



中国气象局



The FengYun Mission Recent Progress on FY3E and FY3G

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FY3 Team
NSMC/CMA

2024.07



国家卫星气象中心
(空间天气监测预警中心)

Fengyun constellation

9 Satellites in orbit

- 5 LEO (FY-3C, FY-3D, FY-3E, FY-3F, FY-3G)
- 4 GEO (79E, 86.5E, 99.5E, 105E)

GEO

FY-2G, -2H

FY-2G (99.5°E) and FY-2H (79°E)
Full disk every 30 min
FY-2H, last flight unit of FY-2 series.

FY-4A

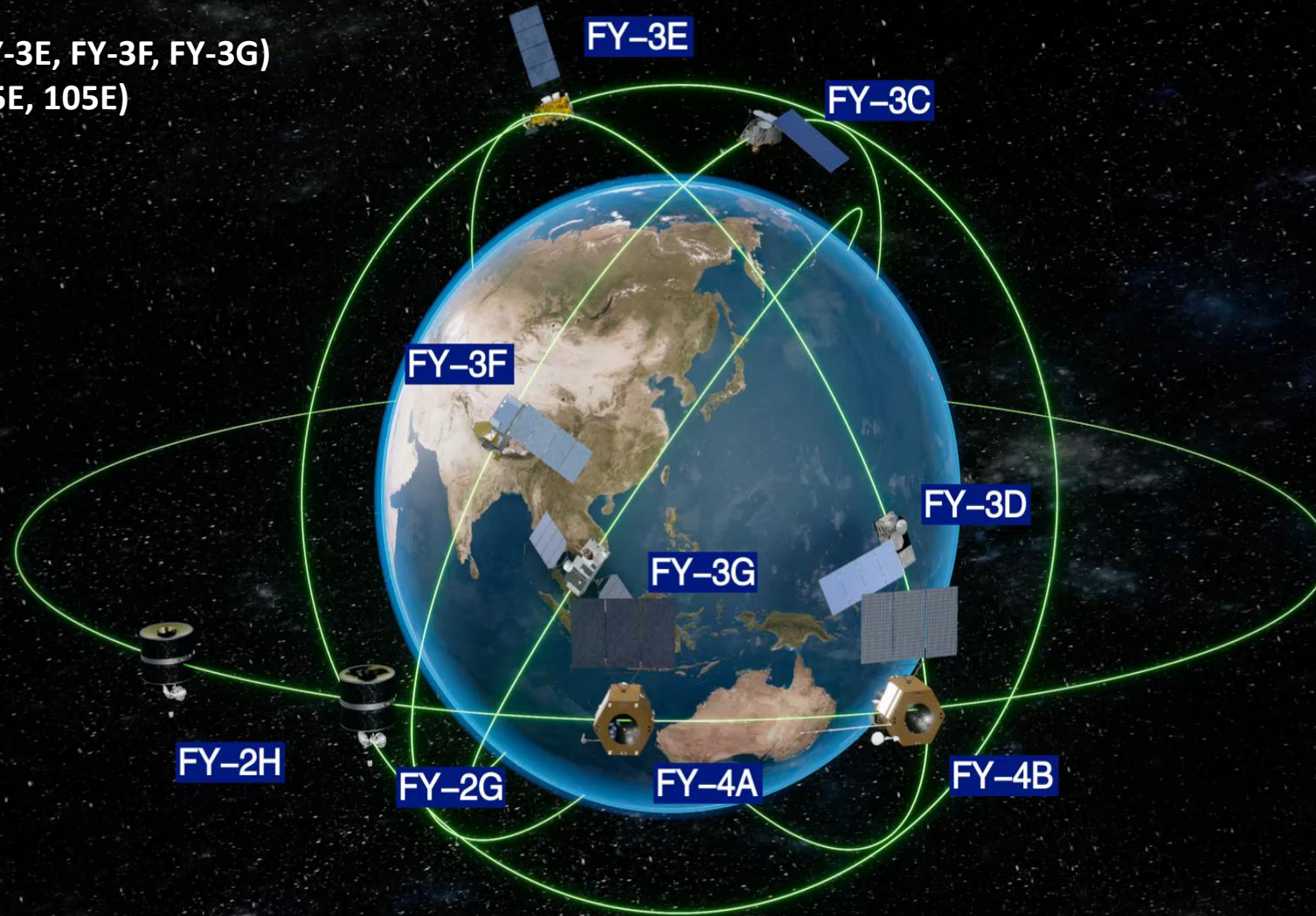
First of China's second-generation
GEO meteorological satellites.

FY-4A (86.5°E), Full disk every 15
min.

FY-4B

FY-4B (104.7°E), Full disk every 15
min, partial areas rapid scanning at 1
min.

**Operational since 1st December
2022**



LEO

FY-3C

Mid-morning orbit
Operational with degraded
performance

FY-3D

Afternoon orbit, ECT 13:45 local
time
10 EO instruments

FY-3E

Early-morning orbit, ECT 5:41
local time
11 EO instruments
Operational since 1 Dec. 2022

FY-3F

Mid-morning orbit
10 EO instruments
Launched 3 Aug. 2023

FY-3G

Incline orbit
6 EO instruments
Launched 16 Apr. 2023
In-orbit testing data released

