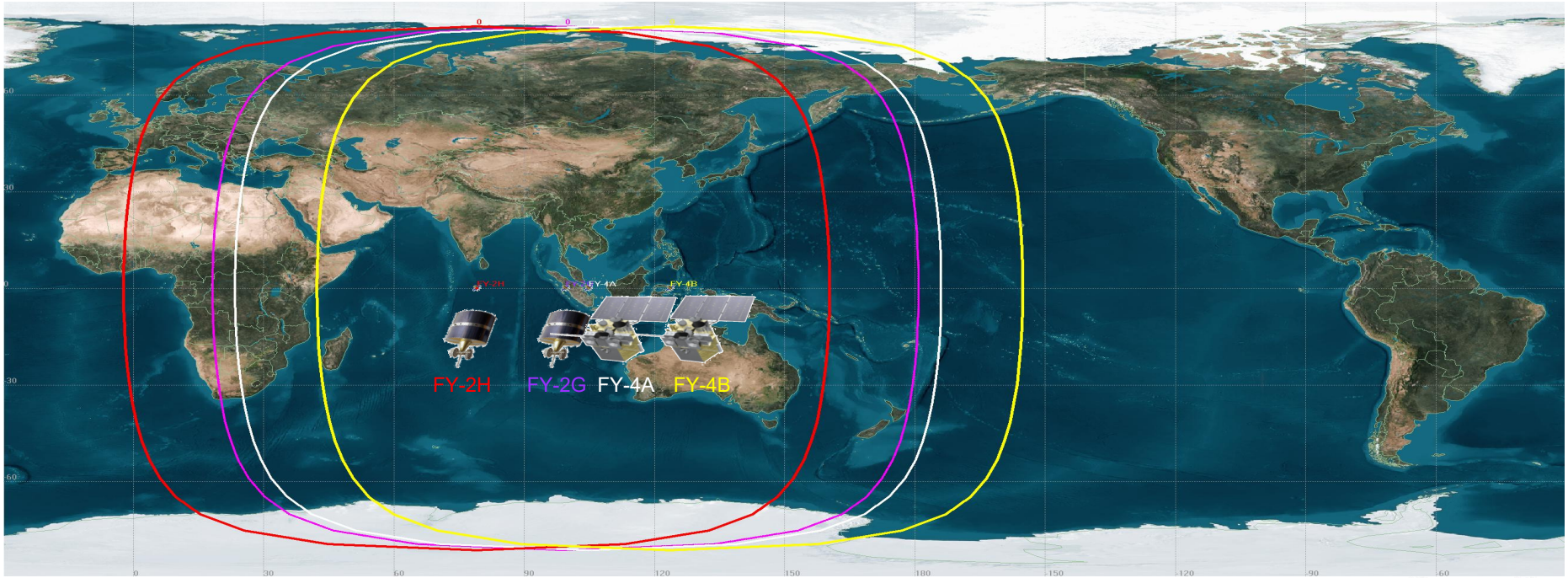
First Generation

FY-2H 79.0E
FY-2G 99.0E

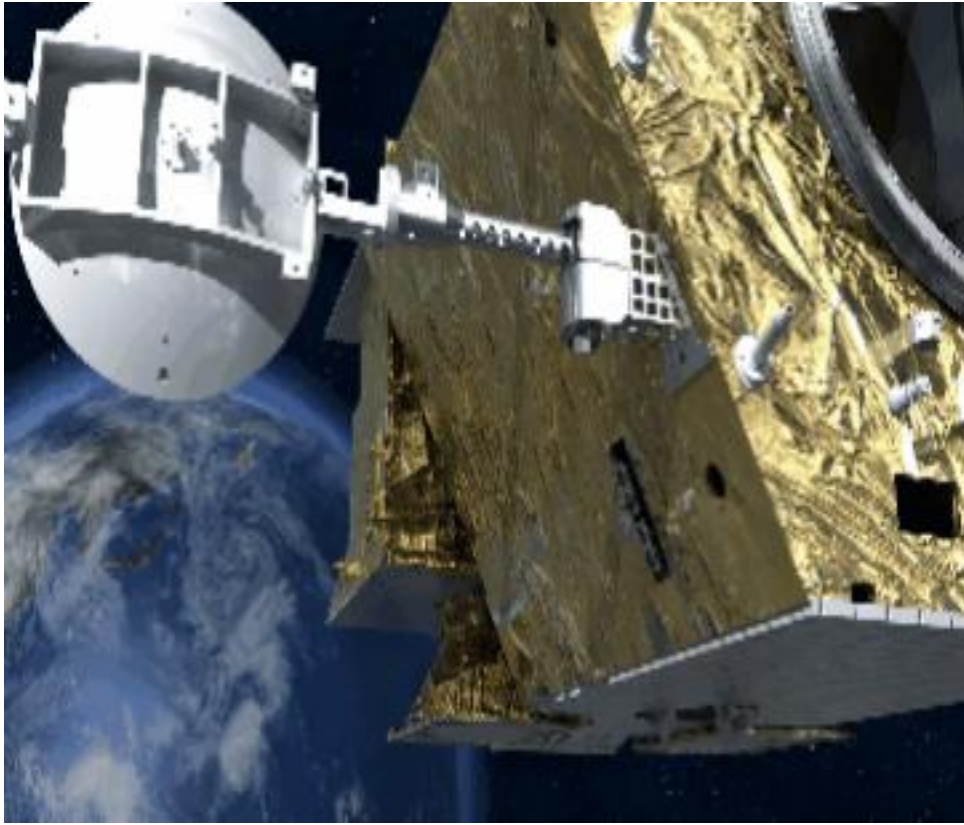


Second Generation

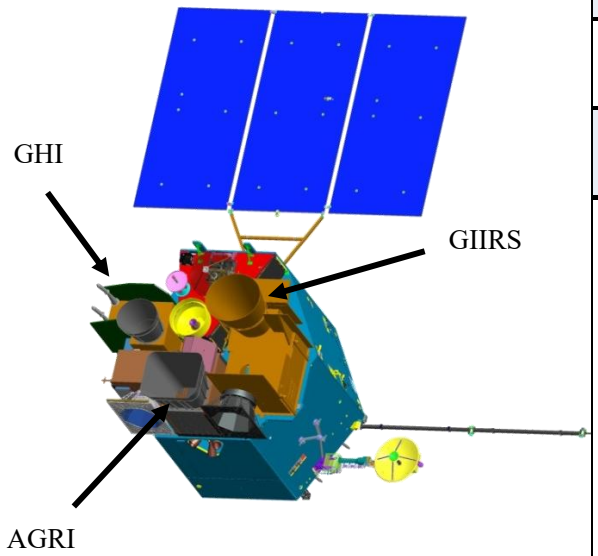
FY-4A 105E 2016
FY-4B 133E 2022



FY-4B was successfully launched on Jun 3,2021, it was operation over 133 E.

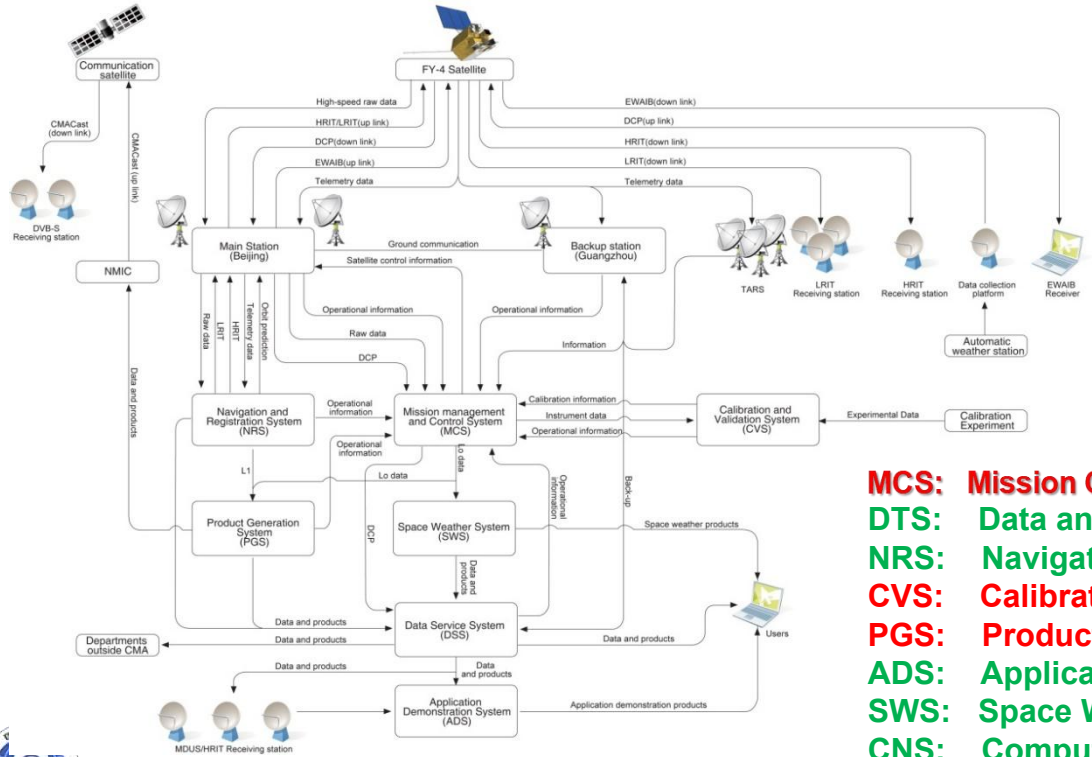


FY-4 Space Segment Overview

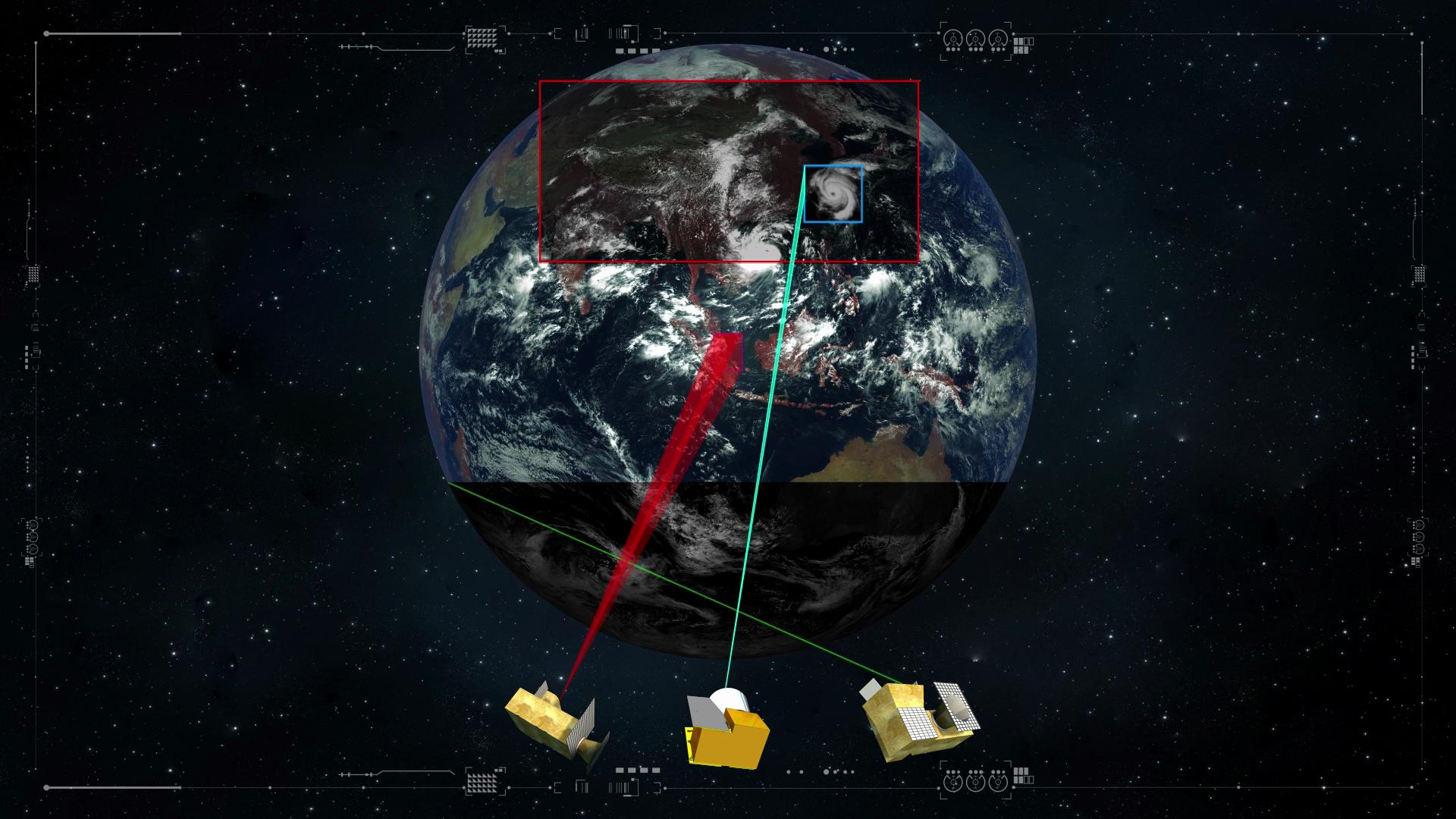


	FY-4A(EXP)	FY-4B(OP)
Stabilization	Three-axis	Three-axis
Designed Life	5~7 Years	7-10 Years
Observation efficiency	85%	85%
Observation Mode	Imaging +Sounding + Lightning Mapping	Imaging +Sounding
Main Instruments	**AGRI :14 channels** SSP Resolution：0.5~4Km Global imaging：15min Flexible imaging ： 2D	**AGRI :15 channels** SSP Resolution：0.5~4Km Global imaging：15min Flexible imaging ： 2D
	GIIRS: SSP Resolution:16Km Spectral Resolution: 0.625cm-1	**GIIRS:** SSP Resolution:12Km Spectral Resolution: 0.625cm-1
	LMI： SSP Resolution:7.8Km	**GHI：7 channels** SSP Resolution0.25-2Km
	SEP High energy particles	**SEP** High energy particles Magnetic field

FY-4 Ground Segment Overview

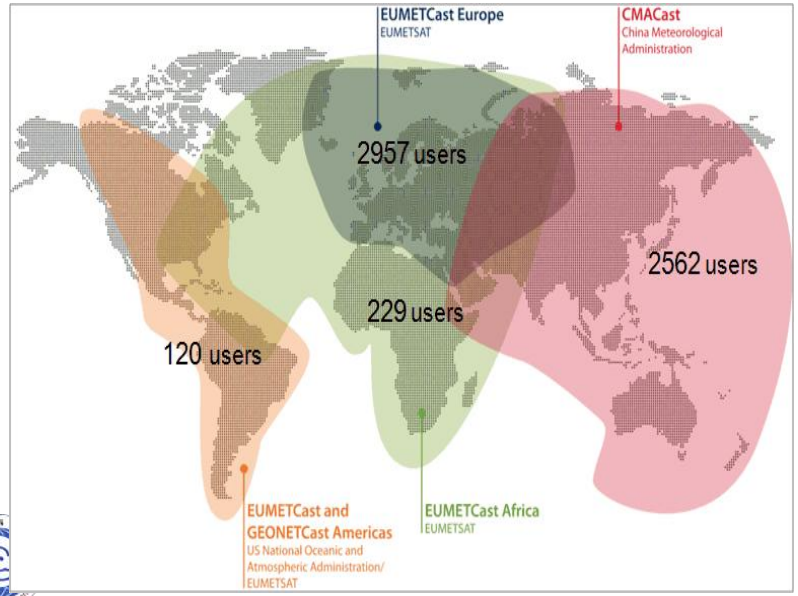


MCS: Mission Control System
DTS: Data and Telemetry System
NRS: Navigation and Registration System
CVS: Calibration and Validation System
PGS: Product Generation System
ADS: Application Demonstration System
SWS: Space Weather System
CNS: Computer and Network System
DSS: Data Distribution and Service System



CMACast in service

- Domestic users
  - Local weather stations, forestry, agriculture, aviation,, hydrology…
- International users
  - Laos(老挝), Iran, Bengal孟加拉（）, Indonesia, Maldives（马尔代夫）, Nepal, Mongolia（蒙古）, Malaysia, Pakistan, Thailand, Philippines, Uzbekistan, Kyrgyzstan, Sri Lanka, Korea, Vietnam, Myanmar（缅甸）, Australia, Kazakhstan…



FY-2/4 Direct DB in service

Outline

- Current status
- Observation Capabilities
- Rapid response by case
- Service
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FY-2/4 Capabilities: Imaging

	FY-2 F/G/H VISSR			FY-4A AGRI			
Channel	Band	Spatial Resolution	Sensitivity	Band	Spatial Resolution	Sensitivity	Main Application
Visible & Near-Infrared				0.45～0.49	1	S/N≥90 (ρ=100%)	Aerosol
	0.55～0.75	1.25	2.3 @ρ=1%	0.55～0.75	0.5～1	S/N≥200 (ρ=100%)	Fog, Clound
				0.75～0.90	1	S/N≥5(ρ=1%)@0.5Km	Vegetation
Short-wave Infrared				1.36～1.39	2	S/N≥200 (ρ=100%)	Cirrus
				1.58～1.64	2	S/N≥200 (ρ=100%)	Cloud,Snow
				2.1～2.35	2～4		Cirrus,Aerosol
Mid-wave Infrared				3.5～4.0(High)	2	NEΔT≤0.7K(300K)	Fire
	3.5～4.0	5	0.22K@300K	3.5～4.0(Low) *	4	NEΔT≤0.2K(300K)	Land surface
Water Vapor				5.8～6.7	4	NEΔT≤0.3K(260K)	WV
	6.3～7.6	5	0.30K@260K	6.9～7.3	4	NEΔT≤0.3K(260K)	WV
Long-wave Infrared				8.0～9.0*	4	NEΔT≤0.2K(300K)	WV,Cloud
	10.3～11.3	5	0.12K@300K	10.3～11.3*	4	NEΔT≤0.2K(300K)	SST
	11.5～12.5	5	0.16K@300K	11.5～12.5*	4	NEΔT≤0.2K(300K)	SST
				13.2～13.8*	4	NEΔT≤0.5K(300K)	CTH

Evolution of FY-4 AGRI imager:

◆More Channels FY-4A(14), FY-4B(15),FY-4C(18）

◆Spatial resolution 2km (FY-4C)

◆Full disk observation time 5min(FY-4C)

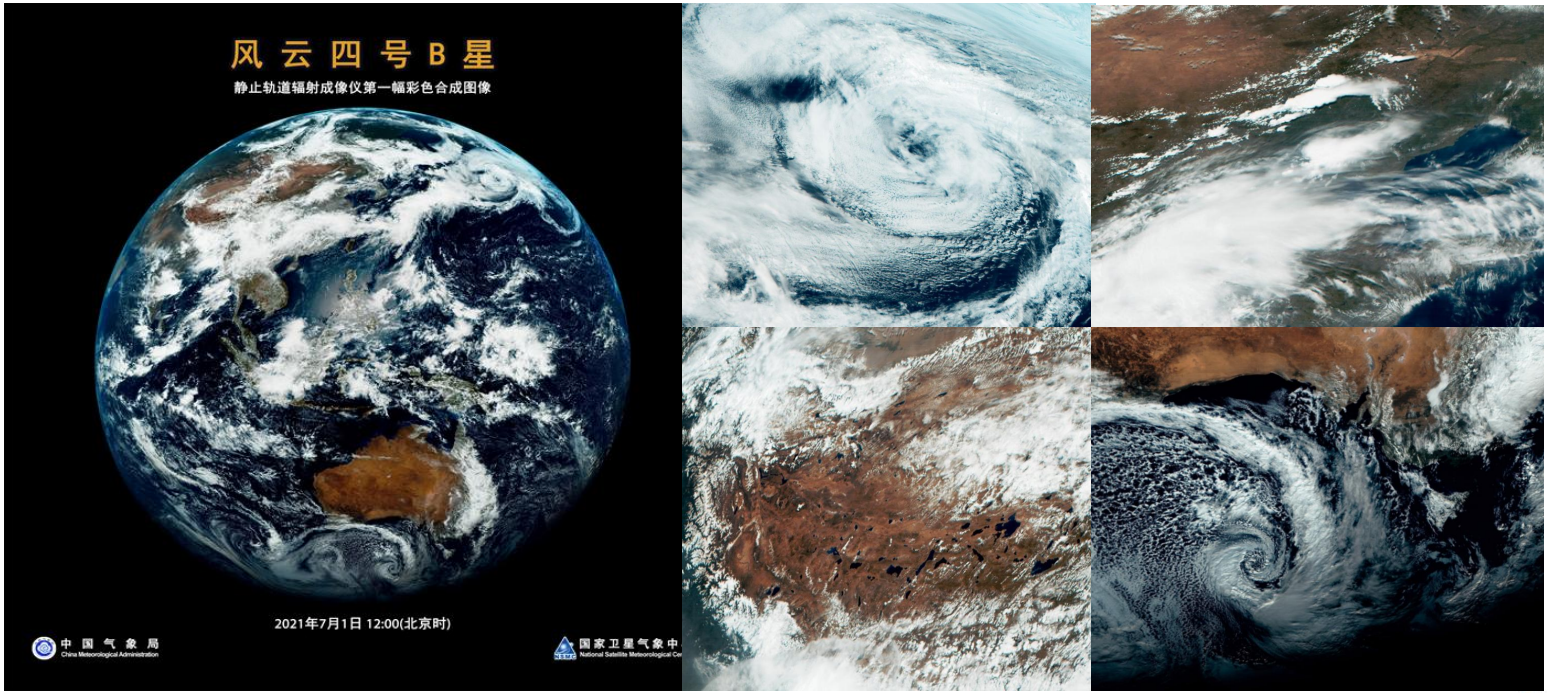
			FY-4		
序号	GOES-R	MTG	Channel	Resolution	SNR/NEDT
12	6.185±0.415	6.3±0.20	5.8-6.7	4km	0.2k@300k
13	6.95±0.2		6.75-7.15	4km	0.25k@300k
14	7.34±0.1	7.35±0.25	7.24-7.6		
15	8.5±0.2	8.7±0.15	8.4-9.0	4km	0.2k@300k
16	9.61±0.19	9.66±0.15	9.42-9.80		

1. 7.34μm→low level watervapor,SO2
2. 9.61μm→high level information ,O3
3. 0.525μm、0.65μm→true color