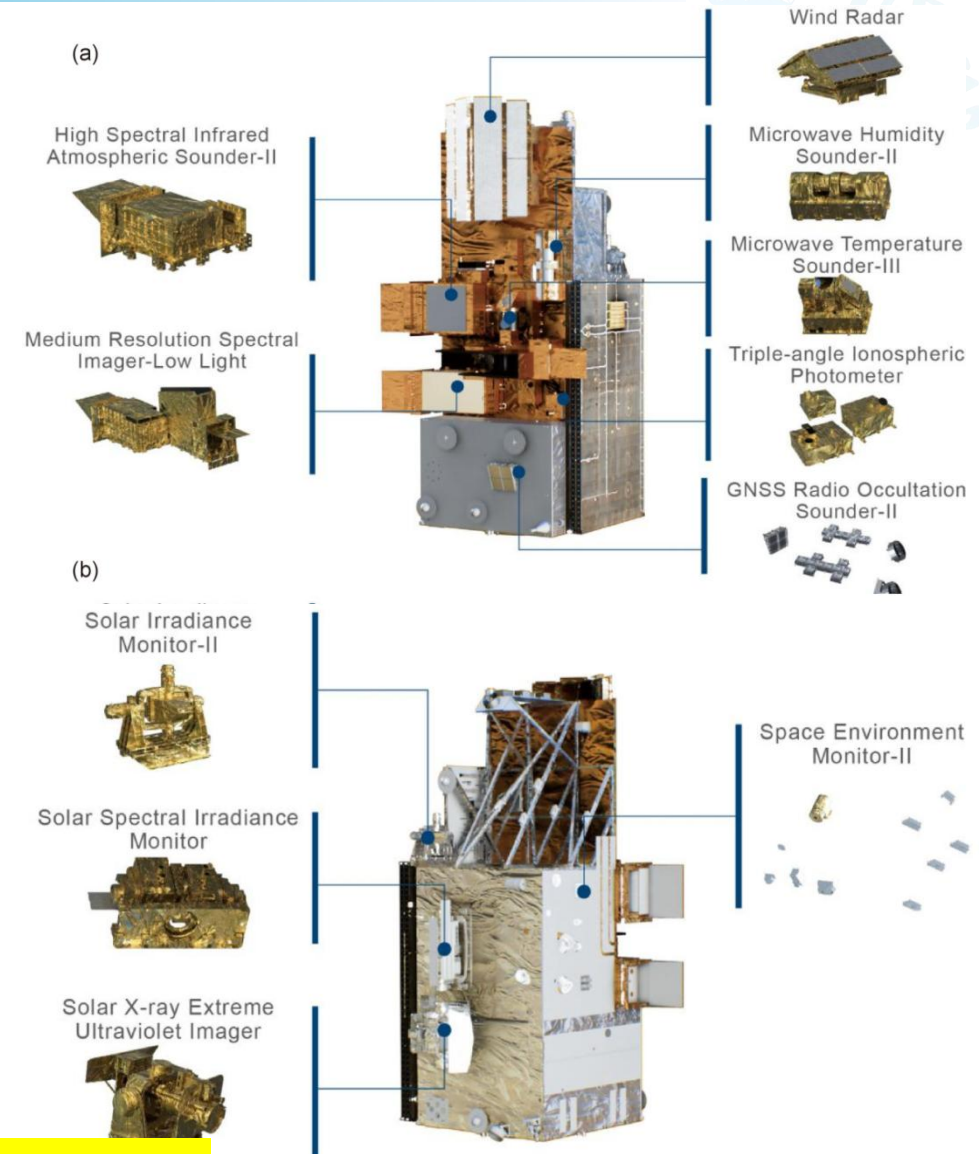
Successful launch of FY-3E on July 5, 2021

Local equator crossing time: 5:40 AM

No.	Group	Instrument
1	Optical Imager	Medium Resolution Spectral Imager-Low Light (MERSI-LL)
2	Passive Microwave Sounder	Microwave Temperature Sounder-III (MWTS-III)
		Microwave Humidity Sounder-II (MWSH-II)
3	GNSS Occultation & Reflection	GNSS Radio Occultation Sounder (GNOS-II)
4	Active Microwave	Wind Radar (WindRAD)
5	Hyperspectral Sounder	High Spectral Infrared Atmospheric Sounder-II (HIRAS-II)
6	Solar Irradiance Observation	Solar Irradiance Monitor-II (SIM-II)
		Solar Spectral Irradiance Monitor (SSIM)
7	Space Weather Sensor	Space Environment Monitor-II (SEM-II)
		Triple-angle Ionospheric Photometer (Tri-IPM)
		Solar X-ray and Ultraviolet Imager (X-EUVI)

- FY-3E together with the mid-morning and afternoon satellites provides an optimal temporal distribution.
- NWP communities will significantly benefit.
- Further benefits are expected in severe weather/climate events monitoring

Zhang, P., et al., 2021: Adv. Atmos. Sci., <https://doi.org/10.1007/s00376-0211304-7>;
 Zhang P., et al., 2023 BAMS.DOI: 10.1175/BAMS-D-22-0045.1