通道	空间分辨率	
	FY-4(B)	(C)
0.47±0.02	1km	0.5km
0.525±0.02		0.5km
0.65±0.1	0.5-1	0.5km
0.65±0.02	0.5~1	0.5km
0.825±0.075	1km	1km
1.375±0.015	2km	1km
1.61±0.03	2km	1km
2.225±0.125	2~4	1km
3.725±0.025H	2km	1km
3.725±0.025L	4km	2km
6.25±0.45	4km	2km
7.1±0.2**	4km	2km
8.5±0.5	4km	2km
9.61±0.19*		2km
10.8±0.5	4km	2km
12.0±0.5	4km	2km
13.5±0.3	4km	4km

First image of FY-4B AGRI

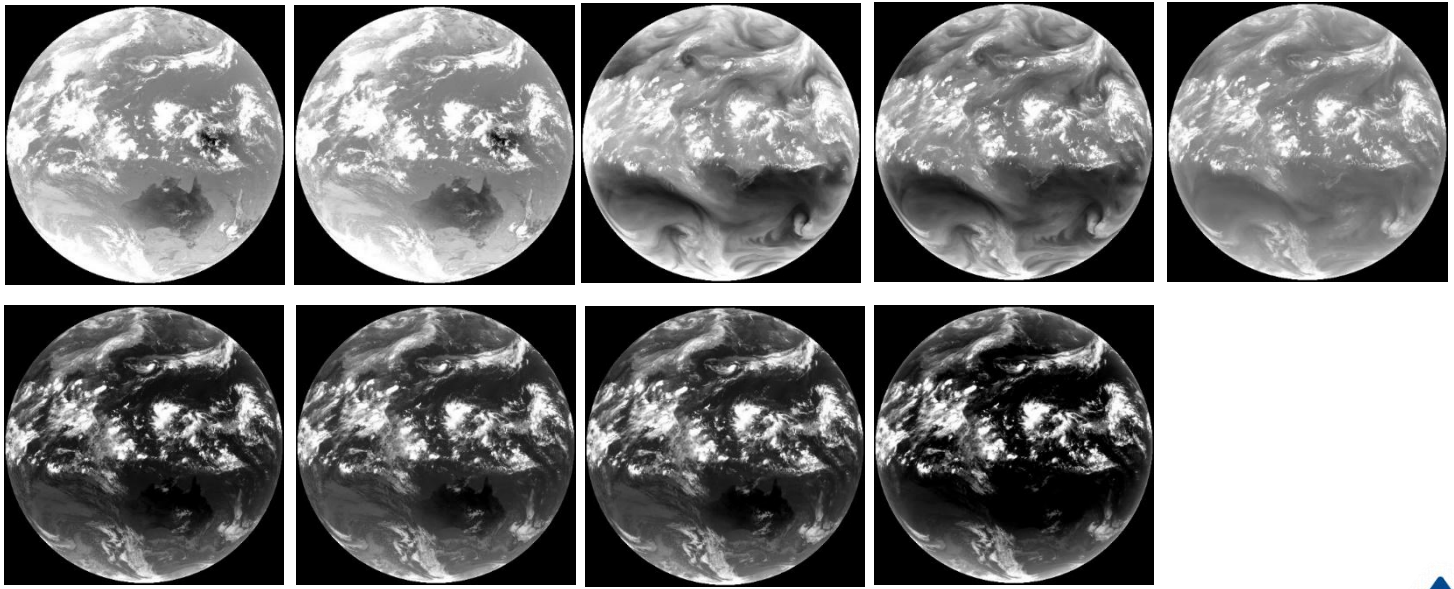
Advanced Geostationary Radiation Imager(AGRI)



First image of FY-4B AGRI

Advanced Geostationary Radiation Imager(AGRI)

All of the FY-4B AGRI IR



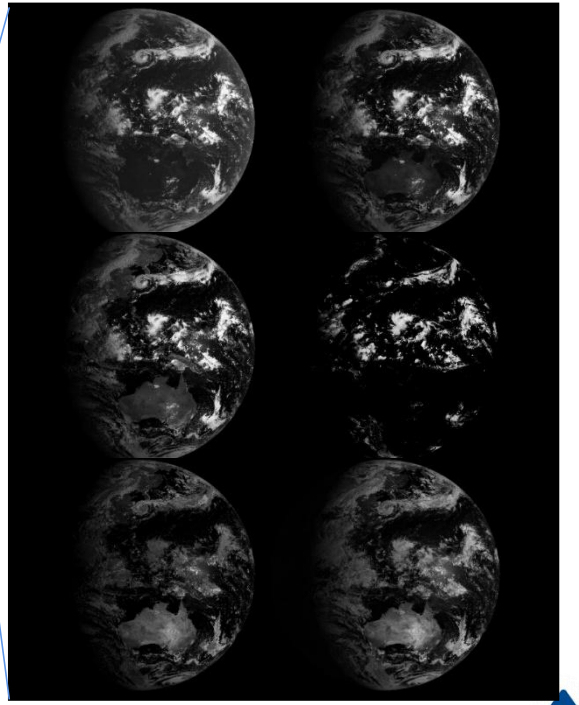
FengYun-4B . imaging capability:AGRI

Advanced Geostationary Radiation Imager(AGRI)

Central wavelength	Spectral interval	SNR or NEΔT @ specified input	IFOV at s.s.p.
0.47 μm	0.45-0.49 μm	≥90 @ 100% albedo	1 km
0.65 μm	0.55-0.75 μm	≥150 @ 100% albedo	0.5 km
0.825 μm	0.75-0.90 μm	≥200 @ 100% albedo or ≥3 @ 1% albedo	1 km
1.378 μm	1.371~1.386 μm	≥120 @ 100% albedo or ≥2 @ 1% albedo	2 km
1.61 μm	1.58-1.64 μm	≥200 @ 100% albedo or ≥3 @ 1% albedo	2 km
2.25 μm	2.10-2.35 μm	≥200 @ 100% albedo or ≥2 @ 1% albedo	2 km
3.75 μm (high)	3.50-4.00 μm	≤ 0.7 K @ 315 K	2 km
3.75 μm (low)	3.50-4.00 μm	0.2 K @ 300 K or 2.0 K @ 240 K	4 km
6.25 μm	5.80-6.70 μm	0.2 K @ 300 K or 0.9 K @ 240 K	4 km
6.95 μm	6.75-7.15 μm	0.25 K @ 300 K or 0.9 K @ 240 K	4 km
7.92 μm	7.24-7.60 μm	0.25 K @ 300 K or 0.9 K @ 240 K	4 km
8.55 μm	8.30-8.80 μm	0.2 K @ 300 K or 0.4 K @ 240 K	4 km
10.80 μm	10.30-11.30 μm	0.2 K @ 300 K or 0.4 K @ 240 K	4 km

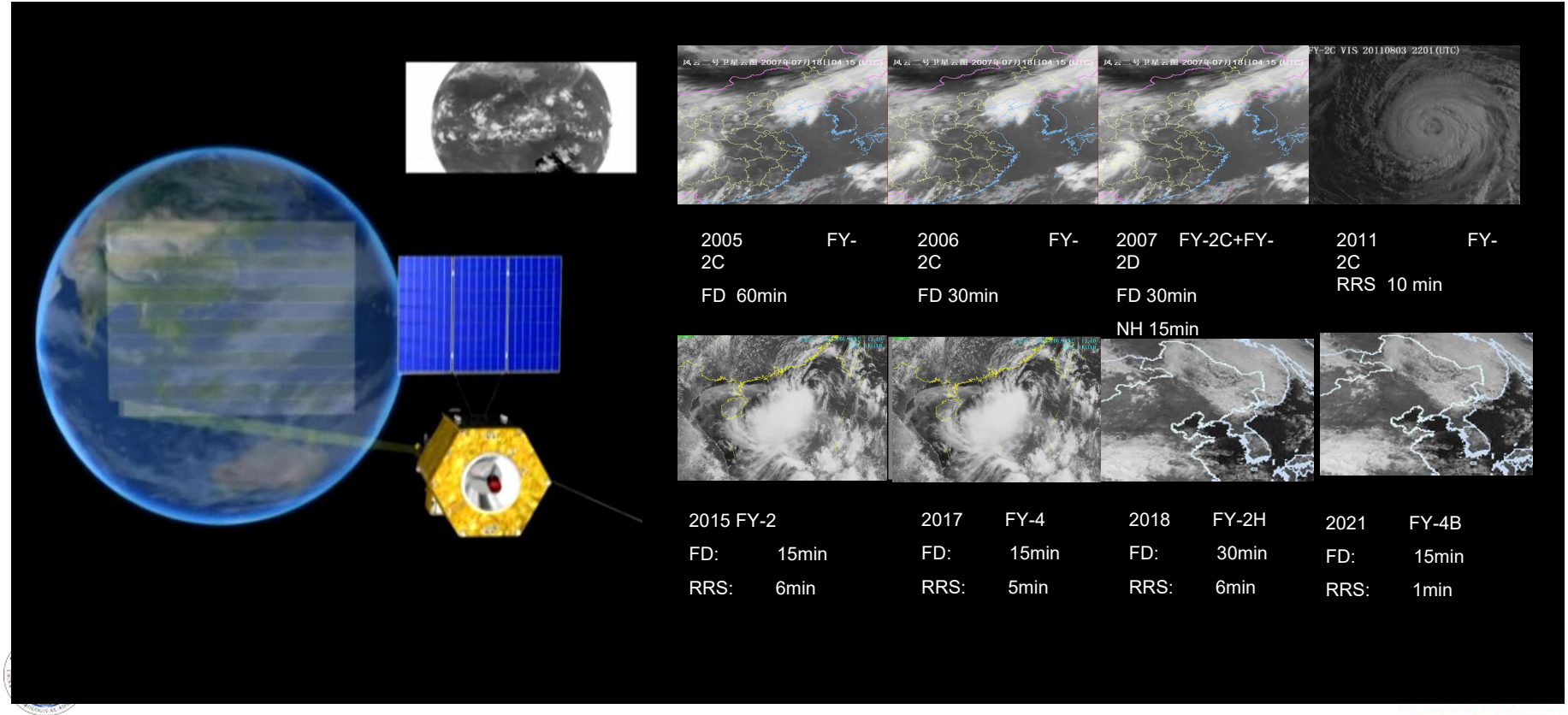
new

Better NEDT



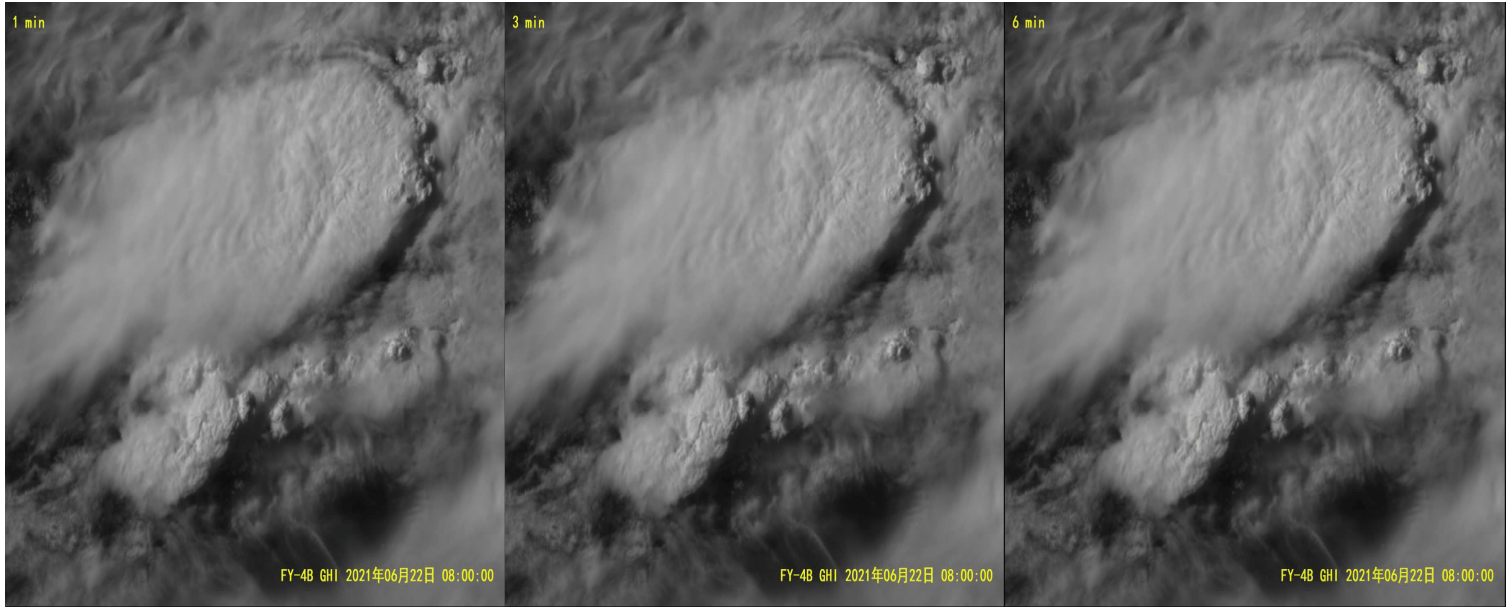
NSMC NCSW

Evolution of FY-2/4 imager:



FengYun-4B . imaging capability:GHI

Geosynchronous High-speed Imager (GHI)

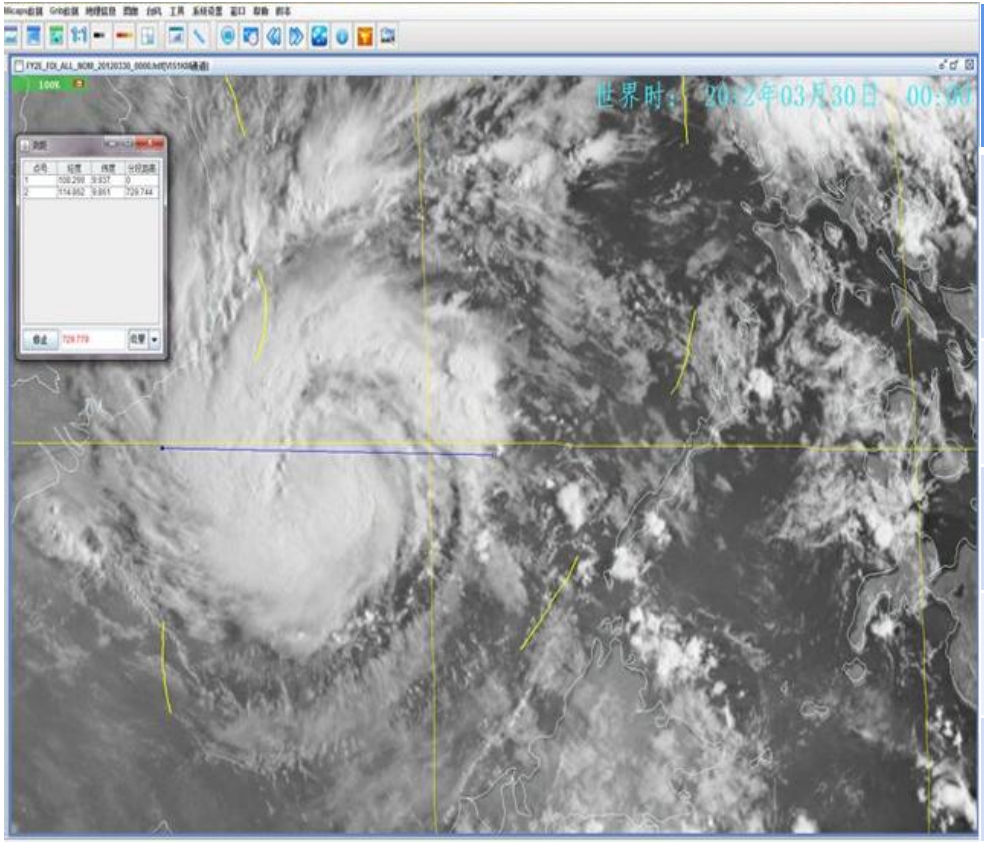


1min

3min

6min

FY-4B High speed imager (GHI)

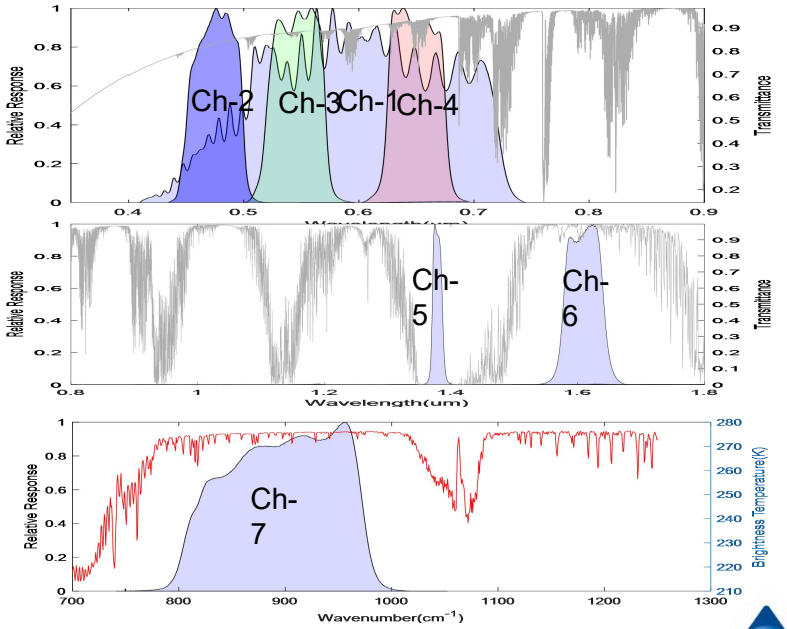


ID		Temporal	spatial	NEDT
1	Visible band	2000km × 2000km <1min	0.25km	SNR>4@ρ=1 %
2	1. 58-1. 64		0.5km	300@ρ=100 %
3	2. 1-2. 35		0.5km	300@ρ=100 %
4	6. 3-7. 60		1km	0. 2K@300K
5	10. 3-11. 3		2km	0. 2K@300K

FengYun-4B . imaging capability:GHI

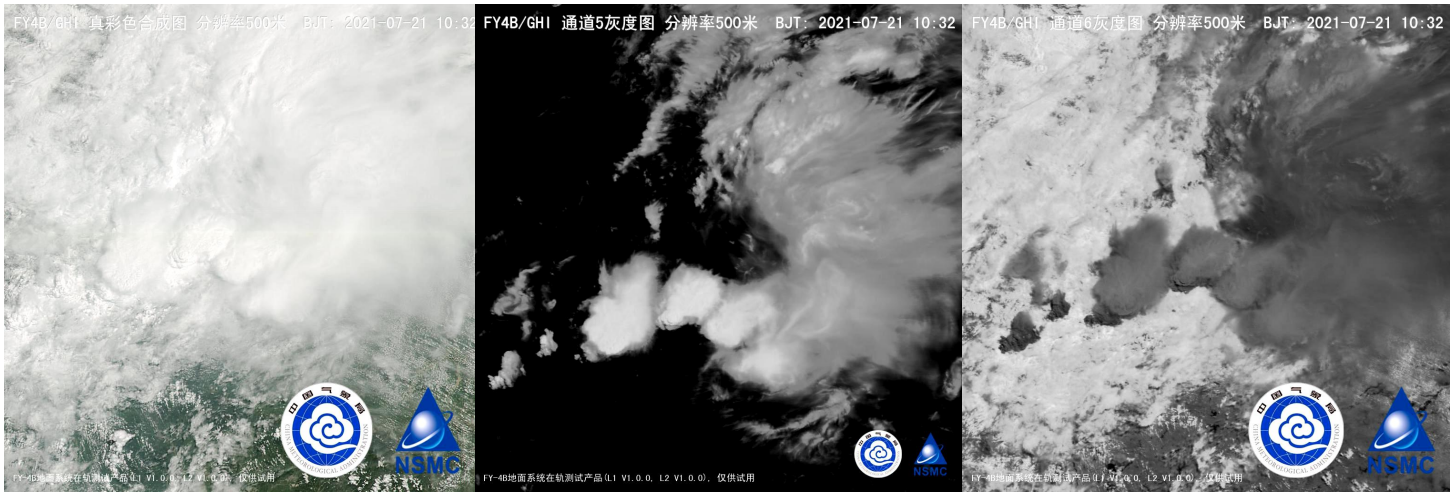
Geosynchronous High-speed Imager (GHI)

Central wavelength	Spectral interval	SNR or NEΔT @ specified input	IFOV at s.s.p.
0.675 μm	0.45-0.9	> 300 @ 100 % albedo	0.25 km
0.470 μm	0.445-0.495	> 300 @ 100 % albedo	0.5 km
0.545 μm	0.52-0.57	> 300 @ 100 % albedo	0.5 km
0.645 μm	0.62-0.67	> 300 @ 100 % albedo	0.5 km
1.378 μm	1.371-1.386	> 300 @ 100 % albedo	0.5 km
1.61 μm	1.58-1.64	> 300 @ 100 % albedo	0.5 km
11.4 μm	10.3-12.5	0.2 K @ 300 K	2.0 km



FengYun-4B . imaging capability: GHI

Geosynchronous High-speed Imager (GHI) Jul 21,2021 Henan China



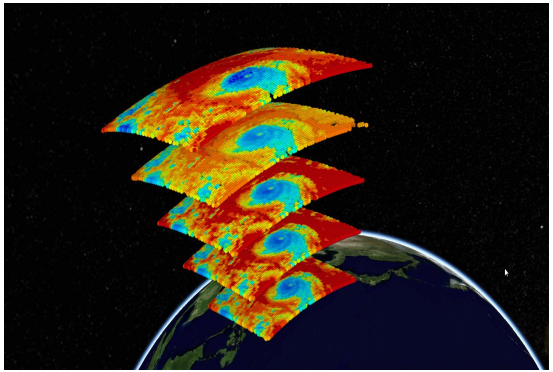
True Color
ice/water cloud

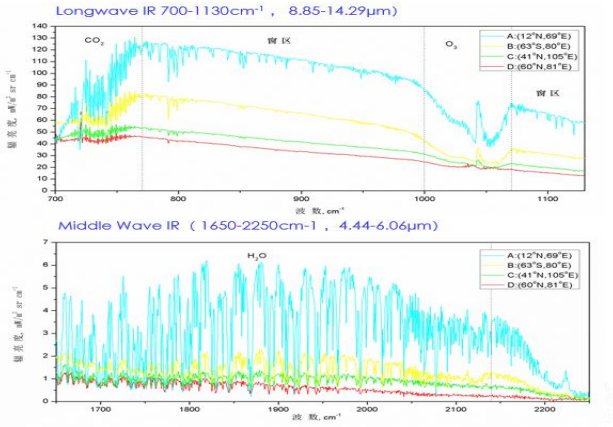
Ch-5 cirrus channel

Ch-6

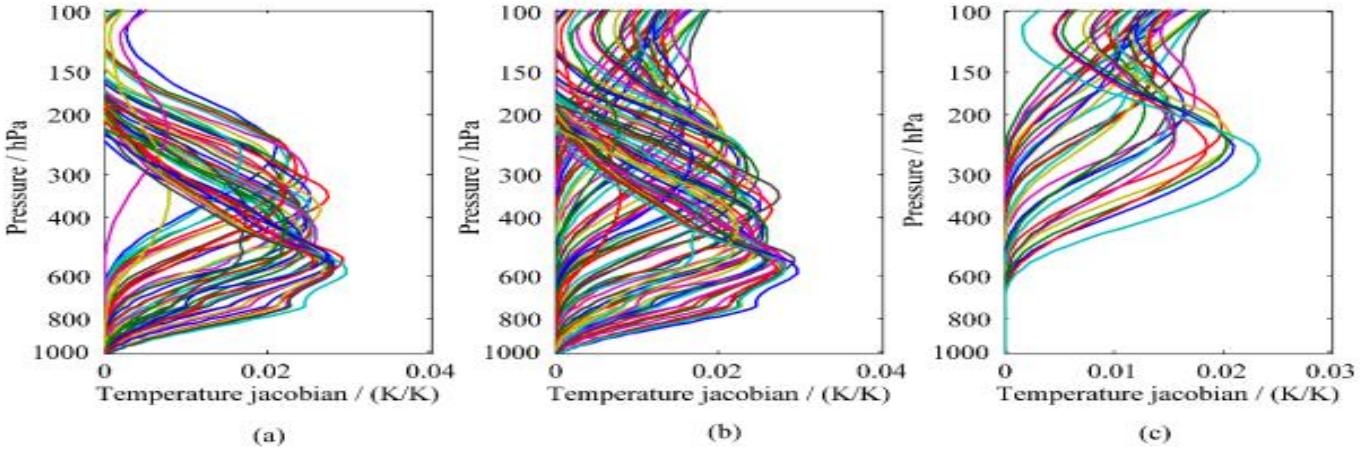
FY-4 Capabilities : Hyperspectral Sounding

	FY-4A GIIRS	FY-4B GIIRS	FY-4C GIIRS
Spectral range (cm^{-1})	700 – 1130	680 – 1130	650 – 1130
	1650 –2250	1650 –2250	1650 –2250
Spectral resolution (cm^{-1})	0.625	0.625	0.625
	0.625	0.625	0.625
Sensitivity@280K (K)	0.4-0.8	0.4	0.2
	0.8-1.2	0.8	0.1
Spatial resolution (Km)	16	12-16	8
Temporal resolution (min)	90Min (5000X5000Km)	90Min (5000X5000Km)	45 Min (5000X5000Km)
Planned Launch	2016	2021	2025
Status	R&D	Op.	Op.