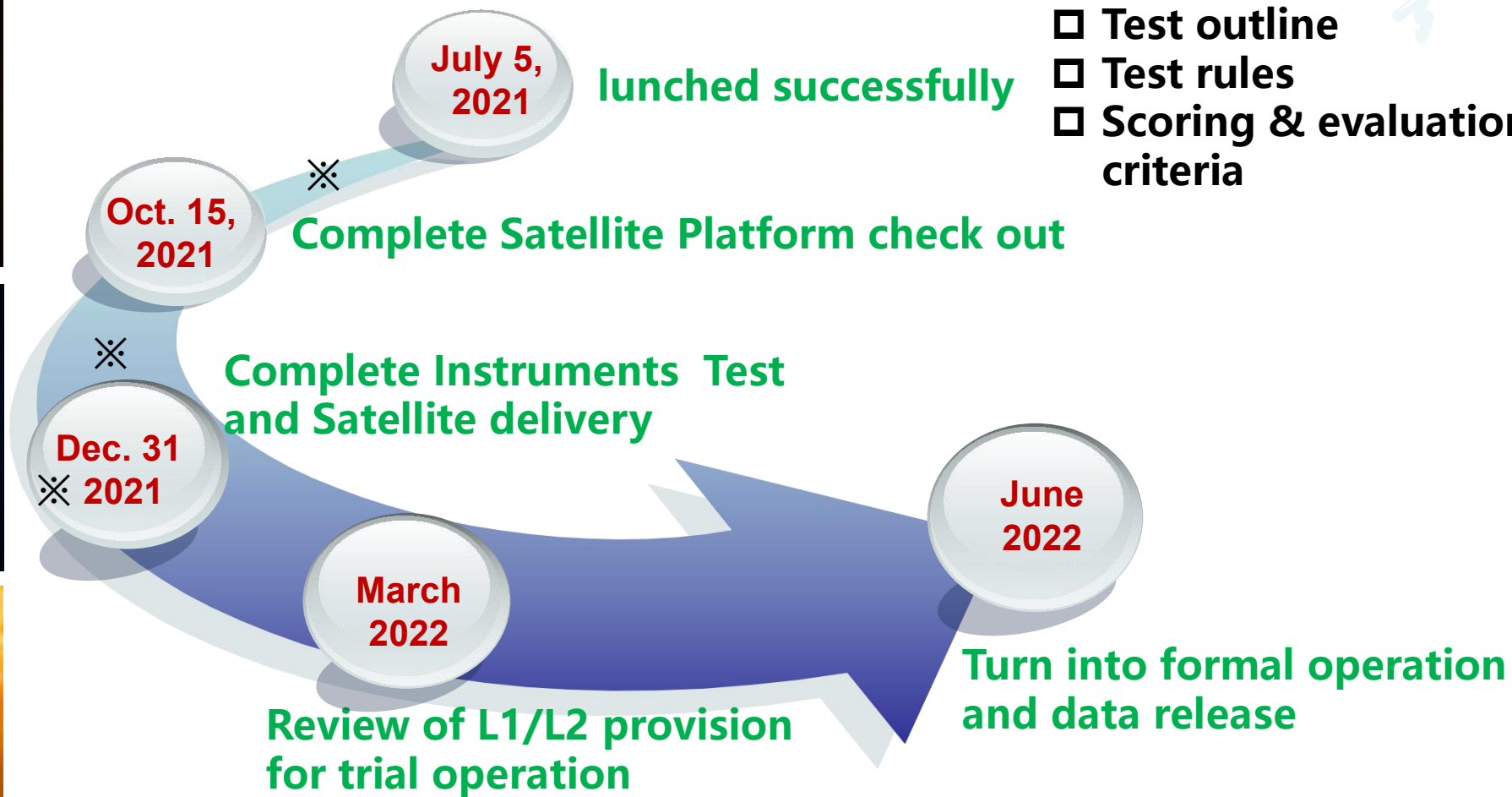


Schedule of FY-3E in-orbit testing after the launch

The first picture of the third phase was released at a press conference of the CMA



- Use requirements
- Test outline
- Test rules
- Scoring & evaluation criteria



FY-3E quantitative products

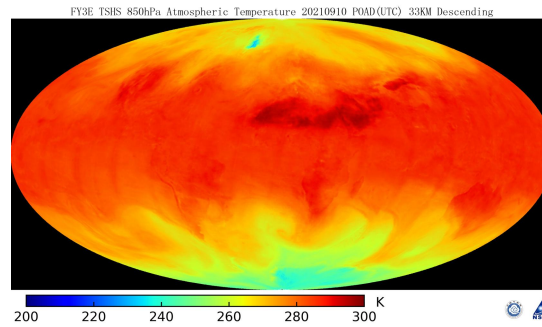
Types	Name
Image	Quasi constant contrast image
	City lights
	Global IR mosaic
	Vertical sound image
Cloud and Radiation	Cloud type
	,Outgoing long-wave radiation
Atmospheric parameter	Atmospheric temperature and humidity profile
	Atmospheric temperature and humidity profile—Microwave
	GNOS-II Atmospheric temperature and humidity profile
	MWHS-II rainfall
Sea and Land	LST
	WindRAD Sea wind field
	GNOS-II SWS
	GNOS-II Atmospheric Density profiles
Space weather	Tri-IPM Total Electron Content
	SEM products
	X-EUVI image
Cryosphere	WindRAD Sea ice

Six categories and eighteen types

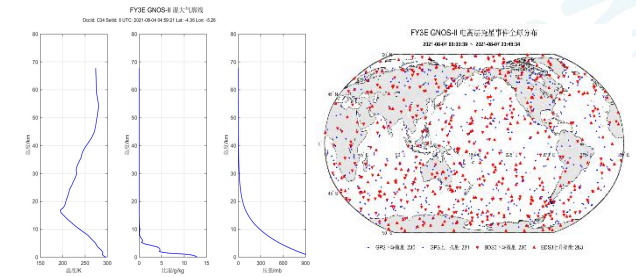
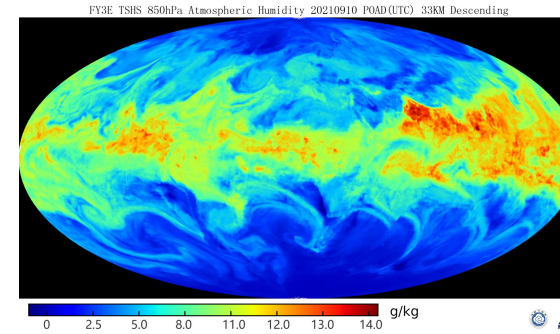
Demonstration of atmospheric, Marine and land surface products

atmosphere

heat

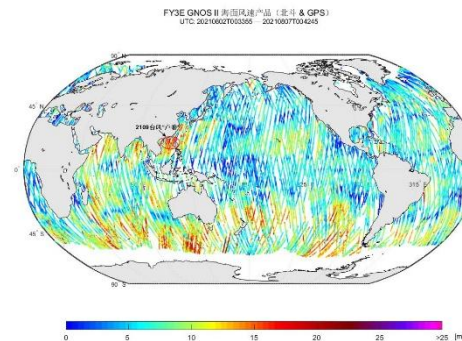
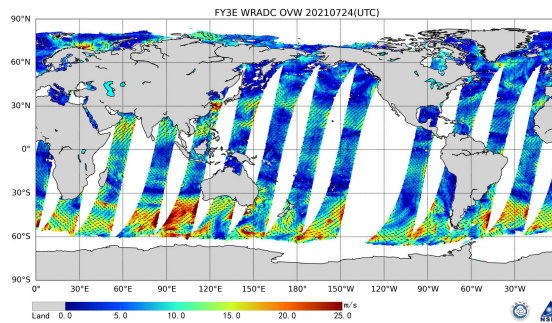


humidity

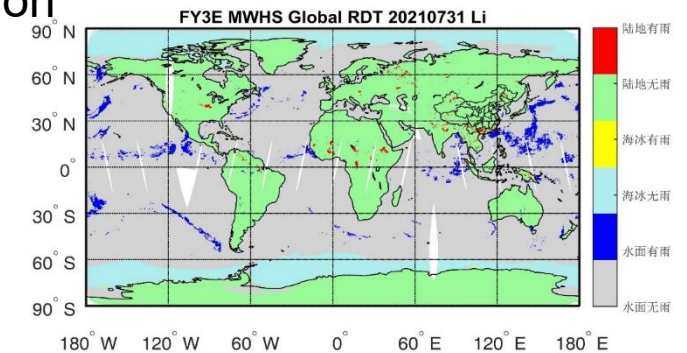


Land and sea surface

motion

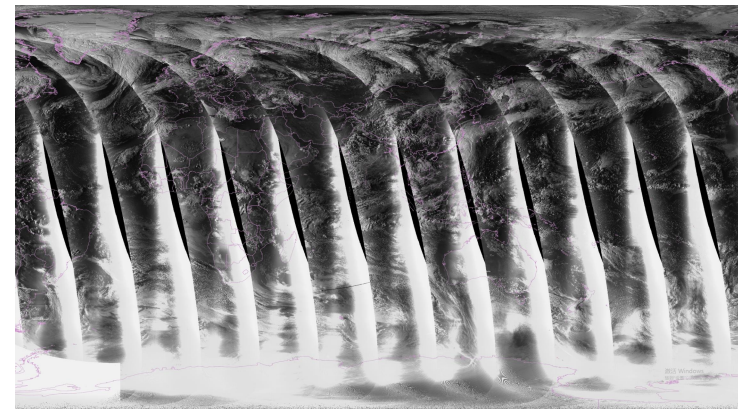
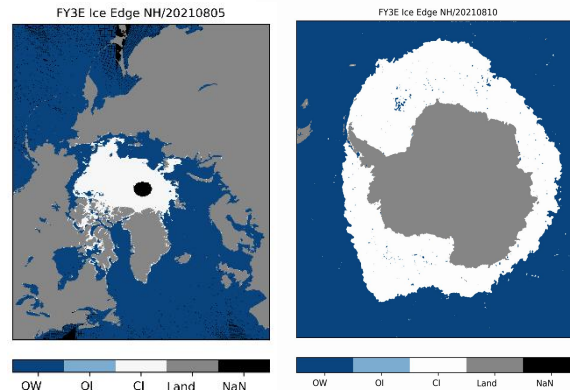