FY-4 Capabilities : Hyperspectral Sounding

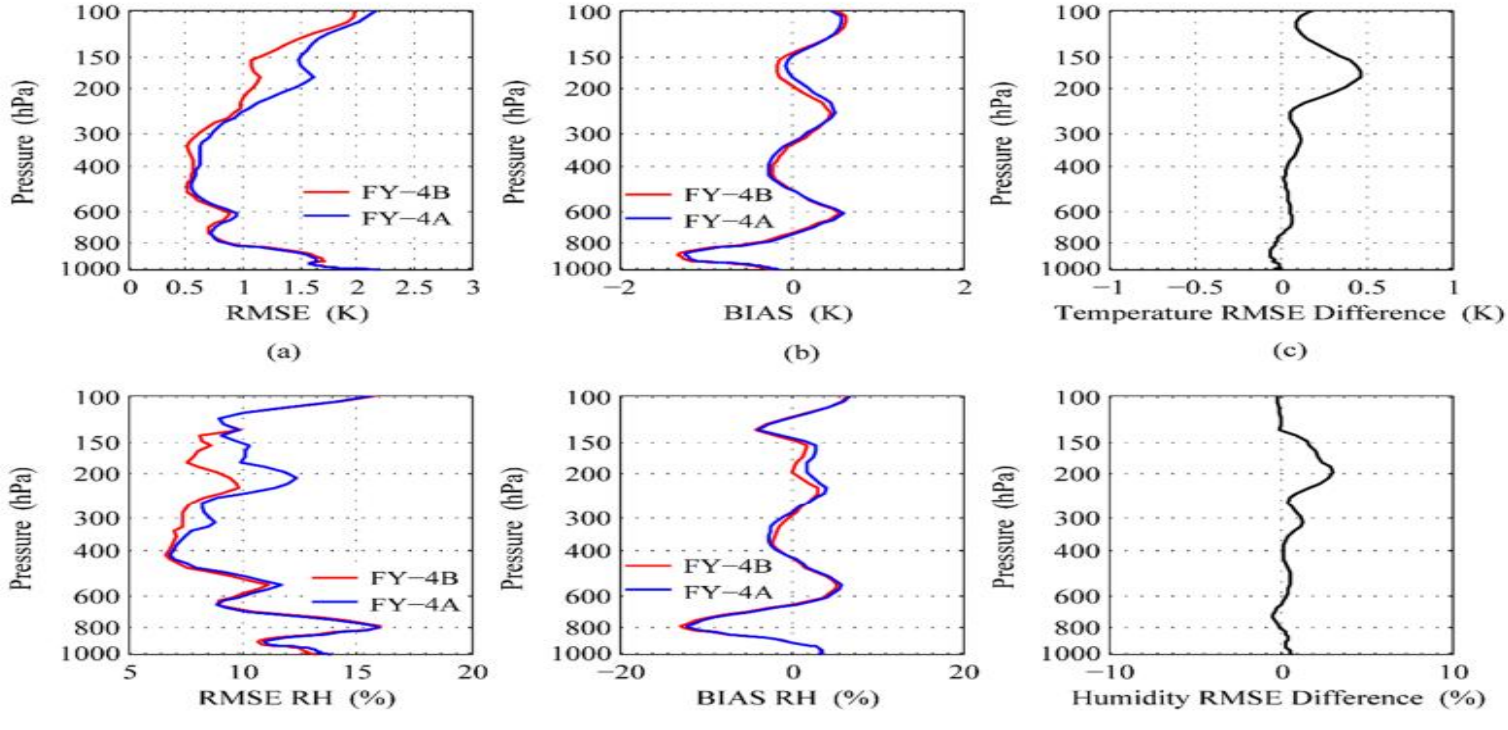


Parameters	FY-4A (R&D)				FY-4B (Operational)			
		Spectral range (cm^{-1})	Resolution	Channels		Spectral range (cm^{-1})	Resolution	Channels
Spectral Parameters (Normal mode)	LWIR	700–1130	0.625	689	LWIR	680–1130	0.625	721
	MWIR	1650–2250	0.625	961	MWIR	1650–2250	0.625	961
	VIS	0.55–0.75 μm	–	1	VIS	0.55–0.75 μm	–	1
Spatial Resolution	LWIR/MWIR VIS		16 km SSP 2 km SSP		LWIR/MWIR VIS		12 km SSP 1 km SSP	
Operational Mode	China area Mesoscale area		5000 × 5000 km^2 1000 × 1000 km^2		China area Mesoscale area		5000 × 5000 km^2 1000 × 1000 km^2	
Temporal Resolution	China area Mesoscale area		60 min <0.5 h		China area Mesoscale area		45 min 15 min	
Sensitivity (mW/m2sr cm^{-1})	LWIR MWIR VIS		0.5–1.1 0.1–0.14 S/N > 200 (ρ = 100%)		LWIR MWIR VIS		<0.5 <0.1 S/N > 200 (ρ = 100%)	
Calibration accuracy (radiation)	1.5 k (3σ)				0.7k (3σ)			
Calibration accuracy (spectrum)	10 ppm (3σ)				<10 ppm (3σ)			
Quantization Bits	13				13			

LWIR = Long Wave Infrared, MWIR = Mid Wave Infrared, VIS = Visible light, SSP = Sub Satellite Position.

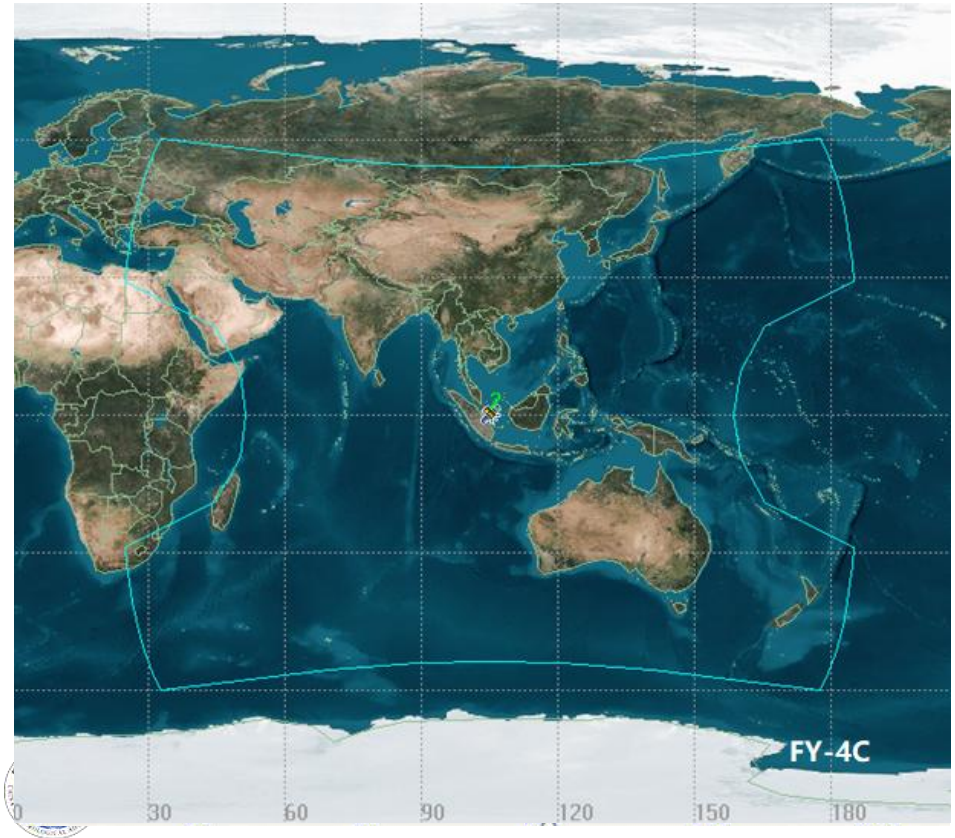
Wang, S.; Lu, F.; Feng, Y. An Investigation of the Fengyun-4A/B GIIRS Performance on Temperature and Humidity Retrievals. Atmosphere 2022, 13, 1830. https://doi.org/ 10.3390/atmos13111830

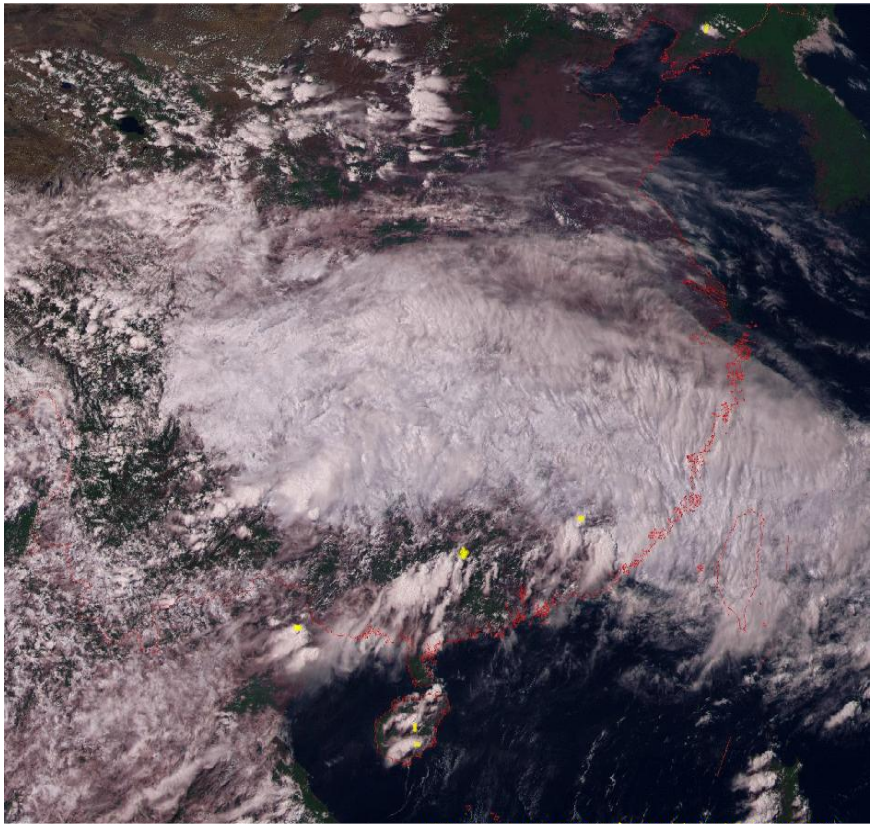
FY-4 Capabilities : Hyperspectral Sounding



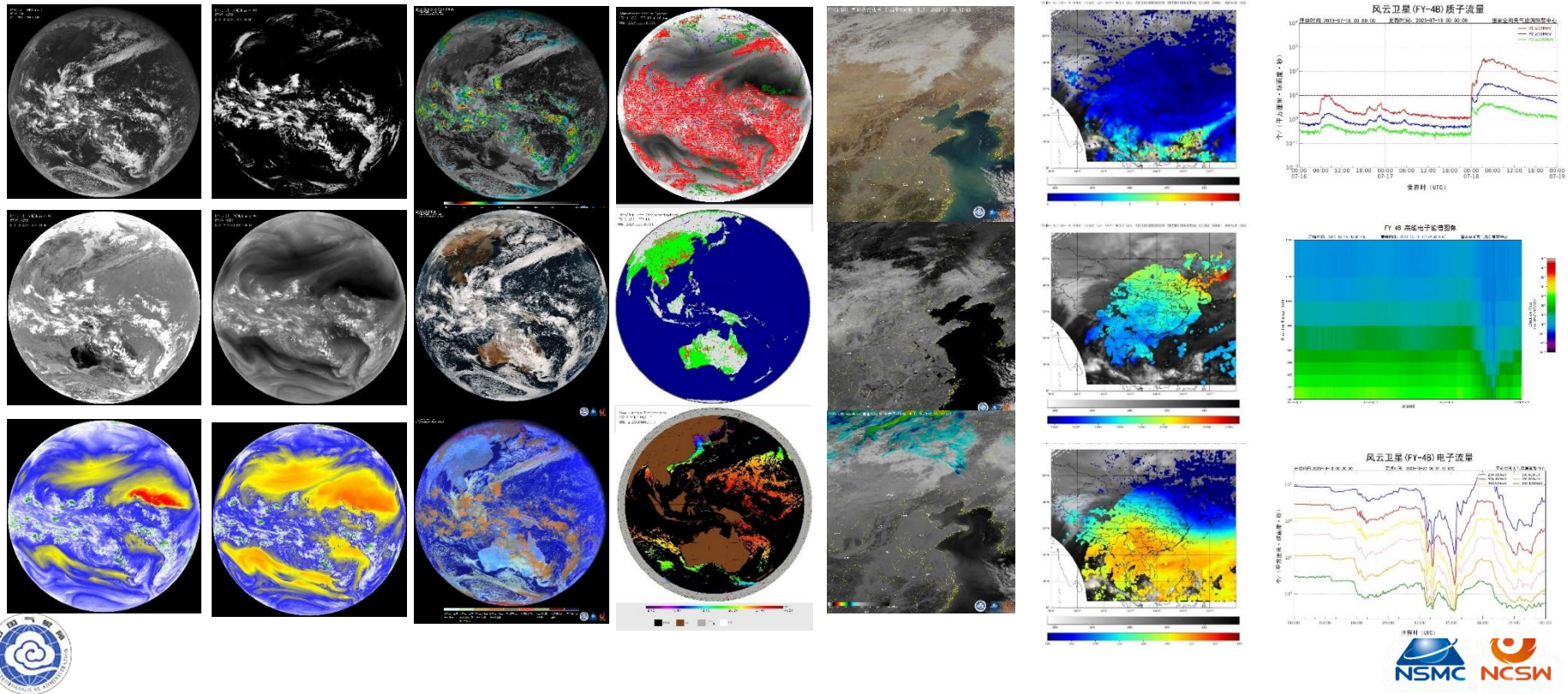
Wang, S.; Lu, F.; Feng, Y. An Investigation of the Fengyun-4A/B GIIRS Performance on Temperature and Humidity Retrievals. Atmosphere 2022, 13, 1830. https://doi.org/10.3390/atmos13111830

FY-4 Capabilities: Lightning Imaging

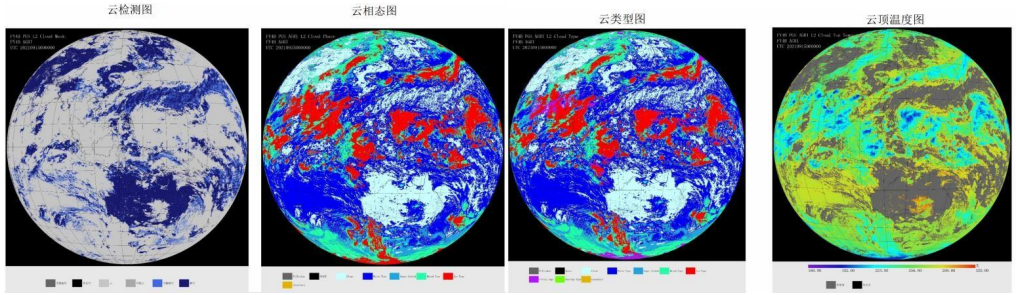


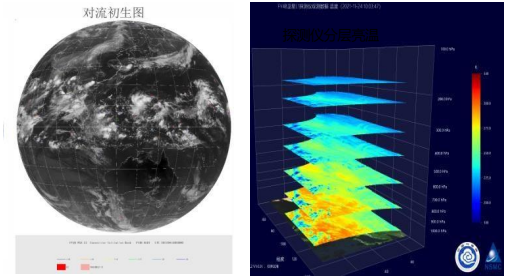


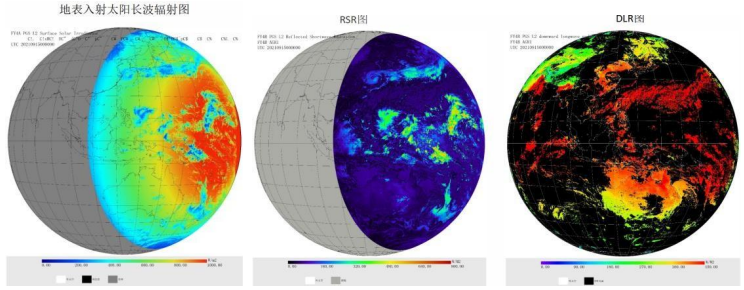
82 products and 70 images

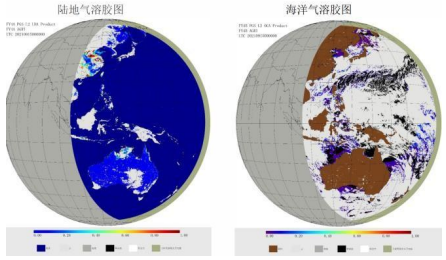


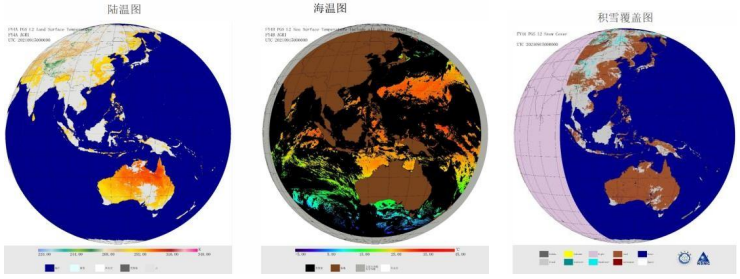
L2 products:37　　Image products :18

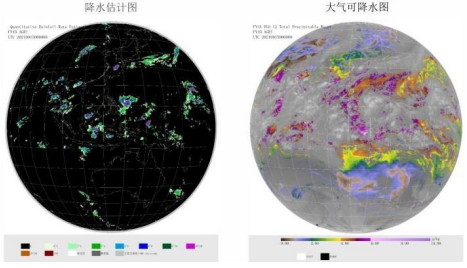


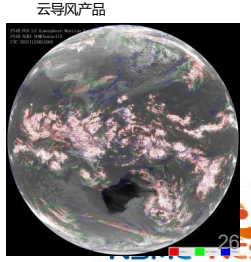












FY-2/4 L1 Products

satellite.nsmc.org.cn/portalsite/Data/DataView.aspx?currentculture=en-US

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FENGYUN Satellite Data Center

National Satellite Meteorological Center
(National Center for Space Weather)

SATELLITES | DATA | IMAGES | PRODUCTS | DOCUMENTS | TOOLS

Home >Data >Data View

LEO | TANSAT | GEO

You have select: FY-2H ✖ L1 DATA ✖ FY-2E ✖

Satellite	FY-4B	FY-4A	☑ FY-2H	FY-2G
	FY-2F	☑ FY-2E	FY-2D	FY-2C ⊞
Product	☑ L1 DATA	Image	Atmosphere	Land
	Ocean	Radiation		
Catalog	L1 Data(L1)			

	Product ▲	Satellite	Instrument	Period	Format	Resolution	Start Date	Last Date	File count	Volume(GB)	Availability	Operation	Quality Report
☐	Normalized Geostationary Projection VISSR data	FY2H	VISSR	HHmm	HDF	--	2018-06-05	2023-11-12	88734	7114.57	View	Go	
☐	Compressed full disk VISSR data	FY2H	VISSR	HHmm	CSV	Full Resolution	2018-06-05	2023-11-12	88830	6970.65	View	Go	
☐	Stretched full disk VISSR data	FY2E	VISSR	HHmm	SVS	Full Resolution	2009-02-17	2018-04-21	6149	845.57	View	Go	

satellite.nsmc.org.cn/portalsite/Data/DataView.aspx?currentculture=en-US

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Home >Data >Data View

LEO | TANSAT | GEO

You have select: L1 DATA ✖

Satellite	FY-4B	FY-4A	FY-2H	FY-2G
	FY-2F	FY-2E	FY-2D	FY-2C ⊞
Product	☑ L1 DATA	Image	Atmosphere	Land
	Ocean	Radiation		
Catalog	L1 Data(L1)	Regional Rapid Scan		