precipitation



Cryosphere

Polar ice

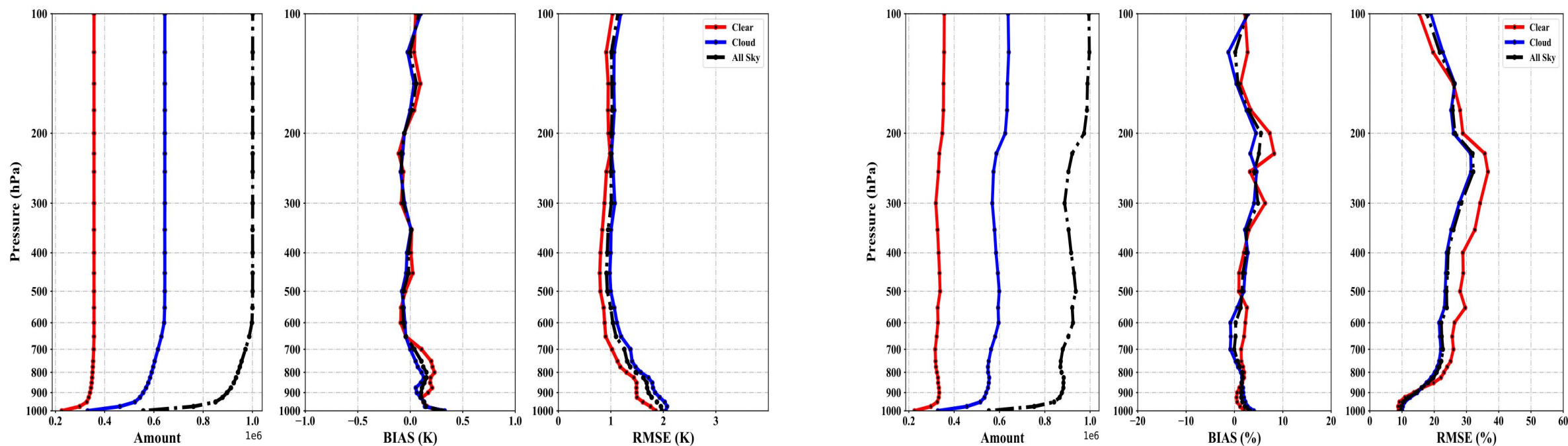


Low light/Infrared images

Atmospheric parameters——Temperature and Humidity

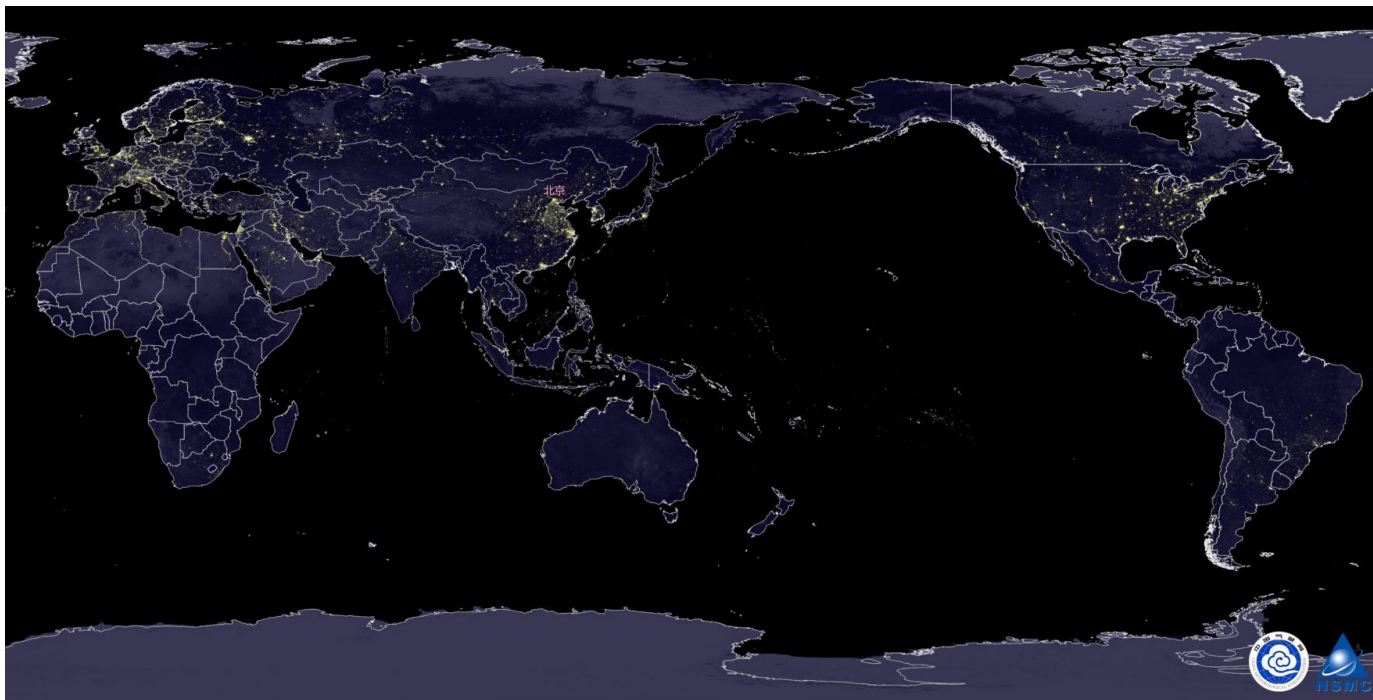
Quality evaluation:

- Compared with ERA5 reanalysis field, the preliminary test conclusion: the precision of clear sky ocean temperature profile & relative humidity is better than 1.5K, and 15%, respectively.

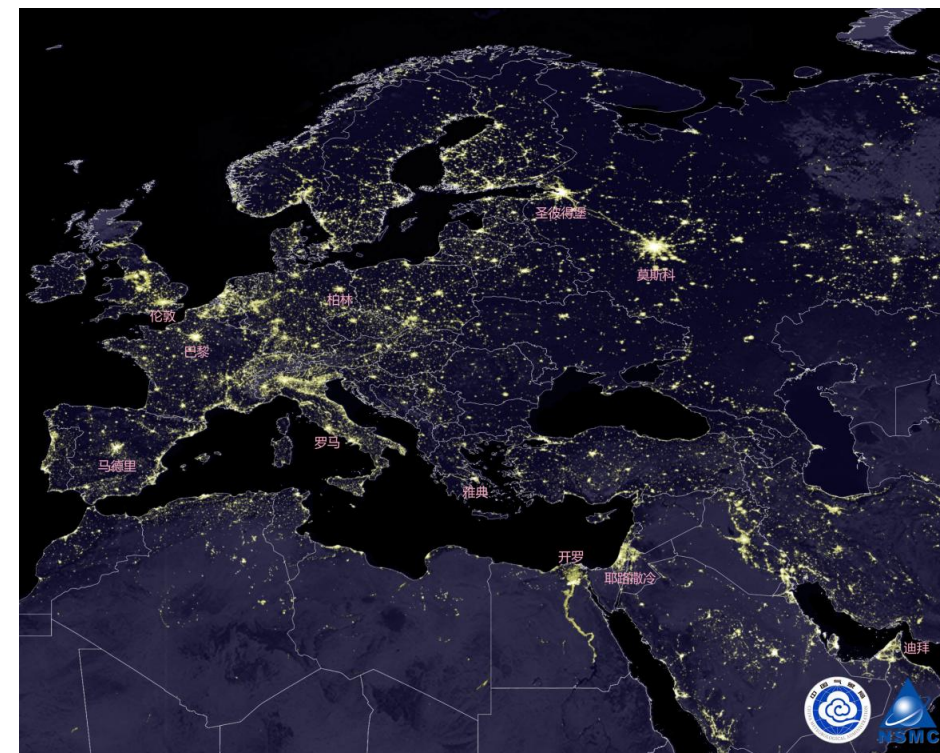


Comparison and verification of FY-3E/VASS temperature and relative humidity profiles with ERA5 reanalysis data

Nighttime Light of FY-3E



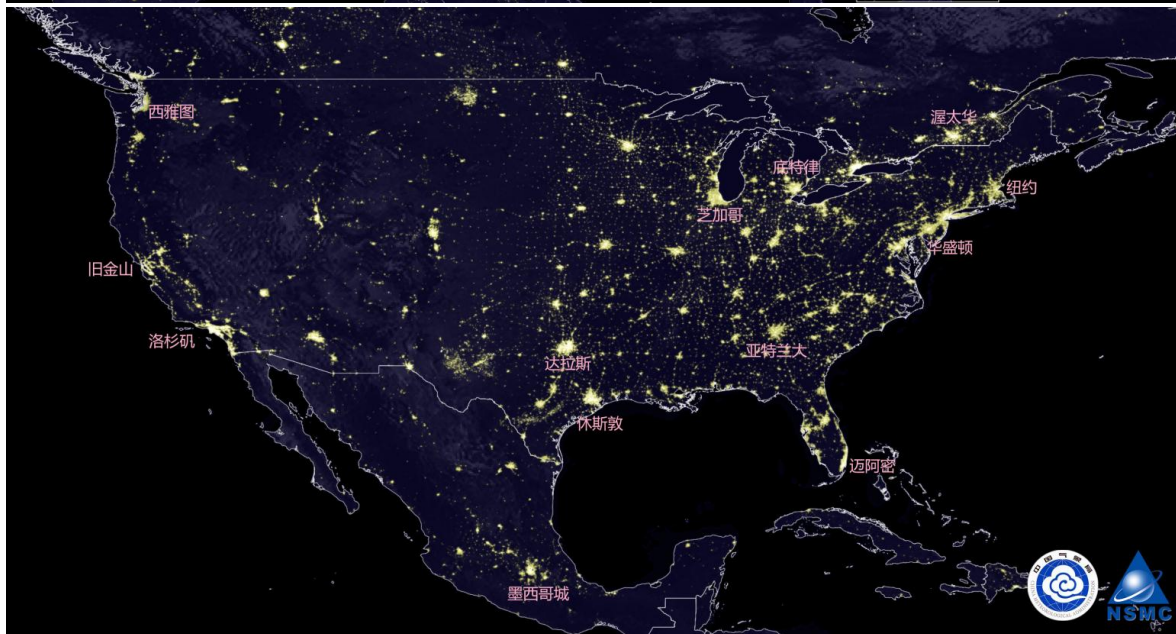
City lights in Europe are very dense, especially in the area from Western Europe to Central Europe. Moscow and St. Petersburg are particularly dazzling in Eastern Europe. In addition, Nile Valley in Egypt along the river has high dense lights.