	Product ▲	Satellite	Instrument	Period	Format	Resolution	Start Date	Last Date	File count	Volume(GB)	Availability	Operation	Quality Report
☐	AGRI L1 Full Disk, 4KM	FY4B	AGRI	HHmm	HDF	4000M	2022-06-01	2023-11-12	49517	4533.43	View	Go	
☐	GHI L1 Regional, 500M	FY4B	GHI	HHmm	HDF	500M	2022-06-01	2023-11-13	479320	29260.71	View	Go	
☐	AGRI L1 Full Disk, 1KM	FY4B	AGRI	HHmm	HDF	1000M	2022-06-01	2023-11-12	49513	12768.41	View	Go	
☐	GHI L1 Regional, 250M	FY4B	GHI	HHmm	HDF	250M	2022-06-01	2023-11-13	479366	20106.07	View	Go	

FengYun Geo L2 Products

FY-2 C/D/E operational L2 products`	FY-2 F/G/H operational L2 products	FY-4A/B Operational L2 products
Cloud Detection	Cloud Detection	Clear Sky Masks (CLM)
Cloud Classification	Cloud Classification	Cloud Type(CLT)
Total Cloud Amount	Total Cloud Amount	
		Cloud Phase
	Cloud Top Temperature	Cloud Top Temperature
		Cloud Top Height/Pressure
		Fog Detection
Dust Detection	Dust Detection	Dust Detection
		Aerosol Optical Depth
Humidity product	Humidity product	Liquid Profile Water
		Atmospheric temperature profile
		Tropopause folding
		Convective initiation

FengYun Geo L2 Products

FY-2 C/D/E operational L2 products	FY-2 F/G/H operational L2 products	FY-4A/B Operational L2 products
Upper Tropospheric Humidity	Upper Tropospheric Humidity	Atmospheric Correction Image
Precipitation Estimation	Precipitation Estimation	Rainfall Rate(QPE)
	Atmospheric Motion Vector	Atmospheric Motion Vector
		Lightning Detection
Surface Solar Irradiance	Surface Solar Irradiance	Surface Solar Irradiance
Blackbody brightness temperature	Blackbody brightness temperature	
Outgoing Long wave Radiation	Outgoing Long wave Radiation	Outgoing Long wave Radiation
		Downward Long wave Radiation: Surface
		Upward Long wave Radiation: Surface
		Reflected Shortwave Radiation: TOA
	Land Surface Temperature	Land Surface Temperature(LST)
Sea Surface Temperature	Sea Surface Temperature	Sea Surface Temperature (SST)
		Land Surface Emissivity(LSE)
Snow Cover	Snow Cover	
		Fire/Hot Spot Characterization

FY-4A L2 Product details

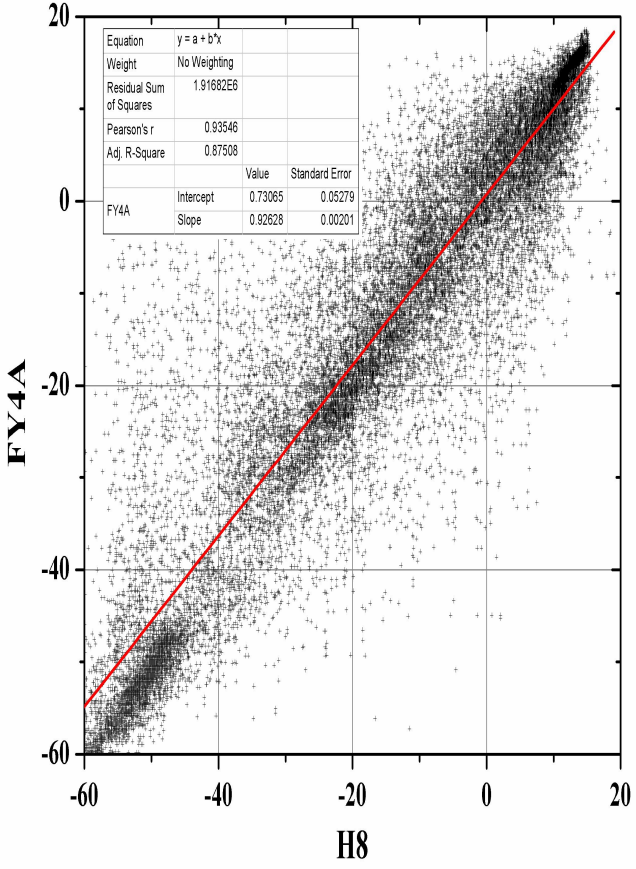
Product	Instrument	Format	Resolution
Atmosphere Instability Index, Disk	GIIRS	NC	16KM
Atmospheric Correction Image	AGRI	NC	1000M
Atmospheric Motion Vector, High Level	AGRI	NC	64KM
Atmospheric Motion Vector, Infrared	AGRI	NC	64KM
Atmospheric Motion Vector, Low Level	AGRI	NC	64KM
Cloud Mask	AGRI	NC	4000M
Cloud Phase	AGRI	NC	4000M
Cloud Top Height	AGRI	NC	4000M
Cloud Top Pressure	AGRI	NC	4000M
Cloud Top Temperature	AGRI	NC	4000M
Cloud Type	AGRI	NC	4000M
Convection Index	AGRI	NC	4000M
Downgoing Longwave Radiation	AGRI	NC	4000M

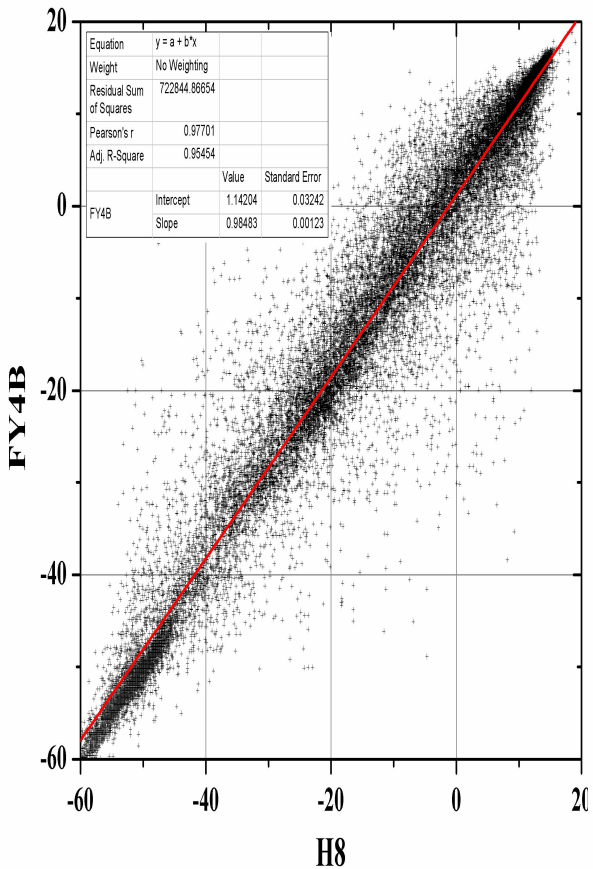
Product	Instrument	Format	Resolution
Fire Hot Spot Detection	AGRI	NC	2000M
Fog Detection, Full Disk	AGRI	NC	4000M
Land Surface Emissivity	AGRI	NC	12KM
Land Surface Temperature	AGRI	NC	4000M
Liquid Percentage Water	AGRI	NC	4000M
Outgoing Longwave Radiation	AGRI	NC	4000M
Quantitative Precipitation Estimation, Northern Hemisphere	AGRI	NC	4000M
Reflective Shortwave Radiation	AGRI	NC	4000M
Sea Surface Temperature	AGRI	NC	4000M
Surface Solar Incidence Radiation	AGRI	NC	4000M
Tropopause Folding	AGRI	NC	4000M
Upgoing Longwave Radiation	AGRI	NC	4000M

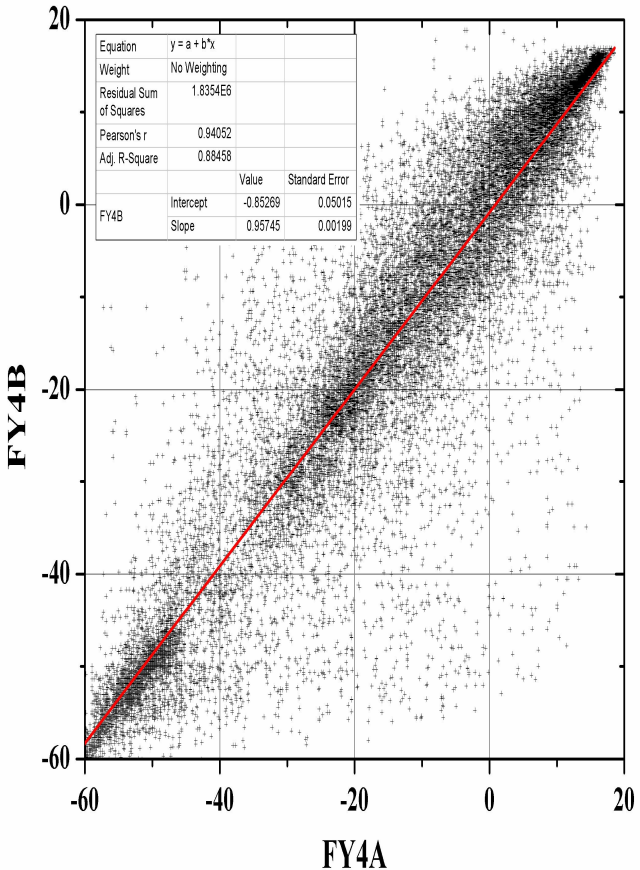
NSMC NCSW

http://satellite.nsmc.org.cn/portalsite/Data/DataView.aspx

CAL/VAL AGRI

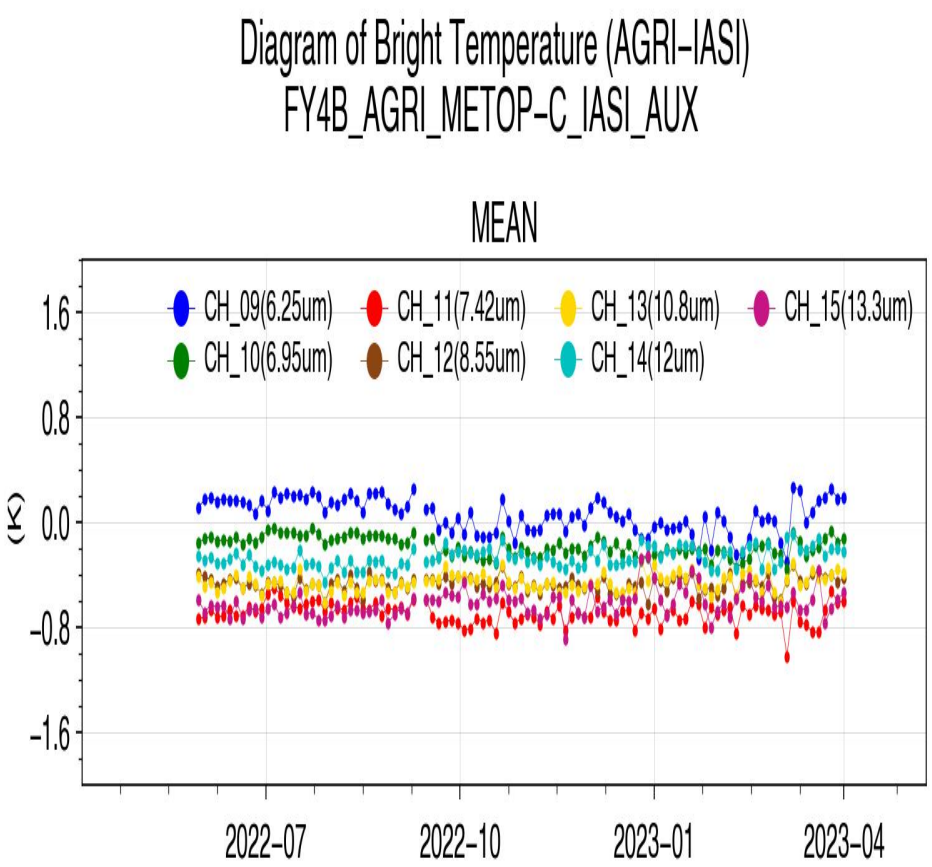


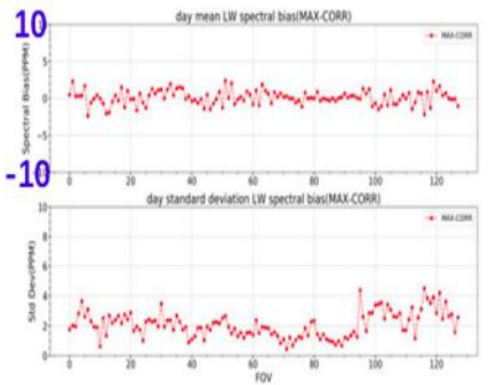


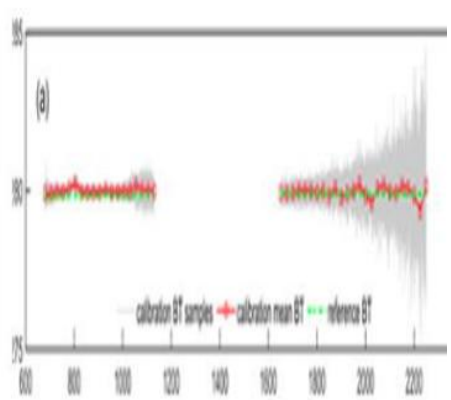


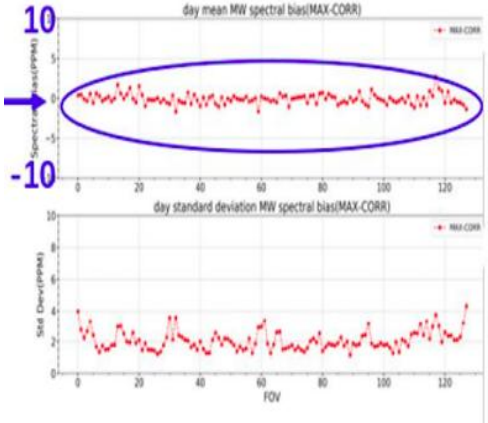
Courtesy Lei Yang, Liaoning meteorological service

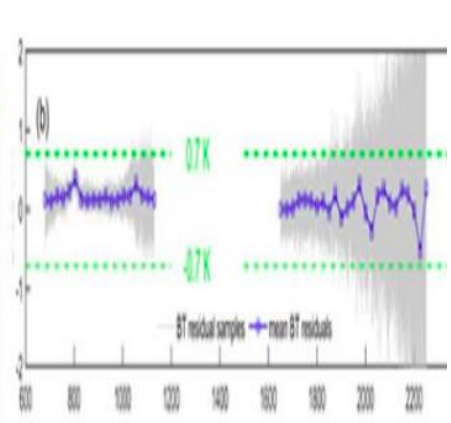
CAL/VAL GIIRS



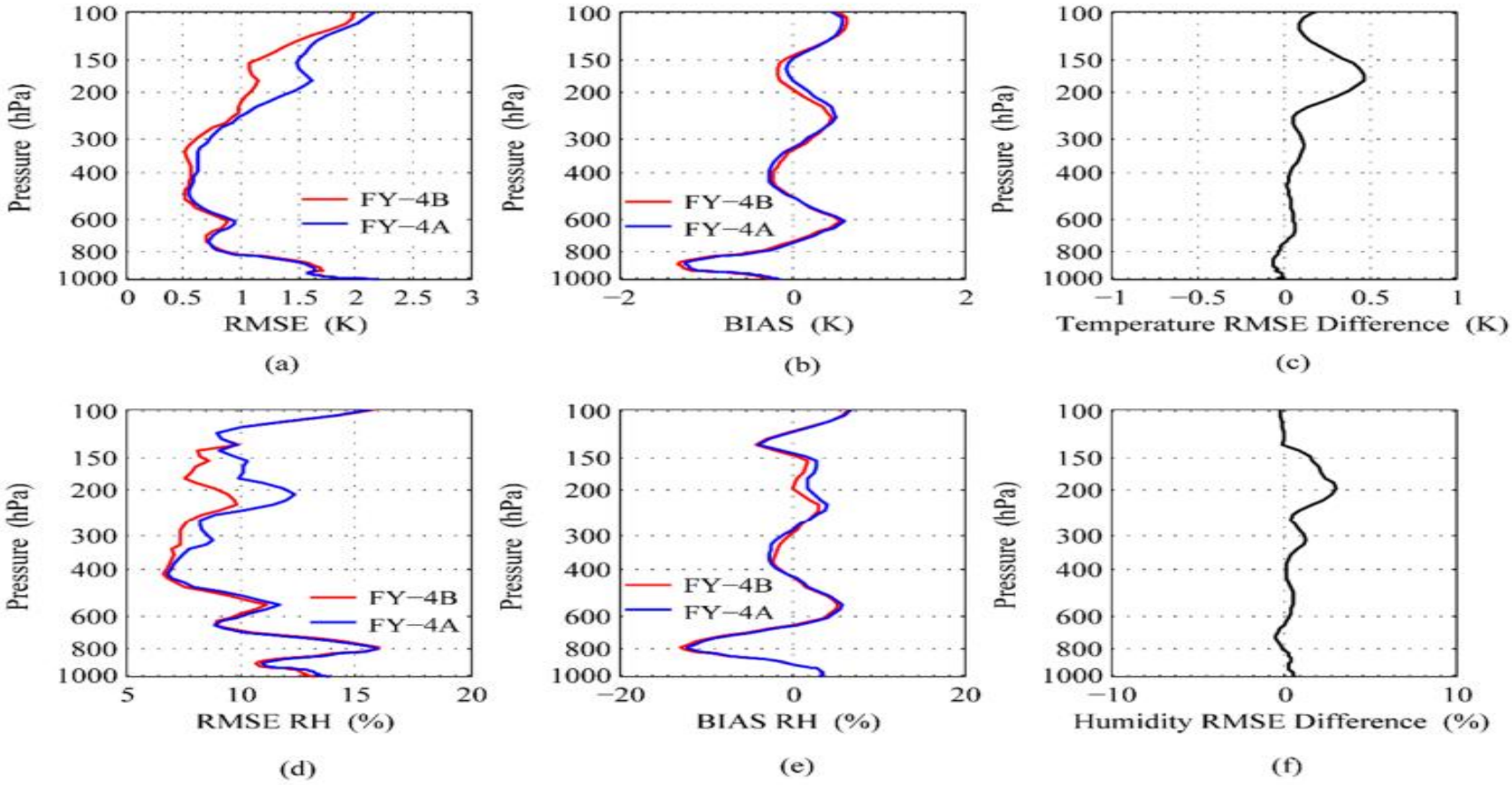








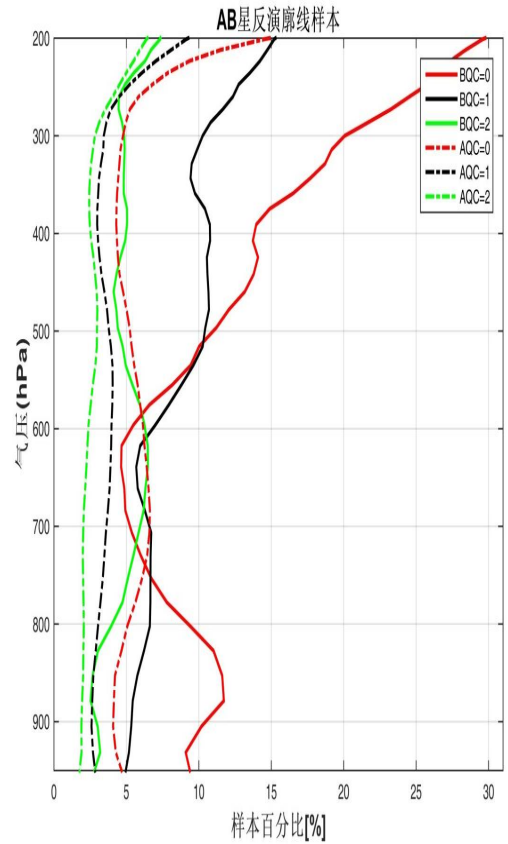
Courtesy Lu Li, NSMC

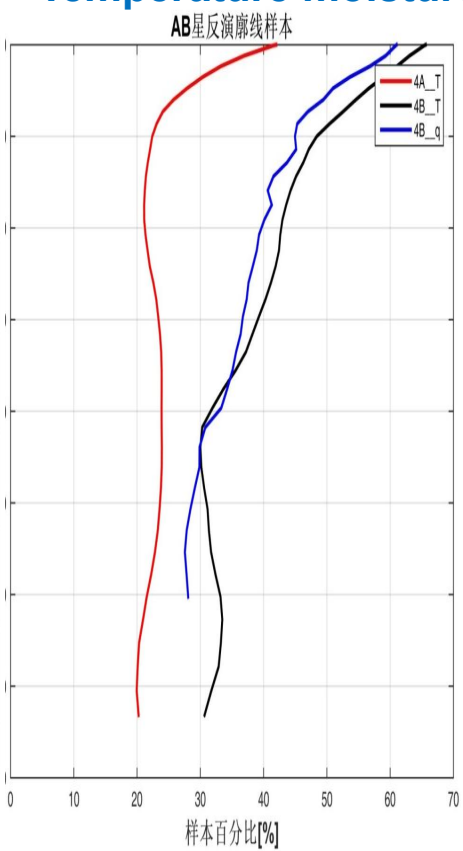


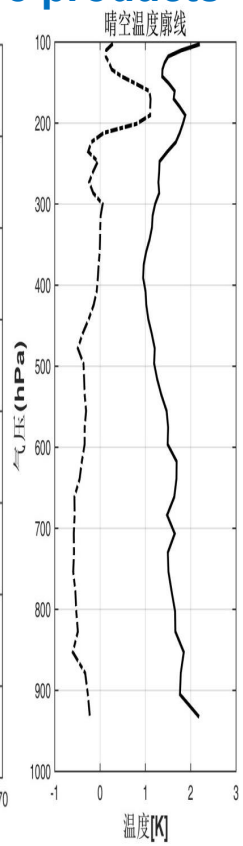
Wang, S.; Lu, F.; Feng, Y. An Investigation of the Fengyun-4A/B GIIRS Performance on Temperature and Humidity Retrievals. Atmosphere 2022, 13, 1830. https://doi.org/ 10.3390/atmos13111830