FY3E is equipped with a low light channel, which can detect weak visible light sources at night, greatly improving China's ability to monitor weather and climate conditions and human activities. City lights can reflect the infrastructure construction level and energy consumption, as well as the economic development level and population. Its changes can be used to assess the impact of urban development, natural disasters and war. The city light thematic map of FY-3E shows China, USA and Europe are obviously regions.

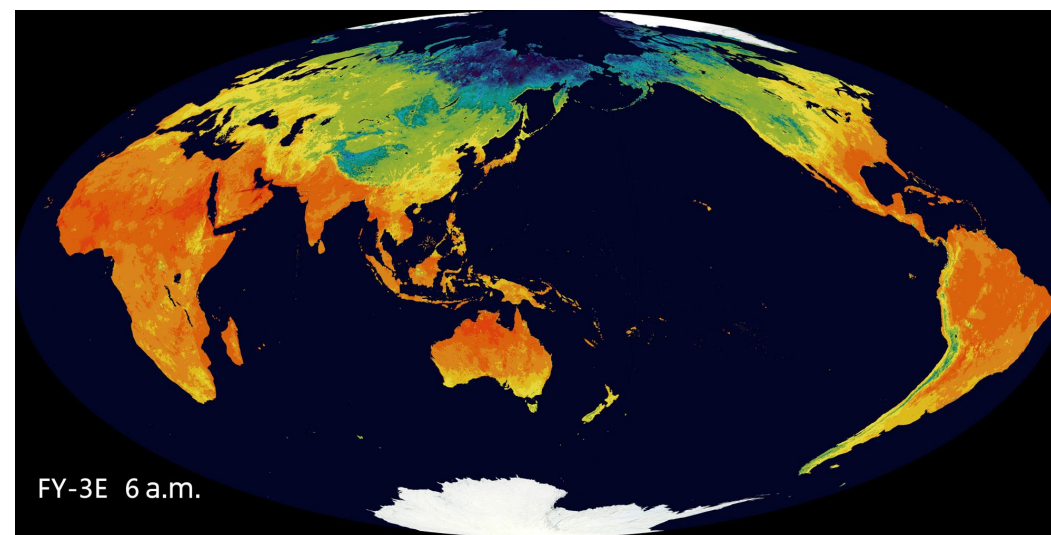
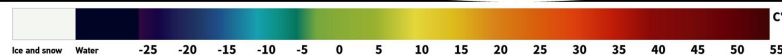
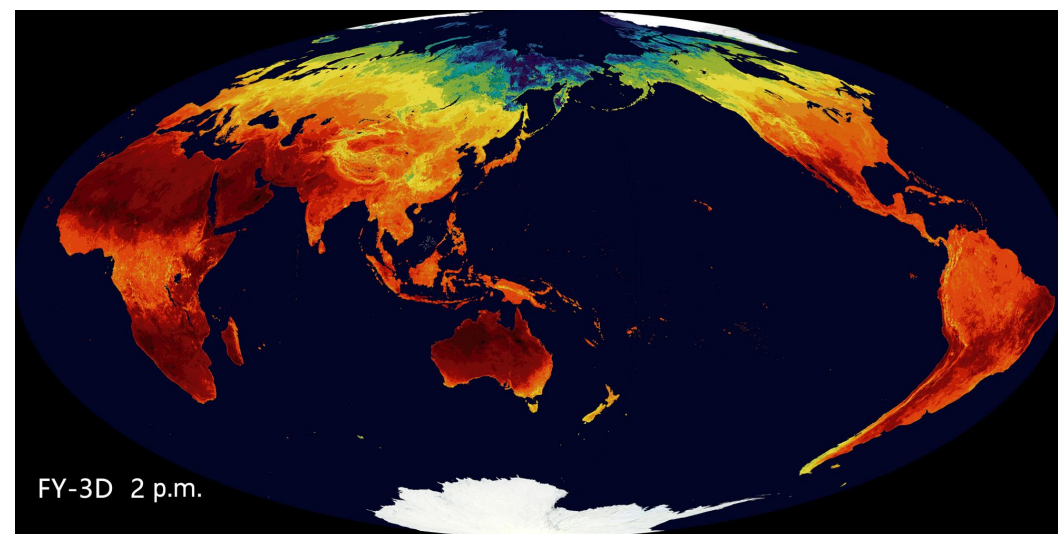
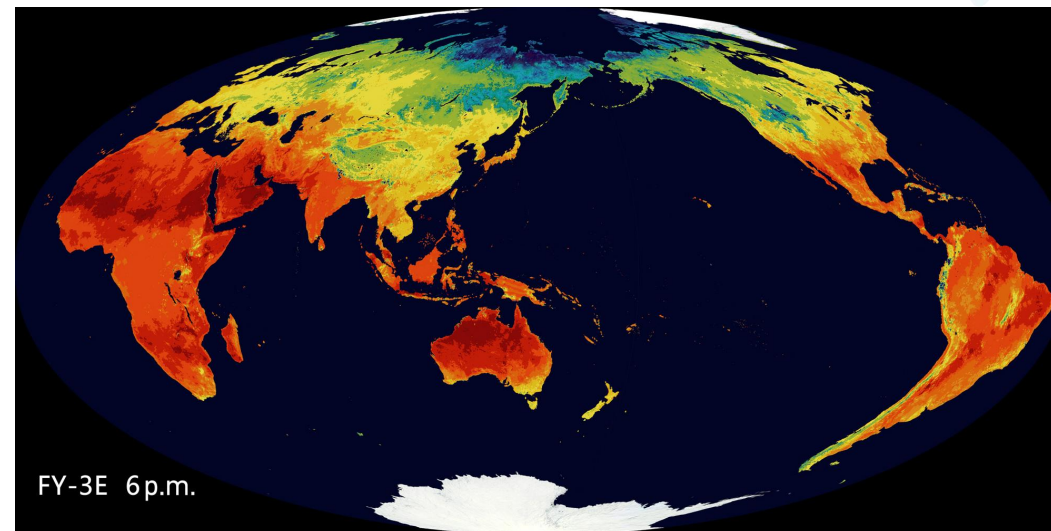
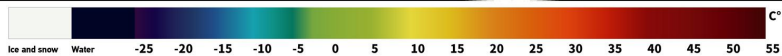
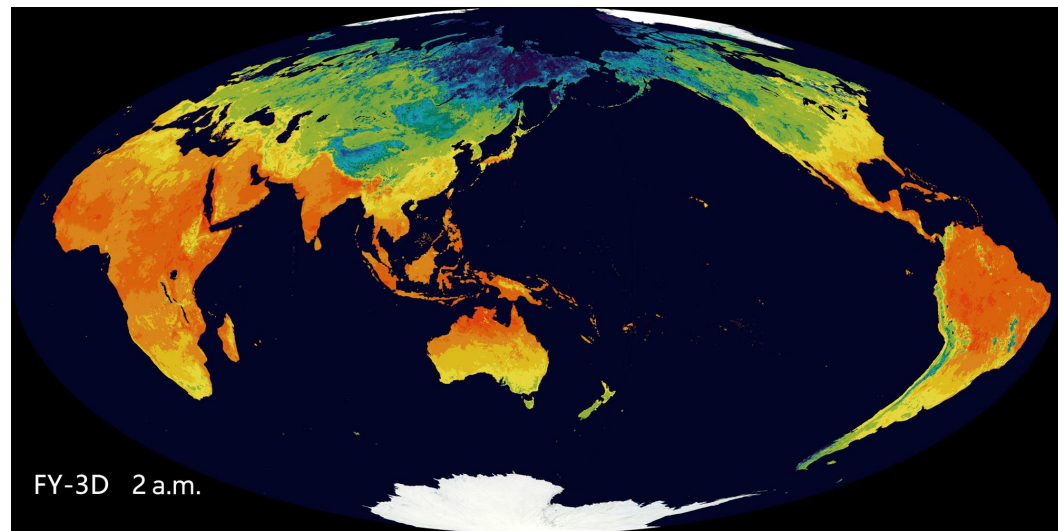