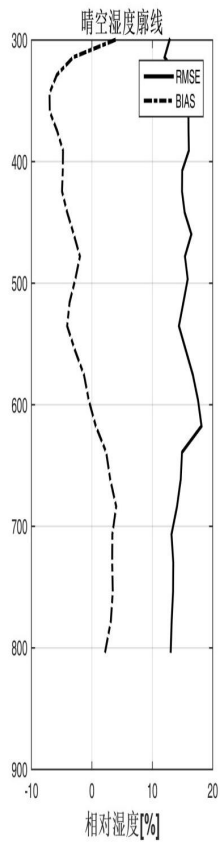
Products Validation

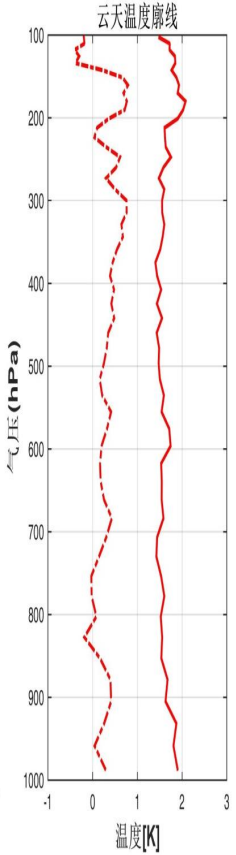
Temperature moisture products

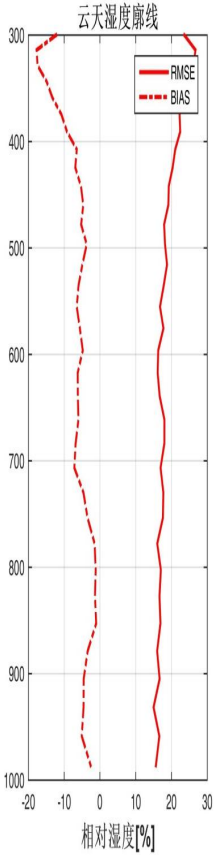










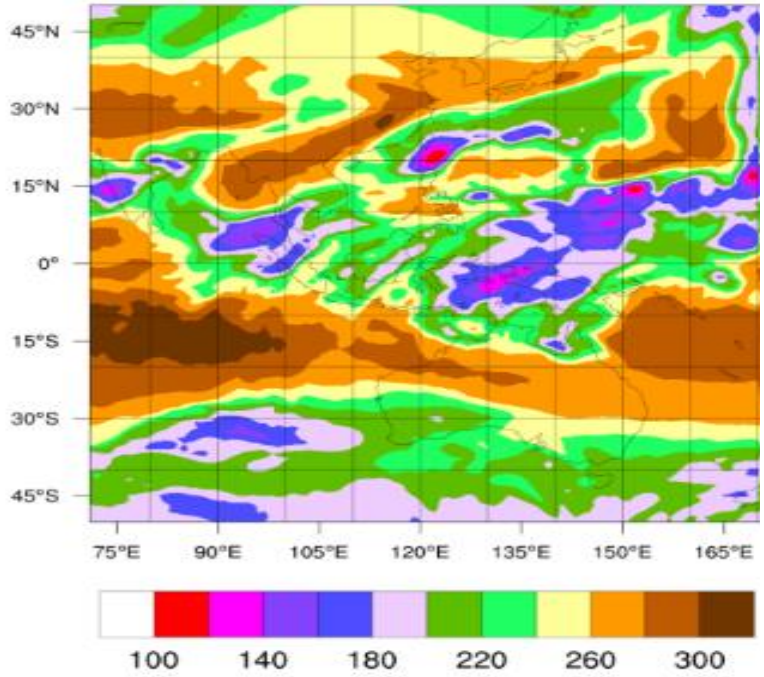


Courtesy Wenguang Bai, NSMC

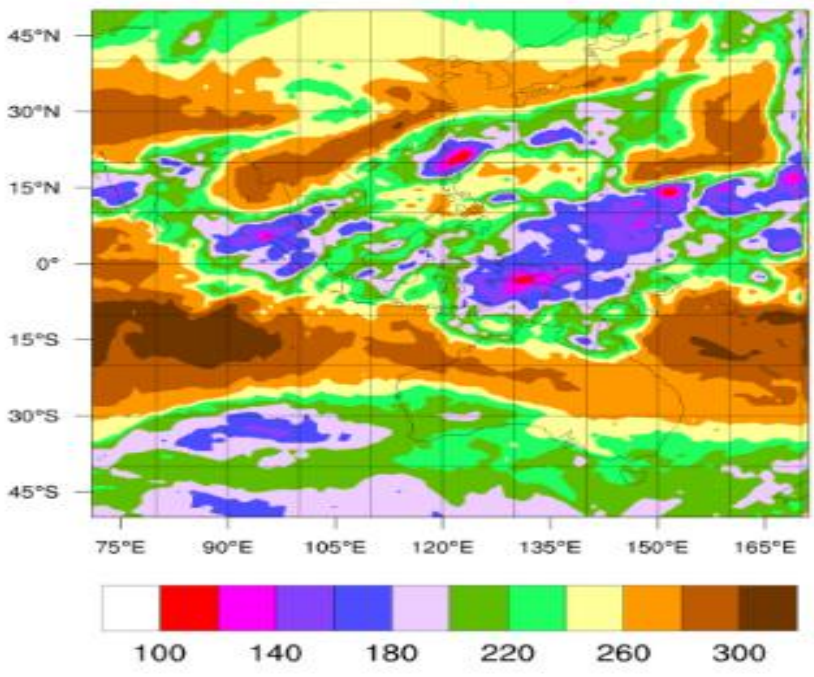
Products Validation: OLR

Bias: -56.508 W/m2 RMSE: 119.661 W/m2

R 0.928

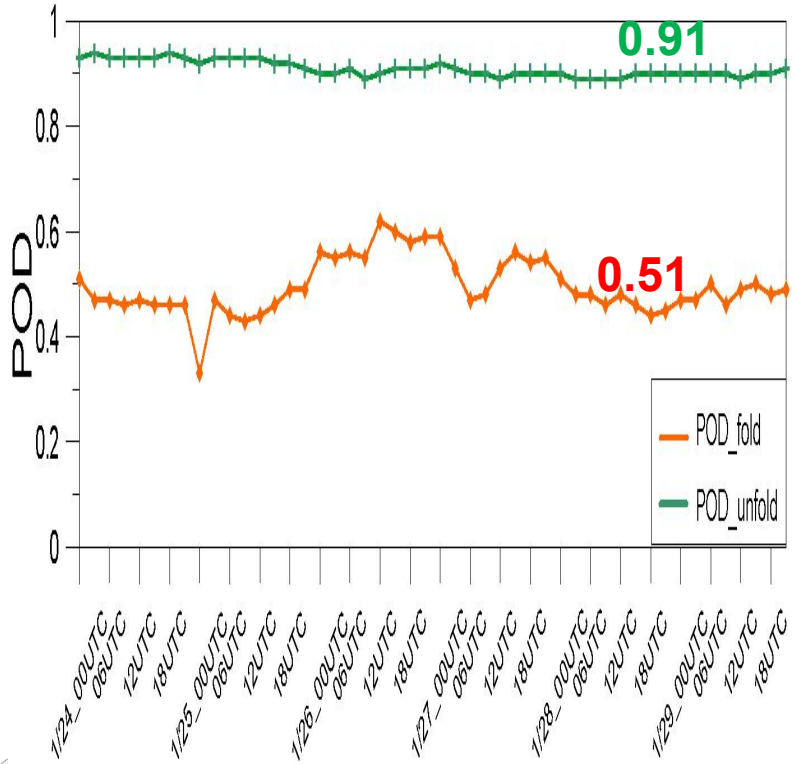


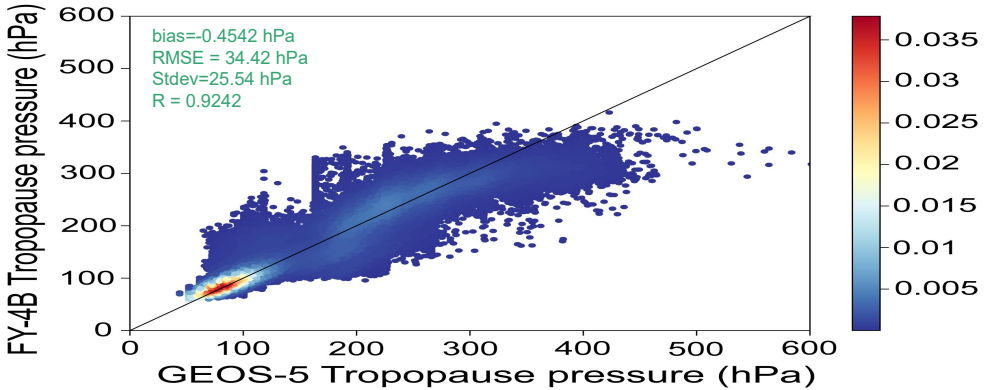
CMA FY-4

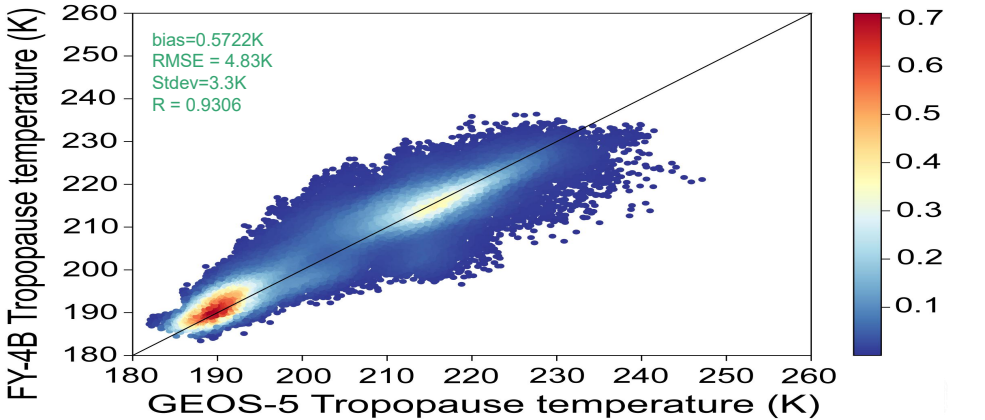


NOAA

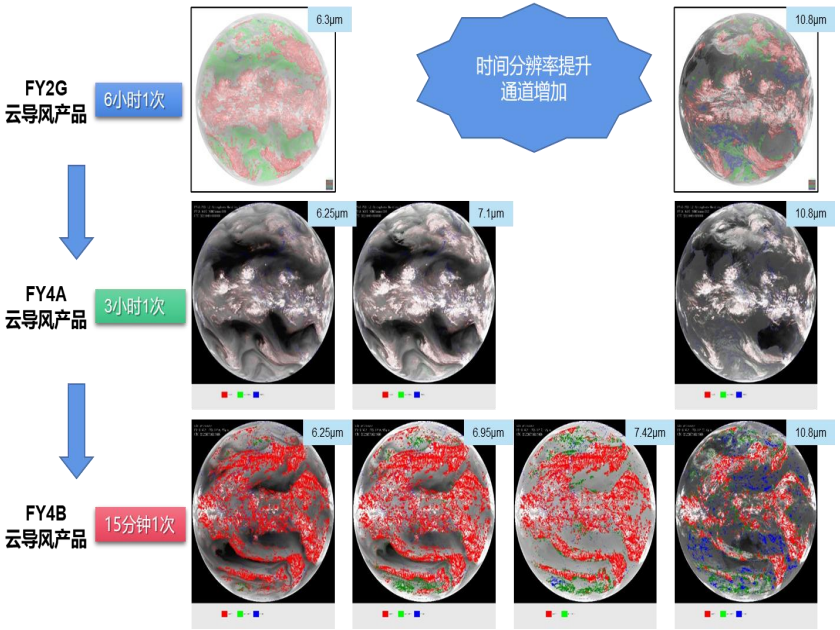
Products Validation： TFP

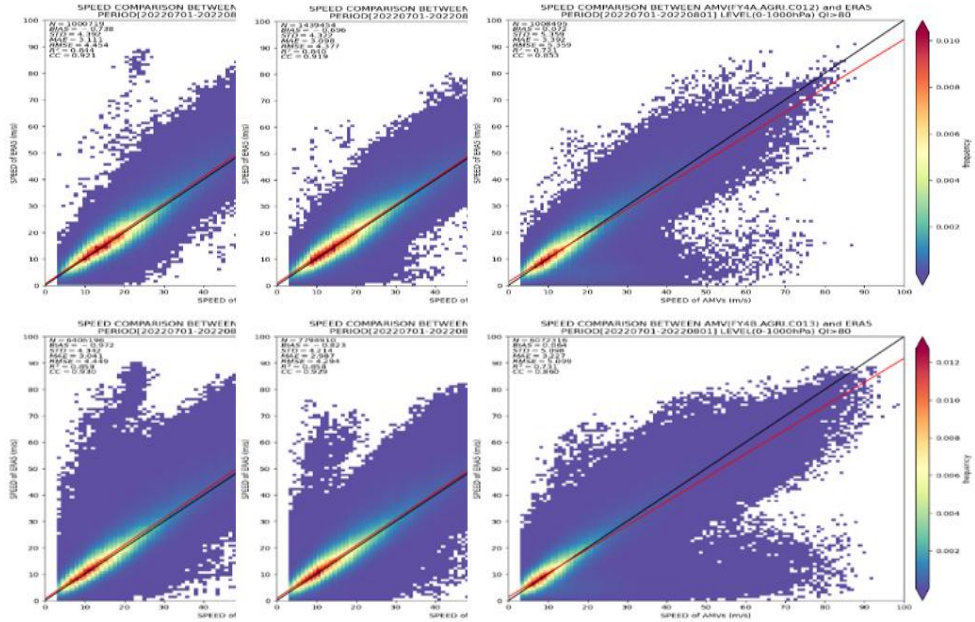






Products Validation: AMV

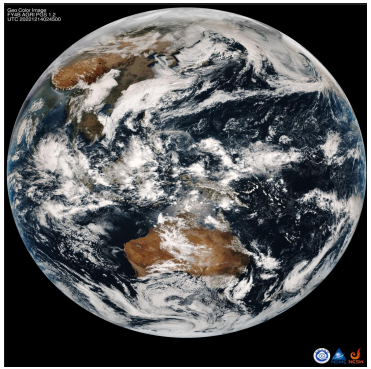
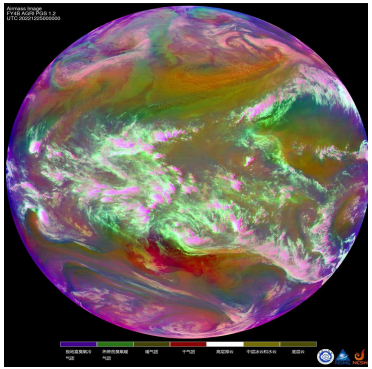
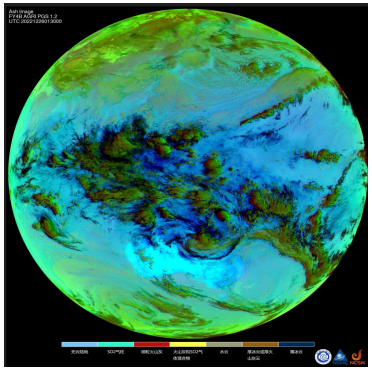
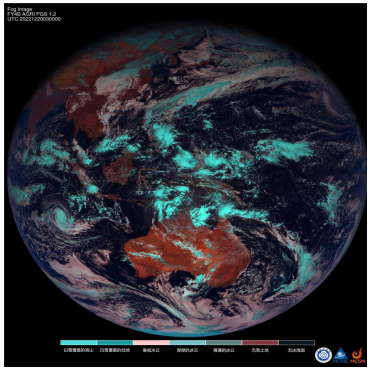
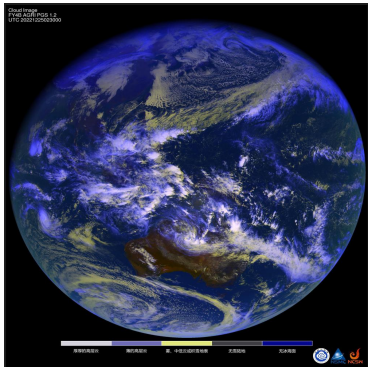
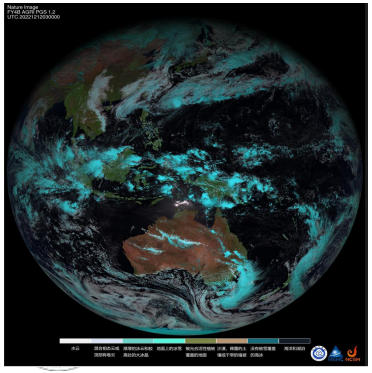
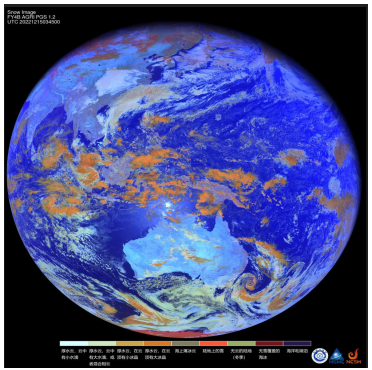
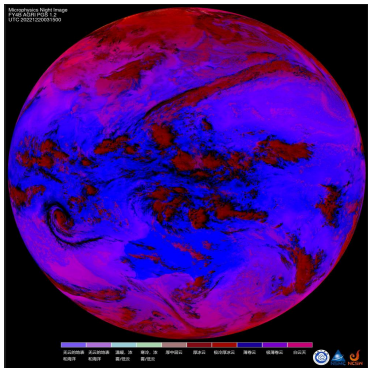
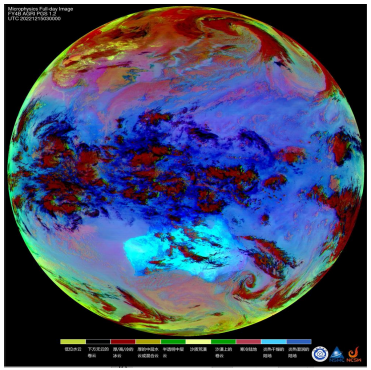
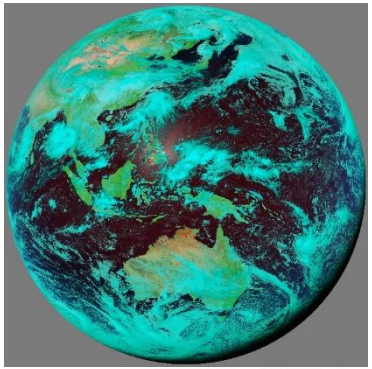




(0-1000hPa, QI>80)									
	WV(6.25μm)			WV(6.95μm)			IR(10.8μm)		
	N	MAE	RMSE	N	MAE	RMSE	N	MAE	RMSE
FY4A	1000719	3.11	4.45	2163977	3.30	4.76	1008495	3.39	5.36
FY4B	6406196	3.04	4.45	7798910	2.99	4.29	6072316	3.23	5.10

Image Products Case: FY-4 RGB products

Adopt WMO RGB composite standards

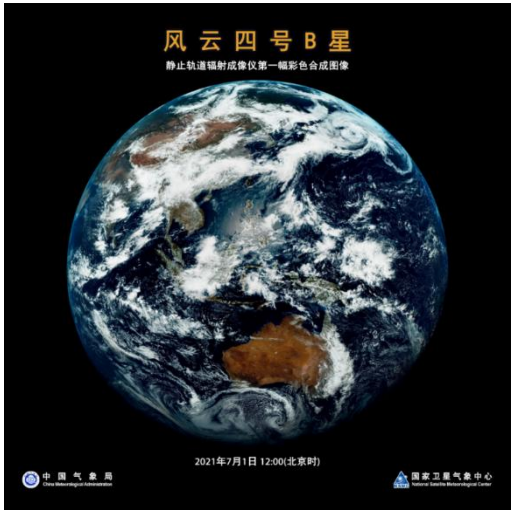











Outline

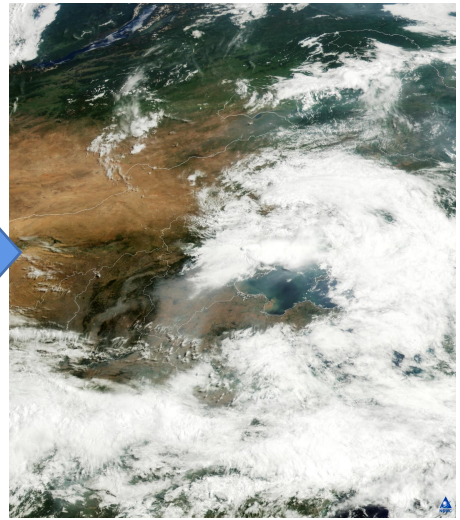
- Current status
- Observation Capabilities
- Rapid response by case
- Service
- Summary

FengYun-4B . imaging capability: GHI+AGRI

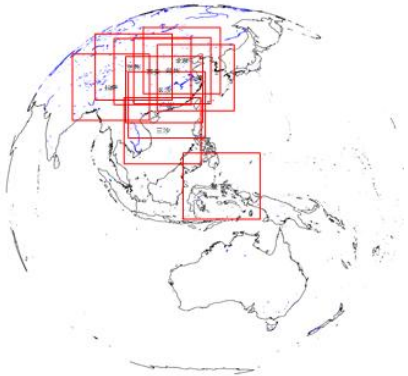
Geosynchronous High-speed Imager (GHI)



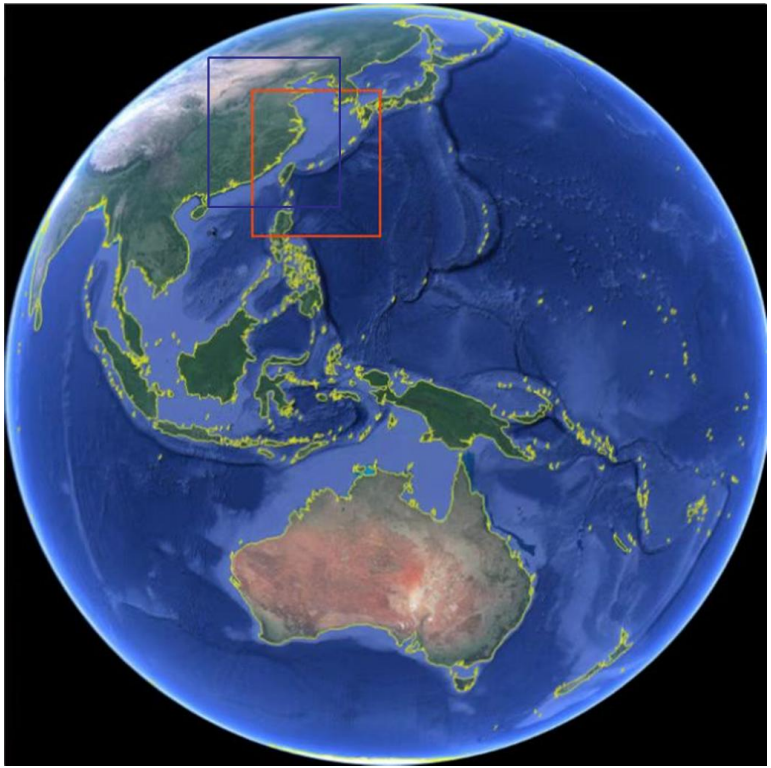
AGRI 5 min /1Km/China Natural Color

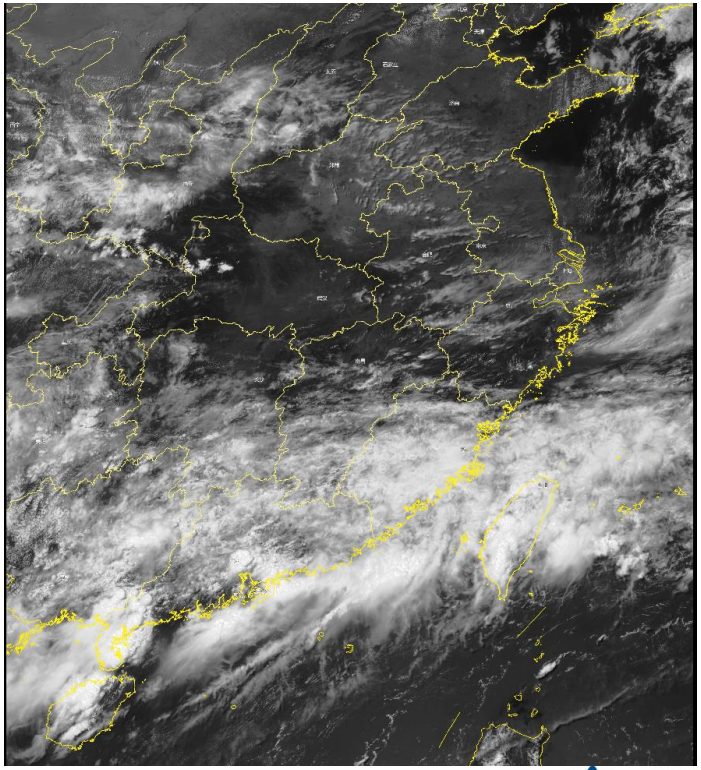


GHI 1min /0.25Km/True Color



Quick response of FY-4 Imager





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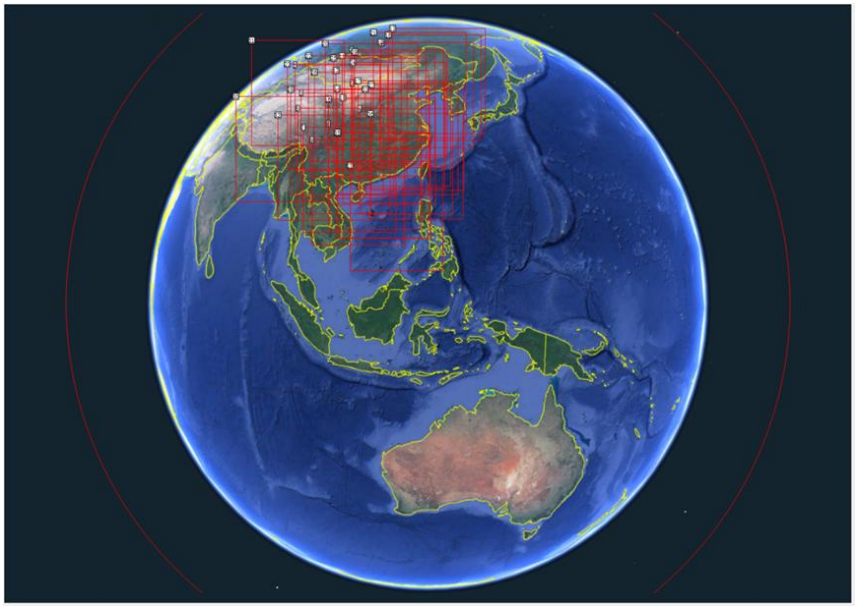
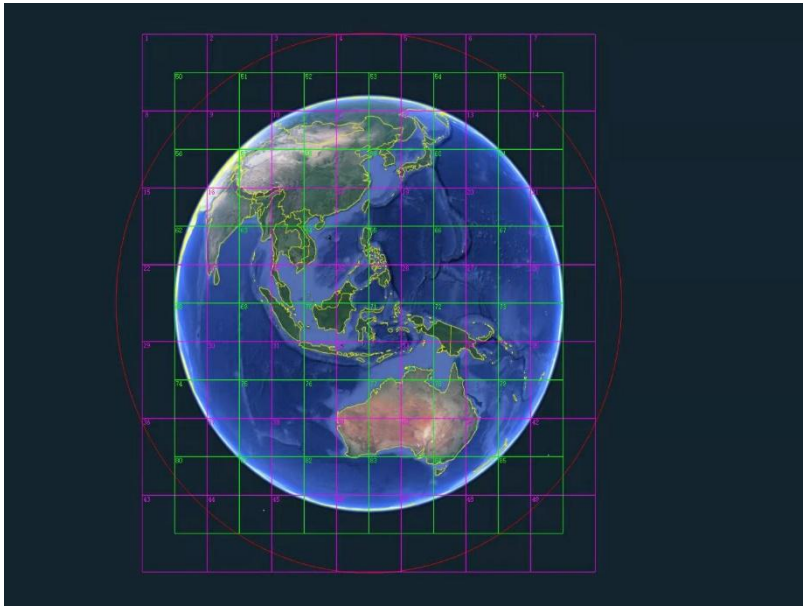
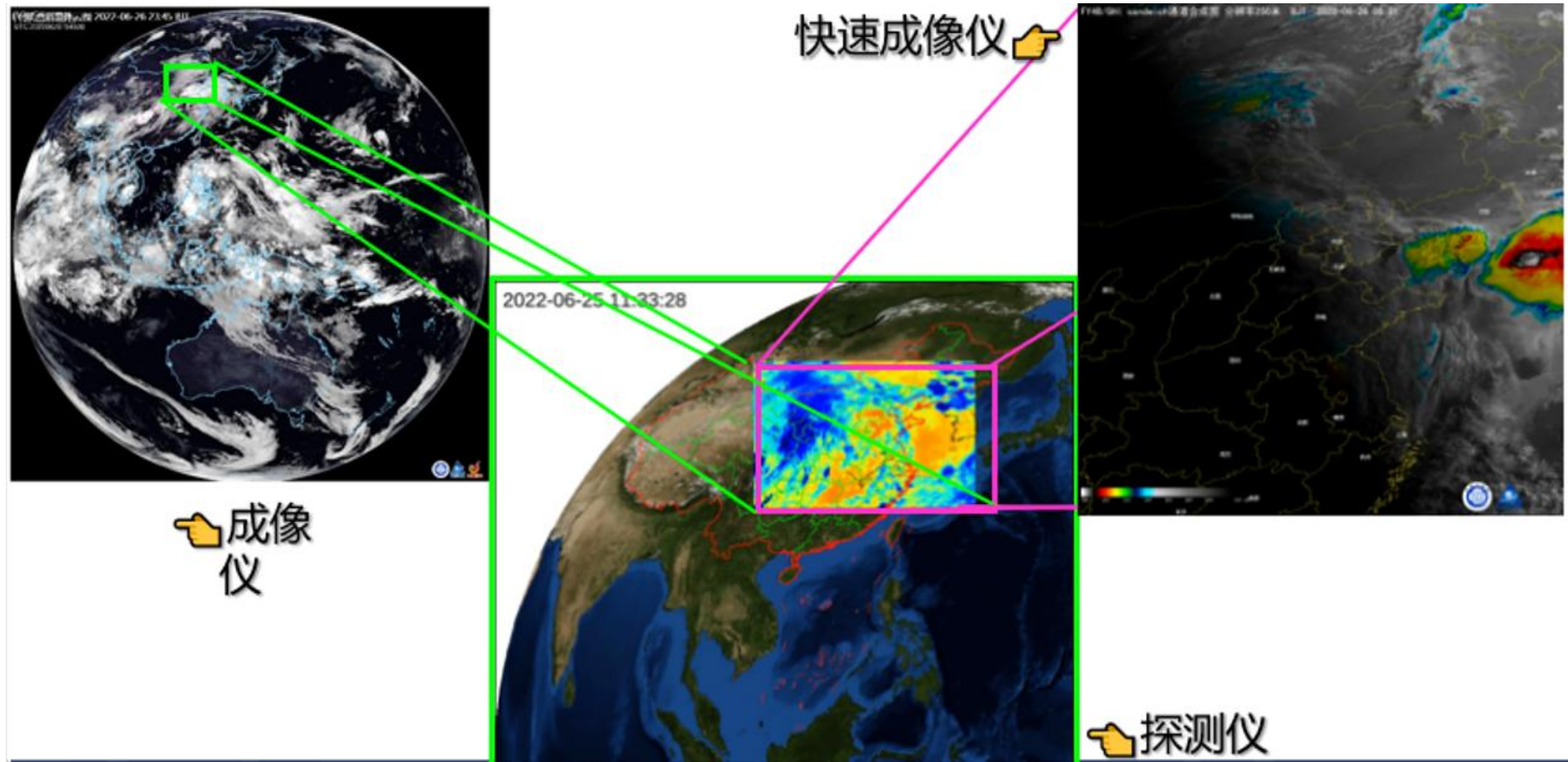


36 Regions

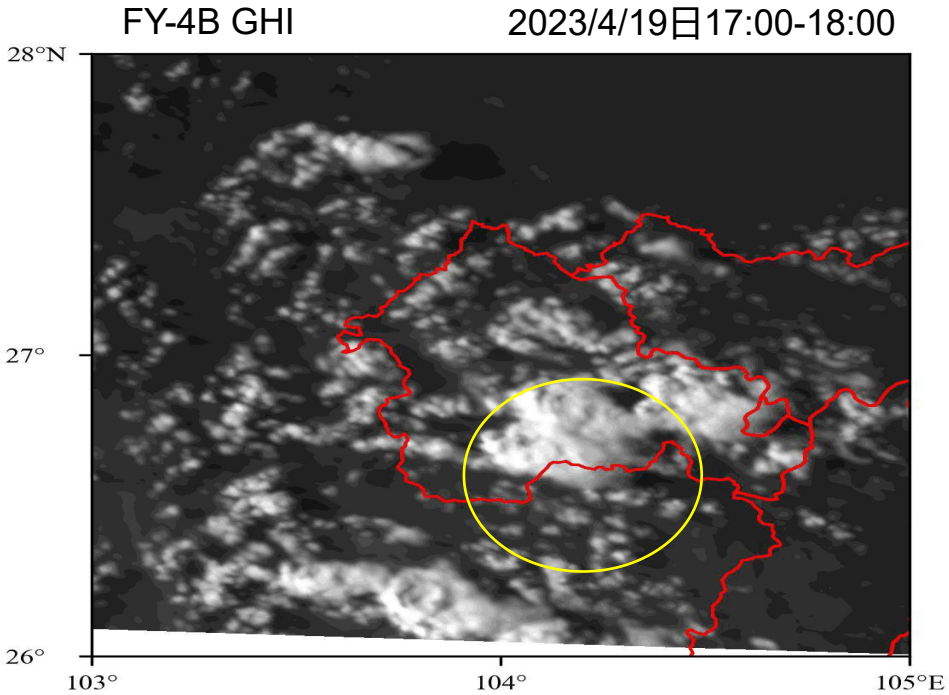


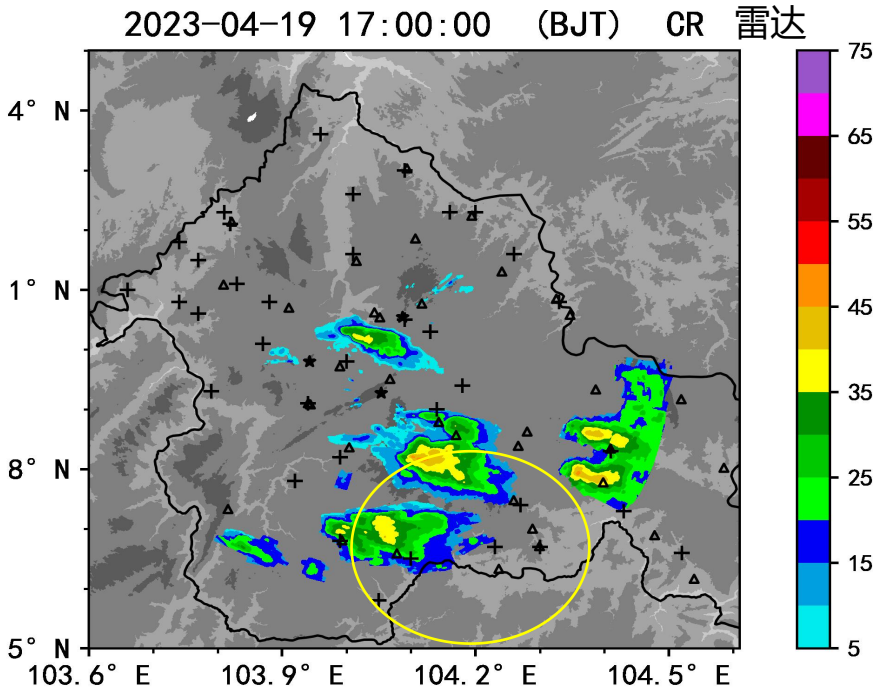
95 Regions

Collaborative Observations spaceborne



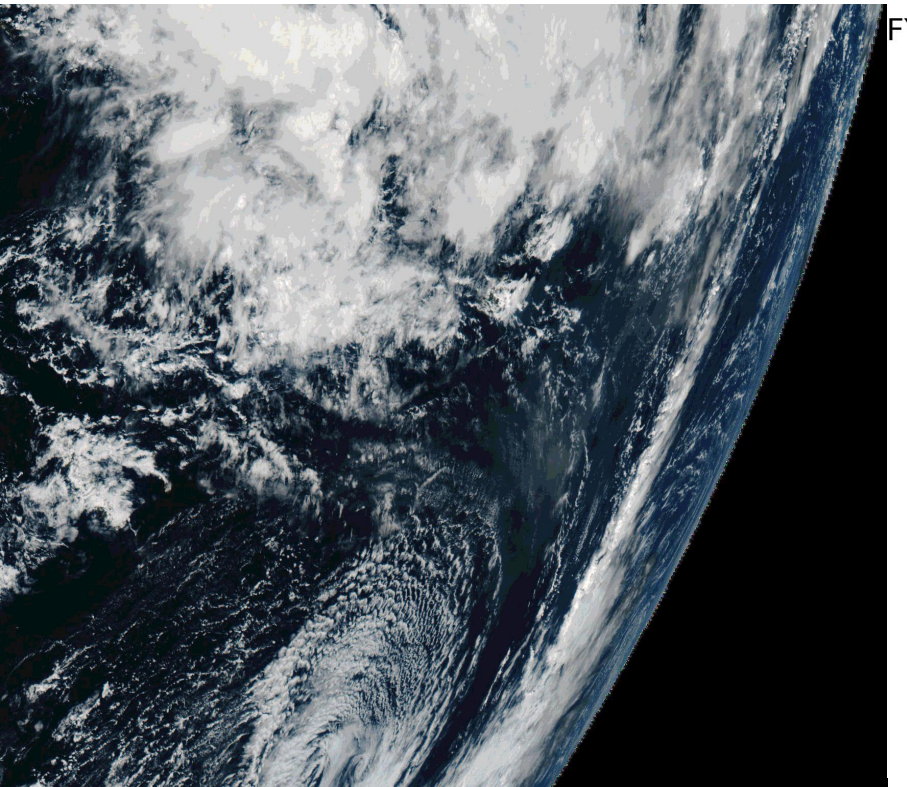
Collaborative Observations: Satellite+Radar



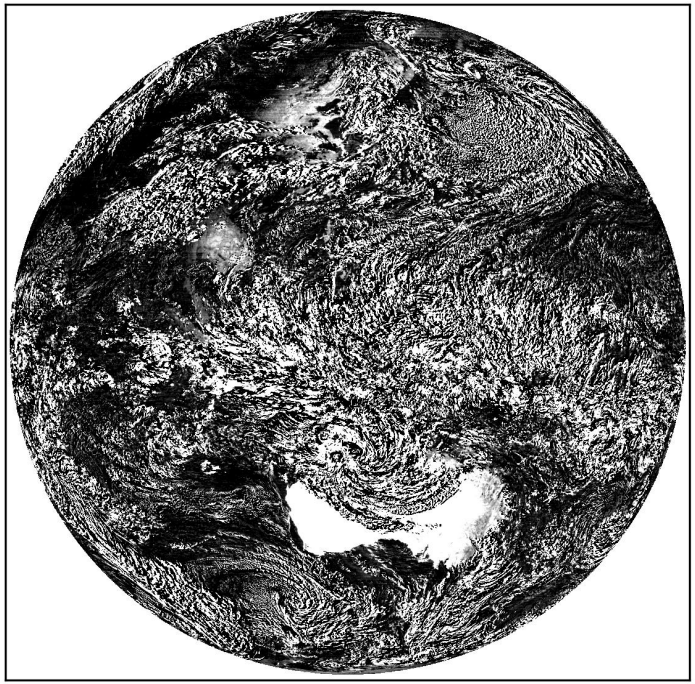


Courtesy of Hui Wang CMAWMC

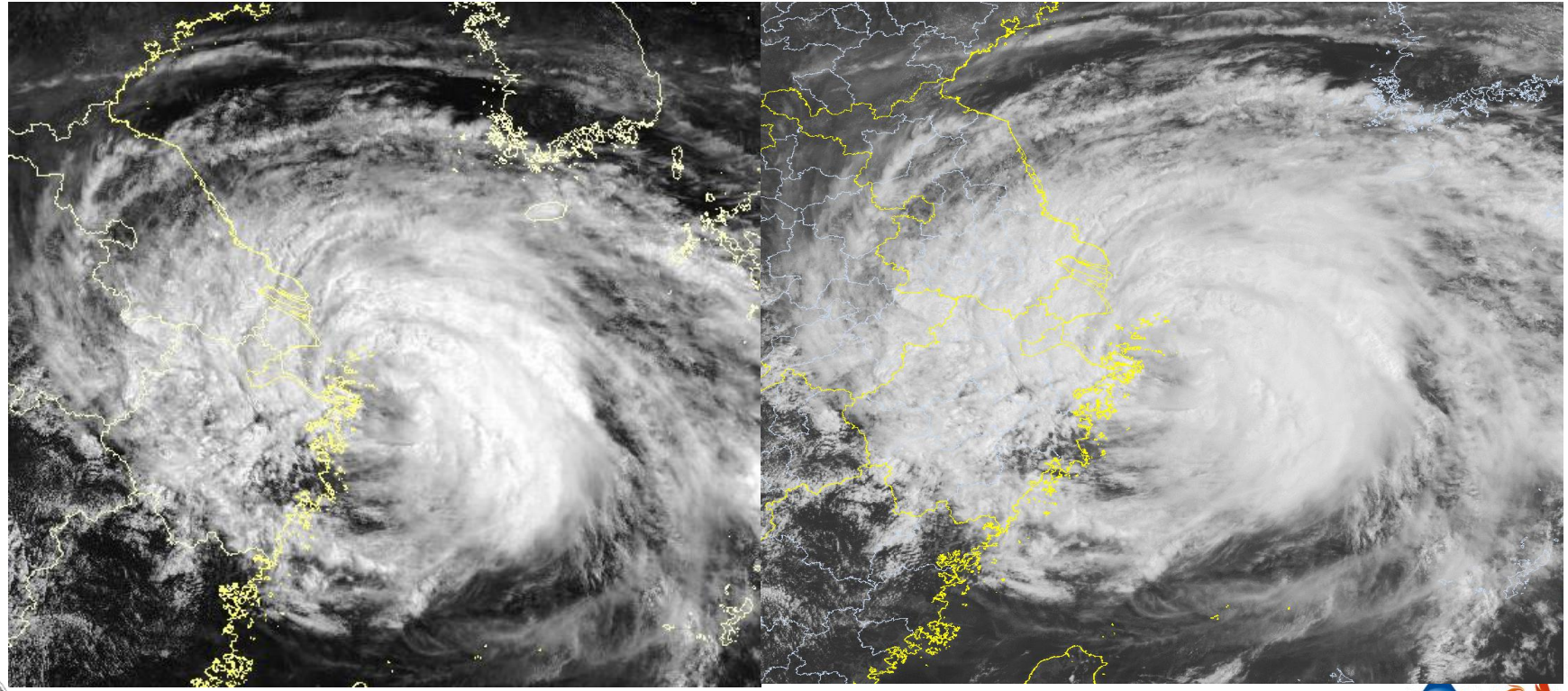
Case : Jan.15 2022 volcano eruption in Tonga.



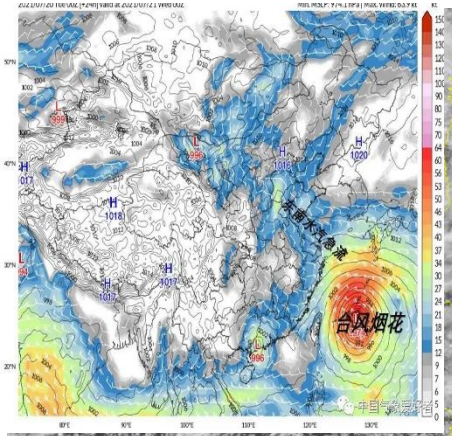
FY4B_AGRI_Channel13_Brightness Temperature_20220115001500

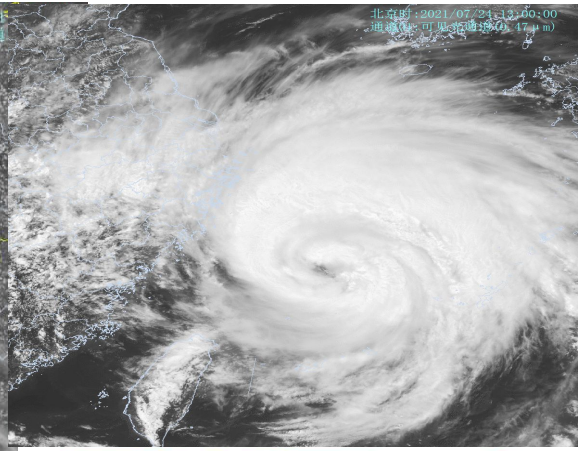


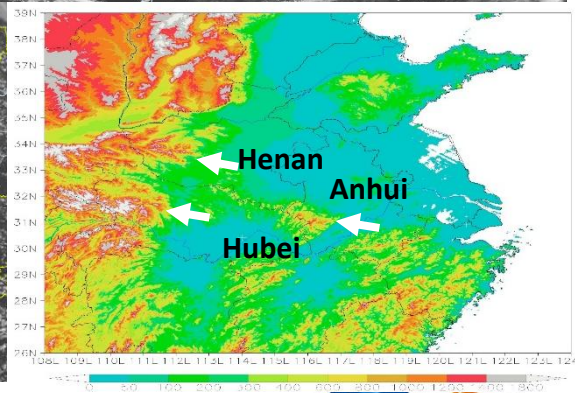
Case : Jul.26 2022 Typhoon Infa.



Case : Jul.21 2022 Heavy rainfall over HeNan

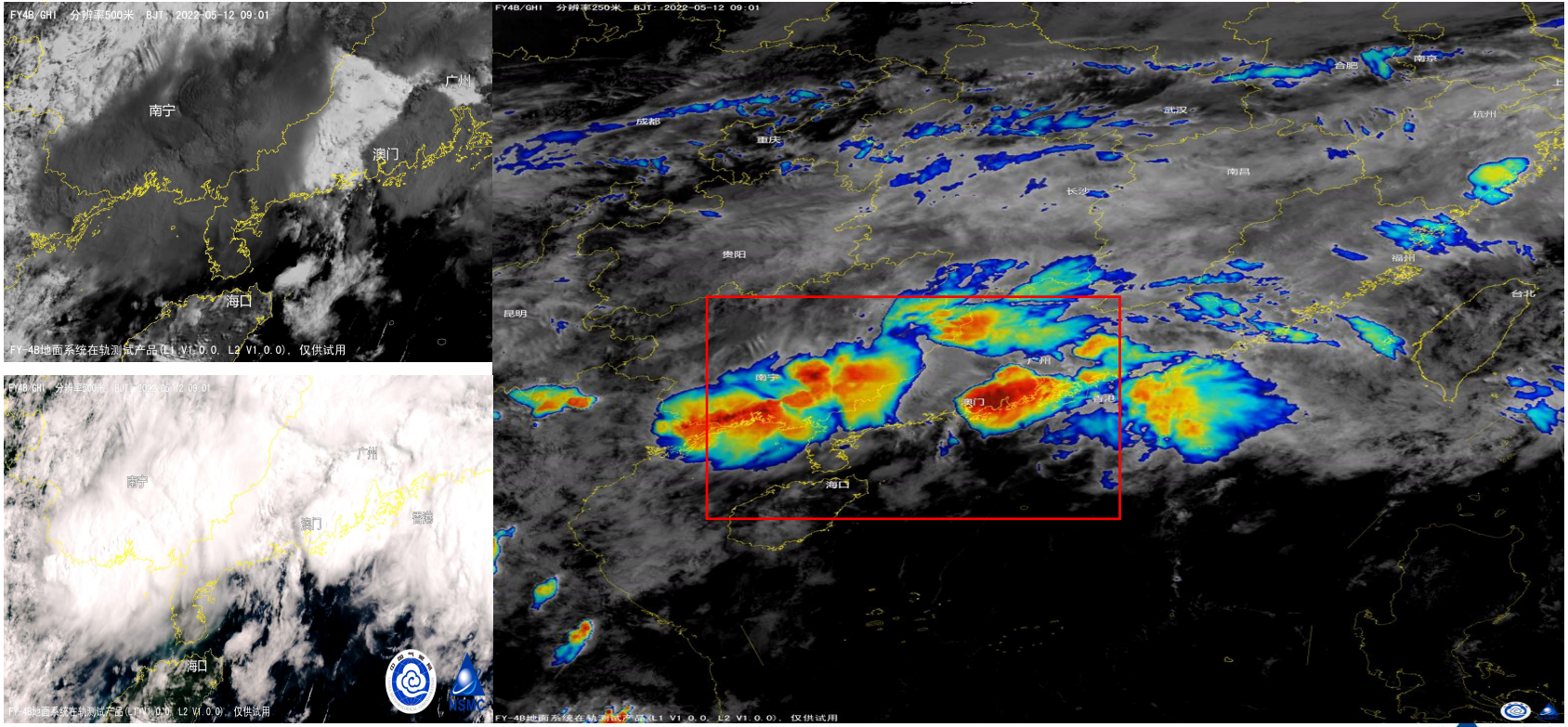






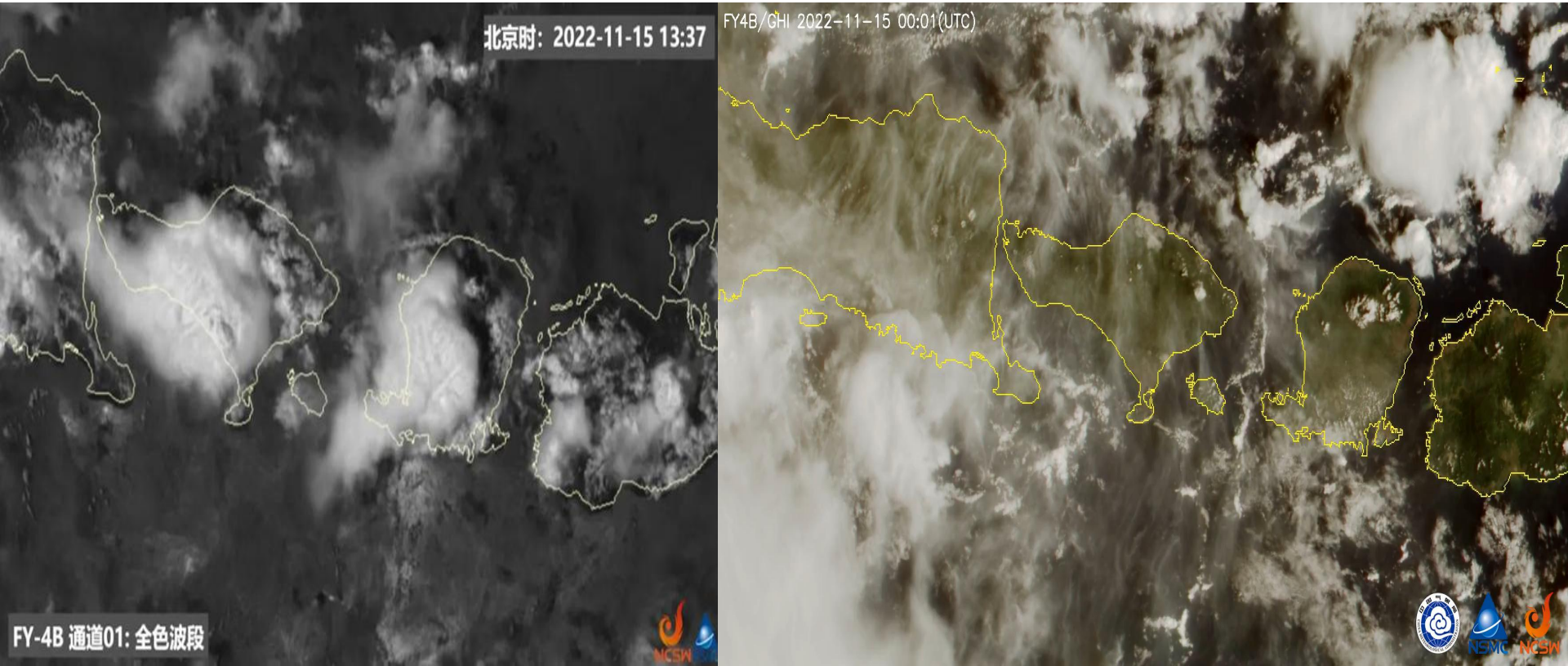
NSMC NCSW

Case： May.12 2022 Heavy rainfall over southern China



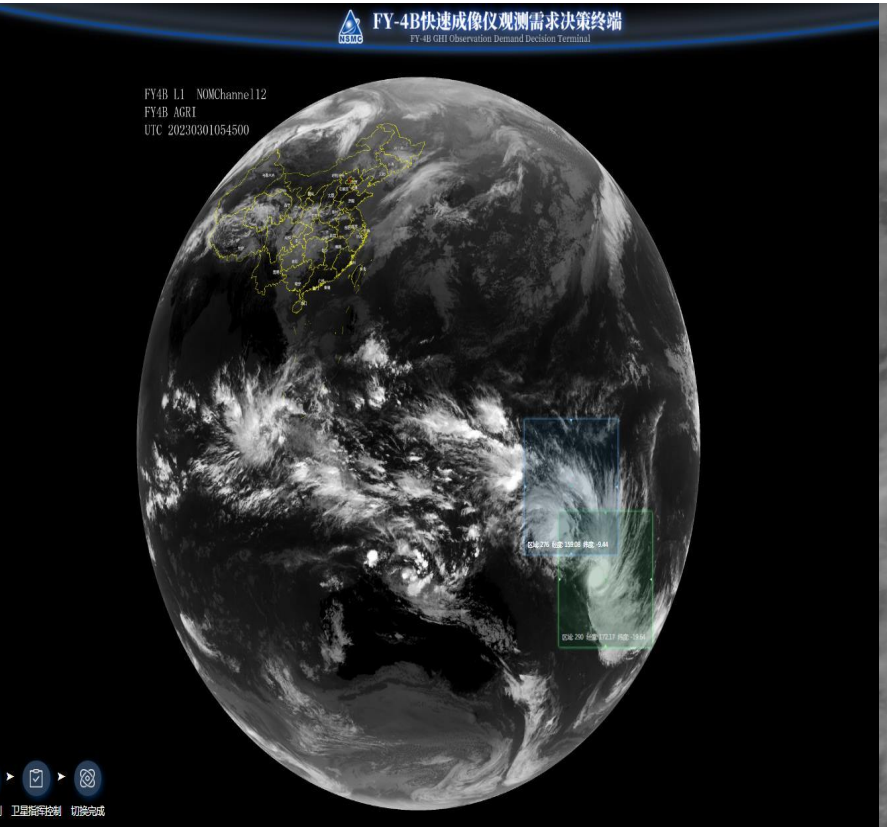
FengYun ESM Support

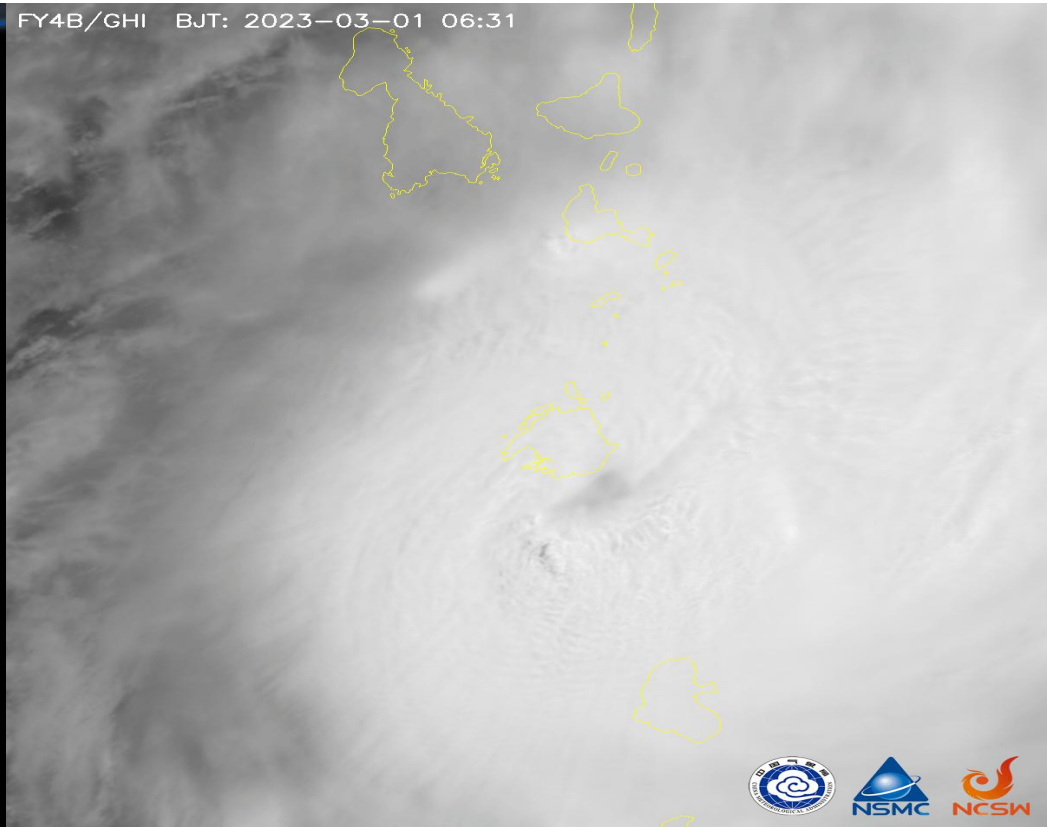
Case： Nov. 15 2022 convective cloud over Indonesia



FengYun ESM Support

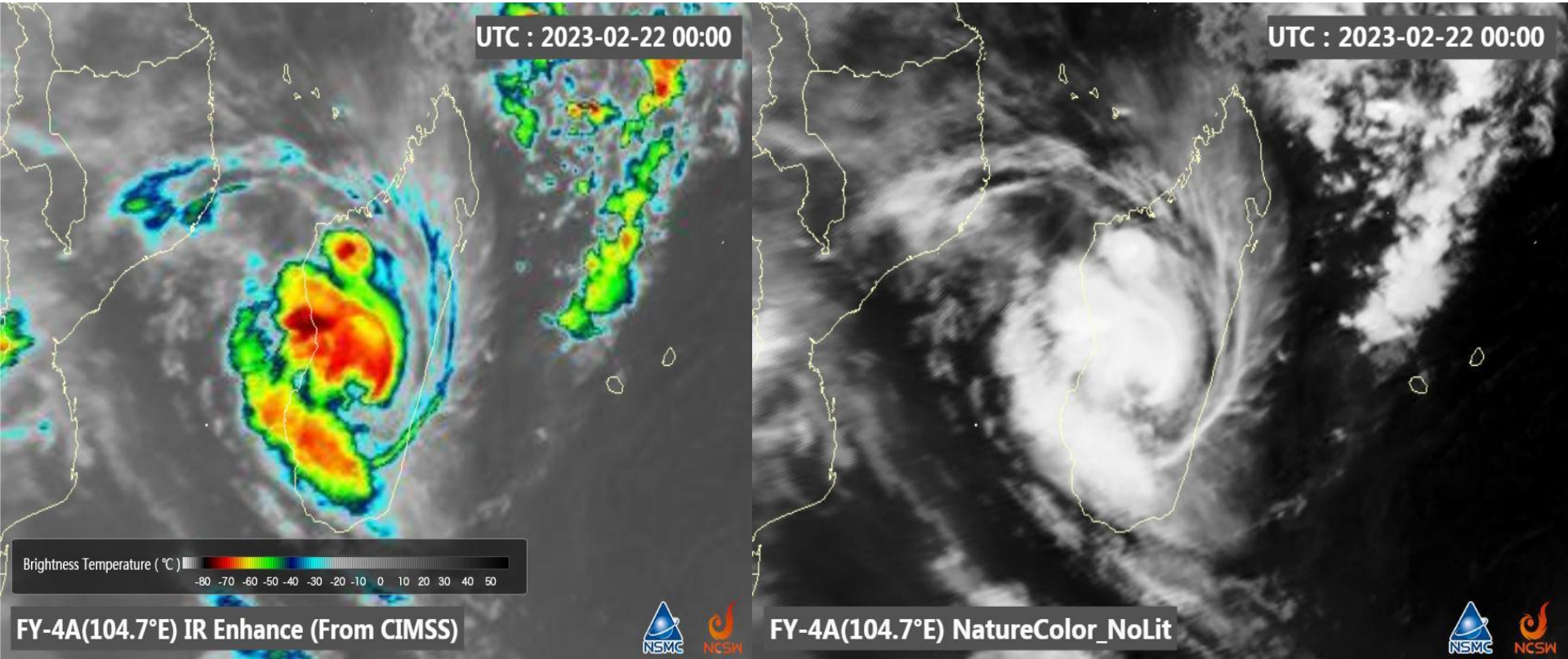
Case : March. 1st 2023 Tropical cyclone JUDY in Solomon islands





FengYun ESM Support

Case : Feb. 22 2023 Tropical cyclone FREDDY landing Madagascar



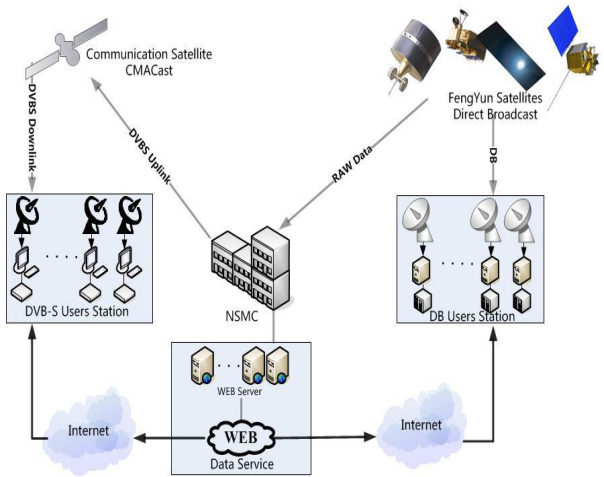
Outline

- Current status
- Observation Capabilities
- Rapid response by case
- Service
- Summary

Data and Utilities

All the FY-2/4 satellite productsand documents status are online accessible

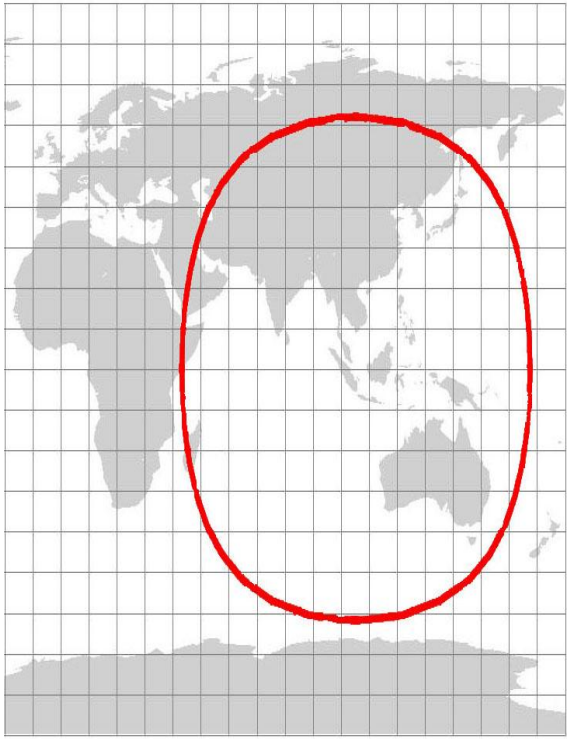
- **Real time**
  - **Direct Broadcast(DB)**
  - **CMACast(DVBS)**
- **Near Real Time**
  - **Website**
  - **Cloud Service**
  - FTP Service
  - Manual Service
- **Achieve**
  - Website
  - FTP Service
  - Manual Service



Fengyun GEO data access scenario

http://www.nsmc.org.cn/en/NSMC/Channels/100029.html

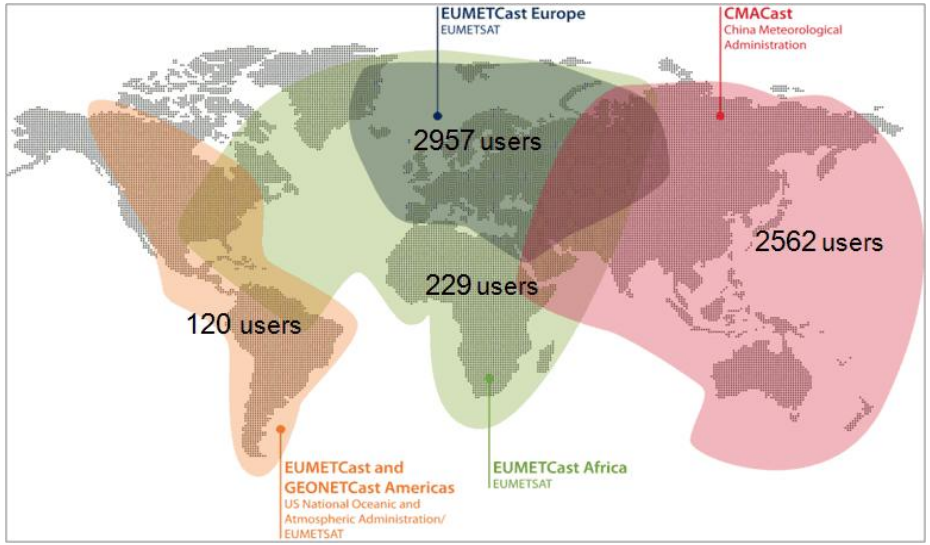
FY-4A Direct Broadcasting



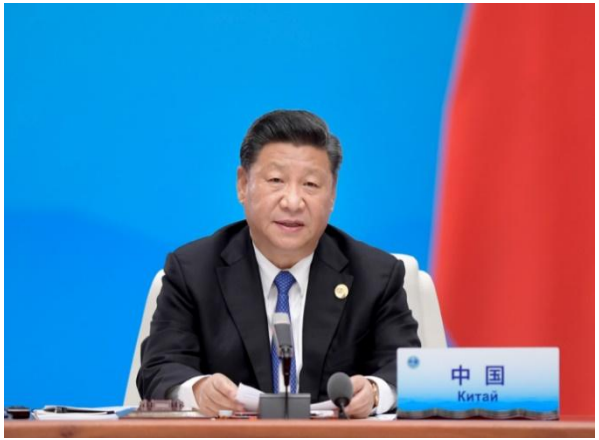
Channel	Data Rate	Broadcast Hours	MAX.Data Volume(GB)	Data	Frequency	Antenna
HRIT-H	11.6Mbps	24	123.05	AGRI L1	1680MHz	7.3m
HRIT-V1	9.3Mbps	16	65.86	GIIRS L1	1679MHz	7.3m
				LMI L2		
				L2 NRT Product*		
HRIT-V2	750Kbps	8	2.64	AGRI Low-Resolution Data**	1679MHz	2m
LRIT	150Kbps	24	1.58	AGRI Images	1697MHz	1.2m /1.8m

CMACast in service

- Domestic users
  - Local weather stations, forestry, agriculture, aviation,, hydrology...
- International users
  - Laos(老挝), Iran, Bengal孟加拉（）, Indonesia, Maldives（马尔代夫）, Nepal, Mongolia（蒙古）, Malaysia, Pakistan, Thailand, Philippines, Uzbekistan, Kyrgyzstan, Sri Lanka, Korea, Vietnam, Myanmar（缅甸）, Australia, Kazakhstan



FY-2H： Special support to SCO countries



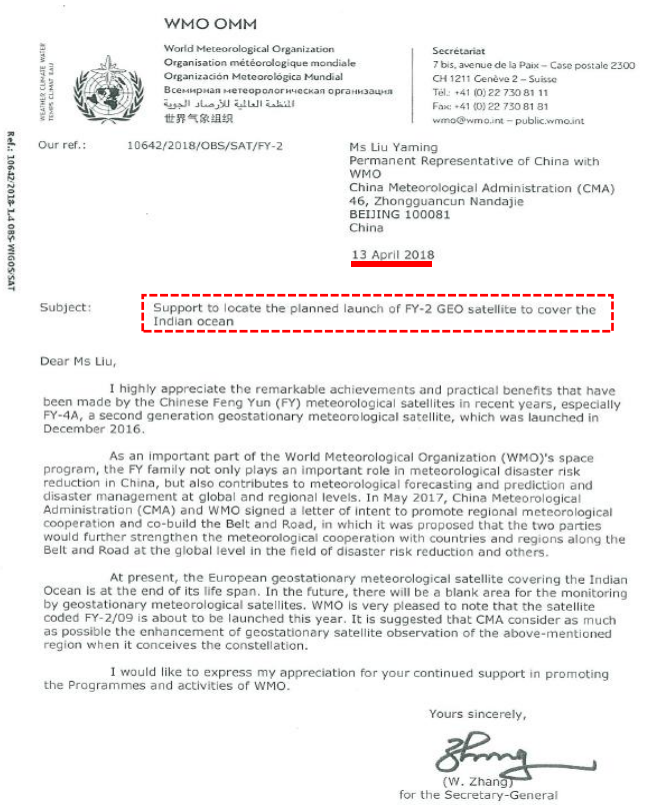
On June 10, at SCO summit in Qingdao, Chinese President Xi Jinping made a commitment that China will provide meteorological services by using FY-2 meteorological satellite.”

- Launched on June 5, 2018
- positioned at 79°E on July 28
- From Oct., FY-2H will provide operational service over the Indian Ocean.

Indian Ocean Observation Requirement: IODC (international)

- **Indian Ocean Data Coverage (IODC) – CGMS Roadmap has been agreed at CGMS-42 plenary.**

EUMETSAT to initiate the dialogue with ISRO, ROSHYDROMET, CMA, and other interested partners to investigate a medium-term strategy for IODC



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
世界气象组织

Secrétariat
7 bis, avenue de la Paix – Case postale 2300
CH 1211 Genève 2 – Suisse
Tél.: +41 (0) 22 730 81 11
Fax: +41 (0) 22 730 81 81
wmo@wmo.int – public.wmo.int

Ref.: 10642/2018-1.4 OBS-WIGOS-SAT

Our ref.: 10642/2018/OBS/SAT/FY-2

Ms Liu Yaming
Permanent Representative of China with WMO
China Meteorological Administration (CMA)
46, Zhongguancun Nandajie
BEIJING 100081
China

13 April 2018

Subject: Support to locate the planned launch of FY-2 GEO satellite to cover the Indian ocean

Dear Ms Liu,

I highly appreciate the remarkable achievements and practical benefits that have been made by the Chinese Feng Yun (FY) meteorological satellites in recent years, especially FY-4A, a second generation geostationary meteorological satellite, which was launched in December 2016.

As an important part of the World Meteorological Organization (WMO)'s space program, the FY family not only plays an important role in meteorological disaster risk reduction in China, but also contributes to meteorological forecasting and prediction and disaster management at global and regional levels. In May 2017, China Meteorological Administration (CMA) and WMO signed a letter of intent to promote regional meteorological cooperation and co-build the Belt and Road, in which it was proposed that the two parties would further strengthen the meteorological cooperation with countries and regions along the Belt and Road at the global level in the field of disaster risk reduction and others.

At present, the European geostationary meteorological satellite covering the Indian Ocean is at the end of its life span. In the future, there will be a blank area for the monitoring by geostationary meteorological satellites. WMO is very pleased to note that the satellite coded FY-2/09 is about to be launched this year. It is suggested that CMA consider as much as possible the enhancement of geostationary satellite observation of the above-mentioned region when it conceives the constellation.

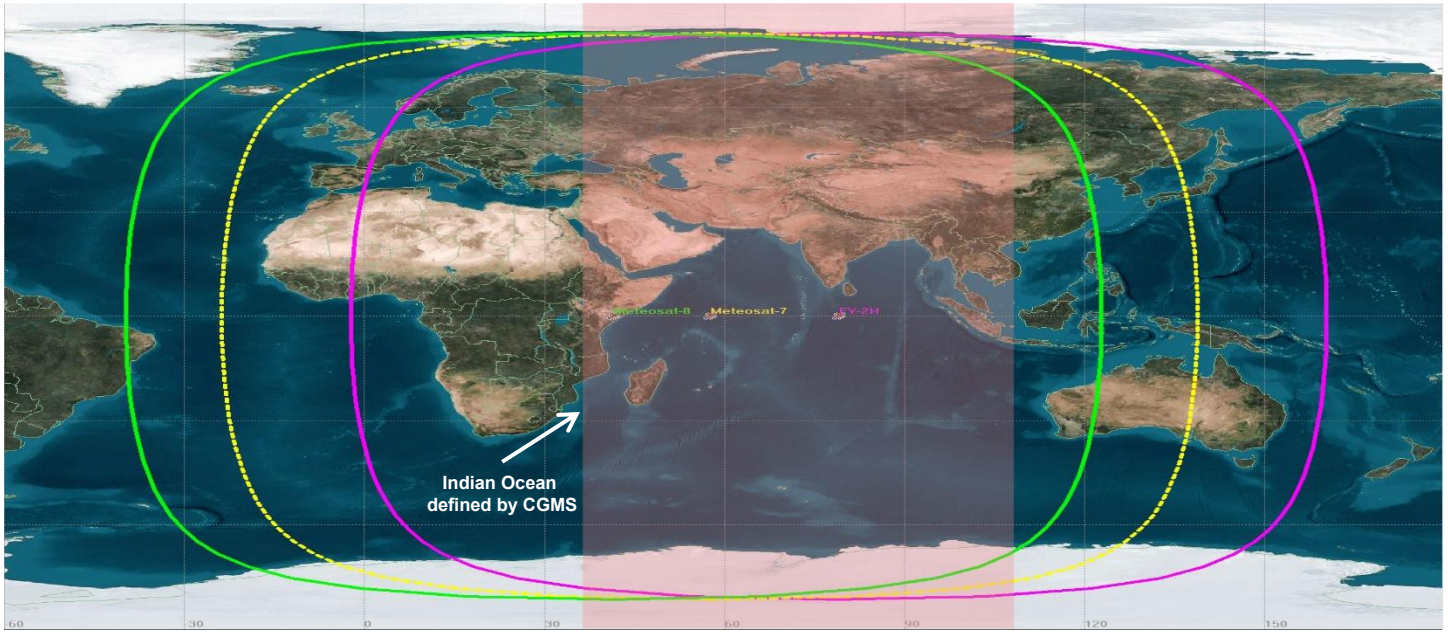
I would like to express my appreciation for your continued support in promoting the Programmes and activities of WMO.

Yours sincerely,

(W. Zhang)
for the Secretary-General

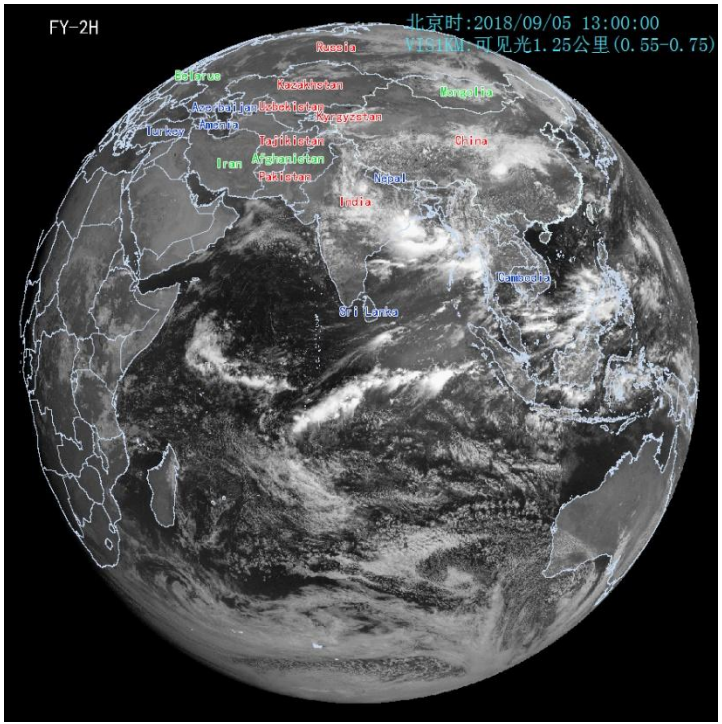
FY-2H is expected to fulfill the Indian Ocean observation by WMO

Superiority support to IODC

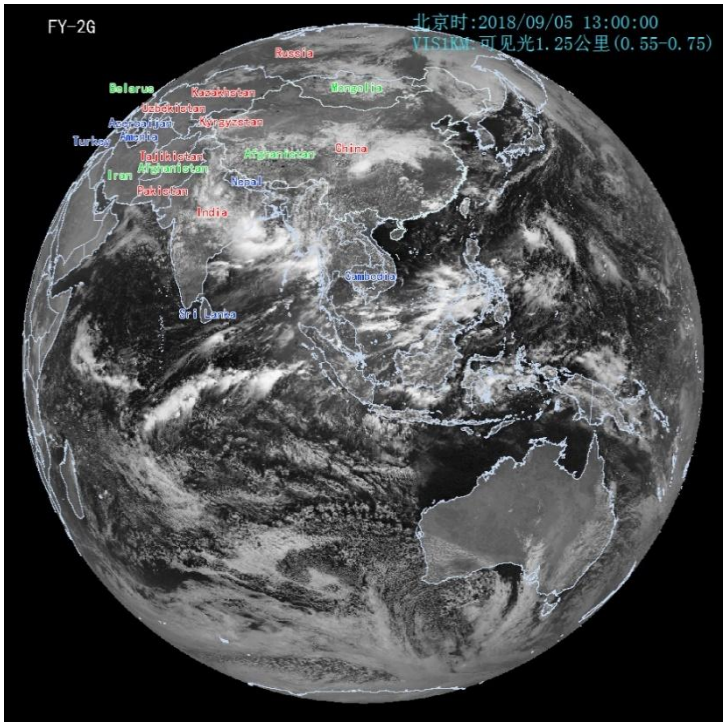


- *Meteosat-7 (57.5°E) stopped on 31 Mar, 2017. FY-2H at 79°E owns the more reasonable coverage over the Indian Ocean (defined by CGMS as 36°E – 108°E)*
- *FY-2H can perform the flexible regional observations about 6-min interval over the Indian Ocean when required*

FY-2H (79^{0}E)



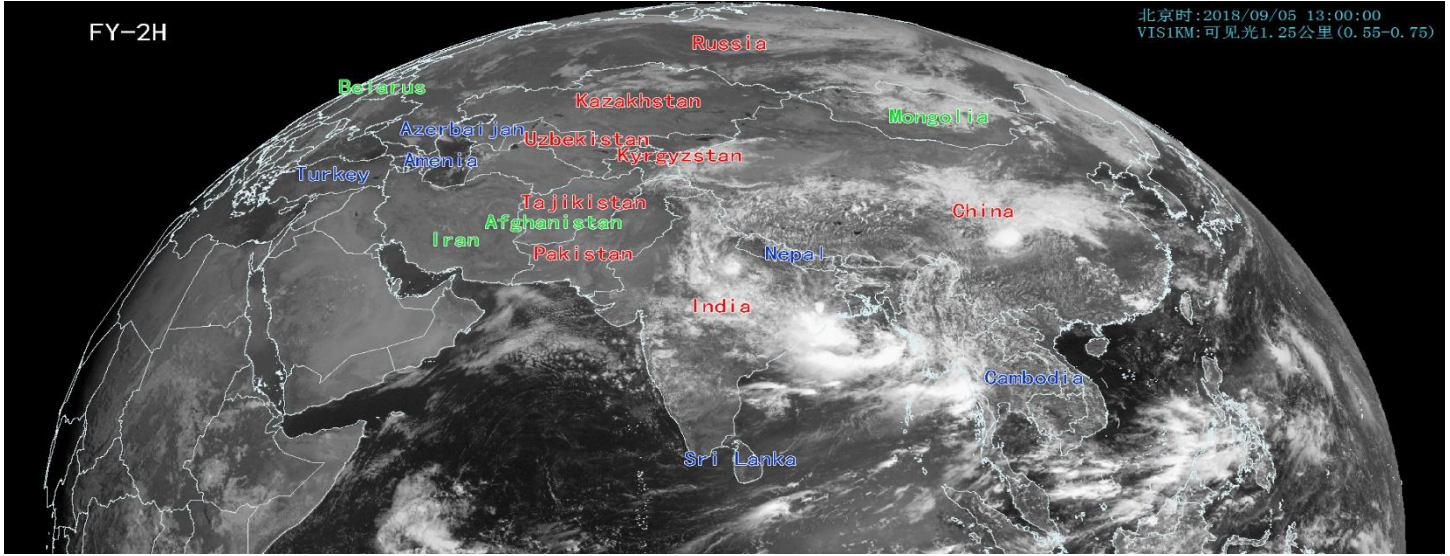
FY-2G (99.5^{0}E)

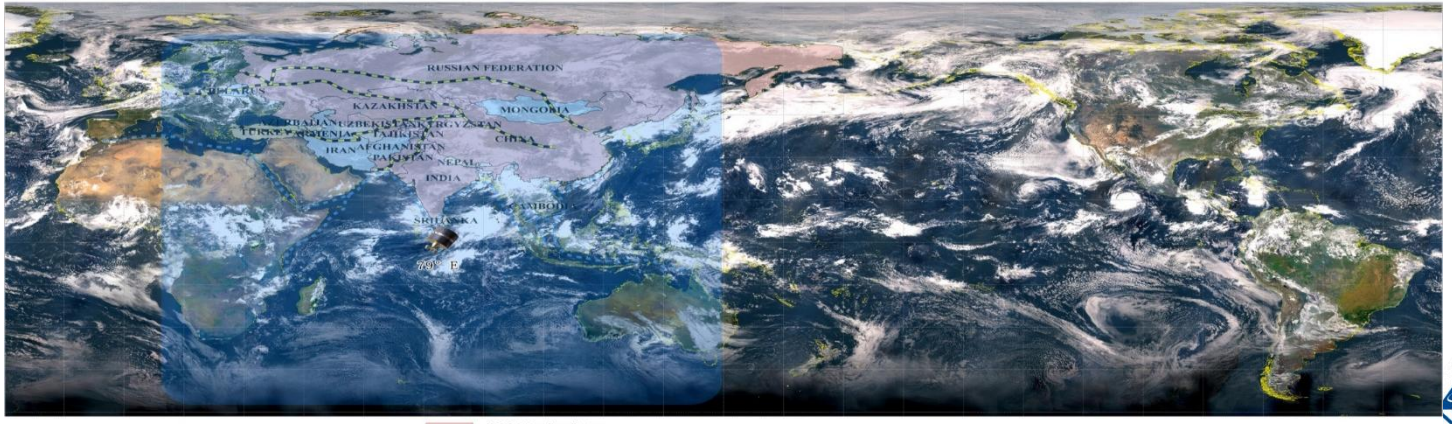


SCO partner countries: 8

Observer countries: 4

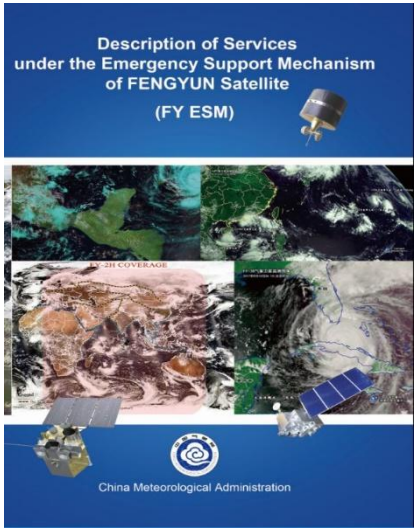
Dialogue partner countries: 5


FY-2H
北京时:2018/09/05 13:00:00
VIS1KM:可见光1.25公里(0.55-0.75)
Russia
Belarus
Kazakhstan
Mongolia
Azerbaijan
Uzbekistan
Kyrgyzstan
Armenia
Turkey
Tajikistan
China
Afghanistan
Iran
Pakistan
Nepal
India
Cambodia
Sri Lanka


RUSSIAN FEDERATION
BELARUS
KAZAKHSTAN
MONGOLIA
AZERBAIJAN
UZBEKISTAN
KYRGYZSTAN
TURKEY
ARMENIA
TAJIKISTAN
CHINA
IRAN
AFGHANISTAN
PAKISTAN
NEPAL
INDIA
CAMBODIA
SRI LANKA
79° E
图例
Silk Road Economic Belt
21st-Century Maritime Sile Road
SCO Member States
SCO Observer States
SCO Dialogue Partners

CMA Announced "Emergency Support Mechanism for International Users of Fengyun Meteorological Satellites in Disaster Prevention and Mitigation" on June 24, 2018

- To serve the countries along the "Belt and Road" in a timely manner. These countries may raise a request for the activation of the mechanism through their respective Permanent Representatives with WMO or their designated focal points.
- Once the request is approved, CMA will command the on-duty FY satellite for frequent and targeted observations per 5-6 minutes over affected areas.
- The images and products will be transmitted to the requesting applicant through CMACast, internet and direct satellite broadcast reception.



Emergency service

the FY_ESM website support more efficient services for disaster mitigation and prevention.

http://fy4.nsmc.org.cn/service/en/emergency/index.html

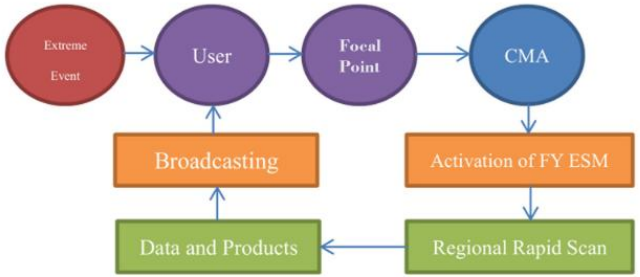
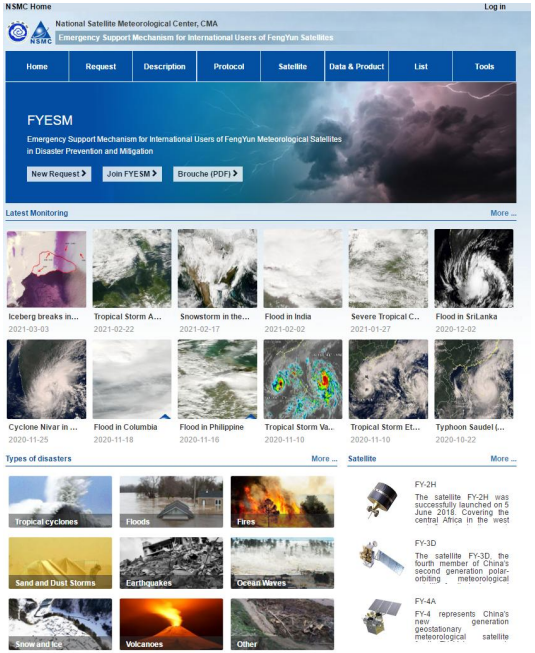


Figure:Activation of FY ESM



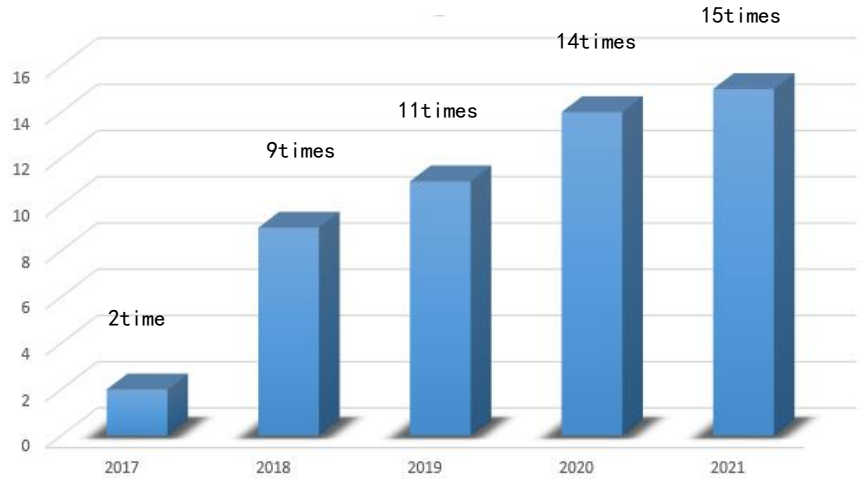
Emergency service

FY_ESM support disaster prevention and mitigation

Emergency support in 2021

	Date	Country	Event
1	2021.01.28	Swaziland	Tropical cyclone &Flood
2	2021.02.08	India	Flood
3	2021.02.23	Philippines	Tropical cyclone &Flood
4	2021.02.24	Philippines	Tropical cyclone &Flood
5	2021.04.07	Indonesia	Heavy rainfall &Flood
6	2021.04.08	Timor-Leste	Tropical cyclone
7	2021.04.13	St.Vincent	Volcanic eruption
8	2021.05.24	Congo	Volcanic eruption
9	2021.06.07	Sri Lanka	Oil spilling
10	2021.06.07	Sri Lanka	Flood
11	2021.06.08	Sri Lanka	Oil spilling
12	2021.06.09	Sri Lanka	Flood
13	2021.07.09	Tunisia	Forest fire
14	2021.07.22	Russia	Forest fire
15	2021.08.09	Russia	Flood

- Observation data and imagery
- Emergency EO monitoring analysis report



Outline

- Current status
- Observation Capabilities
- Products
- Summary

Summary

- CMA/NSMC focuses on operational satellite meteorological applications and capacity building. In-depth research and demonstration efforts are encouraged for the applications of new data in weather analysis, NWP, Environment etc.,
- CMA will keep its commitment to open data policy for Fengyun data. Engagement of regional and global users in the application of Fengyun data are welcome.
- International partnerships are essential. Users community is a very important value added benefit to CMA satellite applications.

THANK YOU

lufeng@cma.gov.cn