City lights in China are mainly distributed in the east, especially in the Beijing Tianjin Hebei, Yangtze River Delta and Pearl River Delta regions. Provincial capitals are outstanding in the central and western regions. Strong contrast between South Korea and North Korea on the Korean Peninsula.

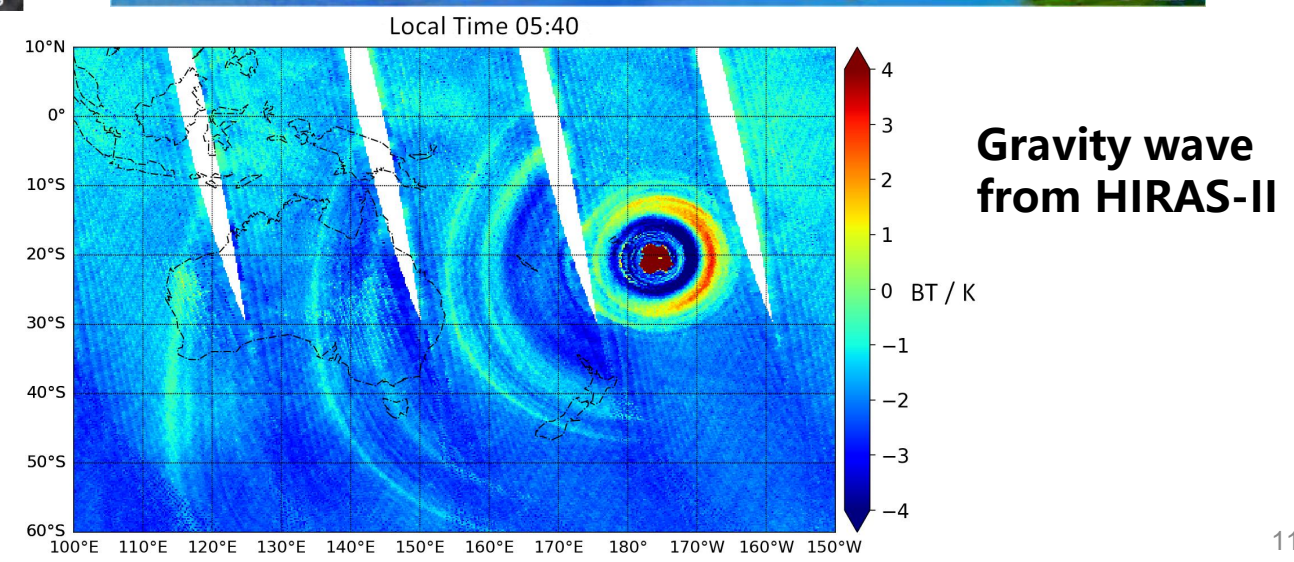
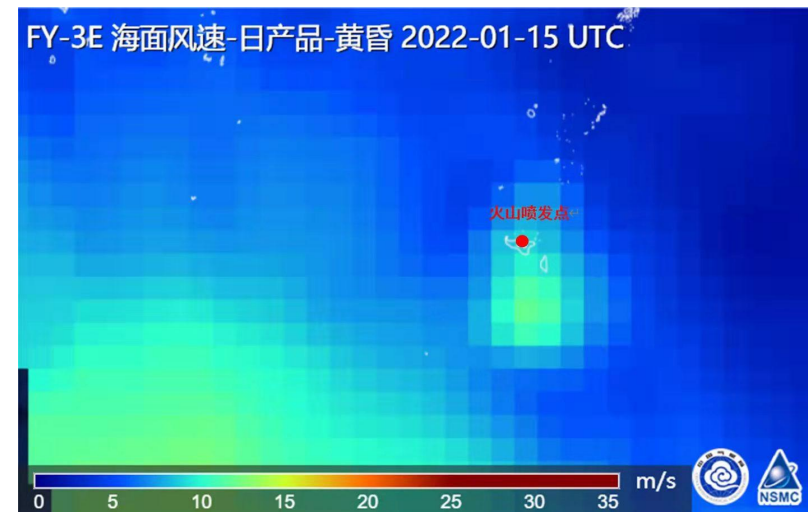
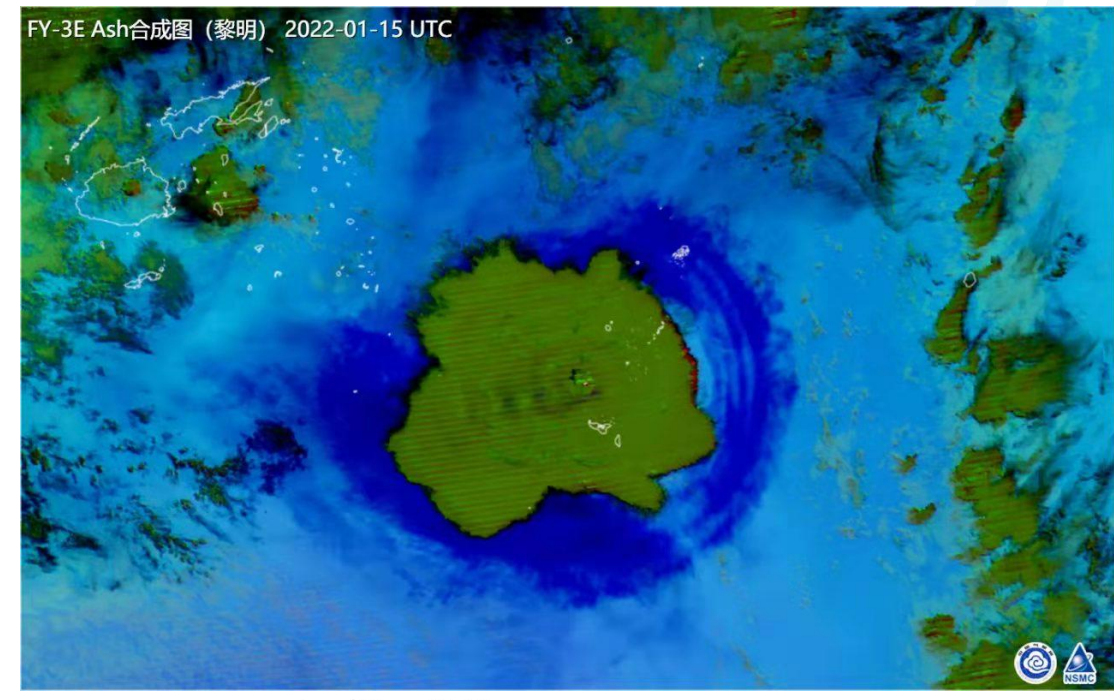
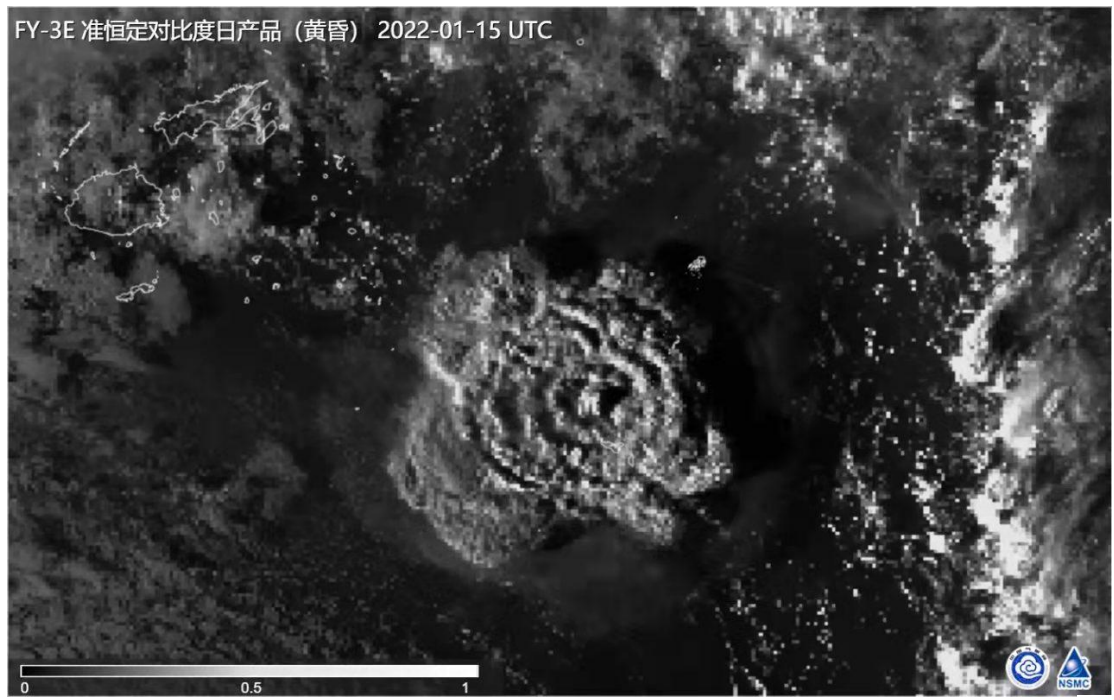


Lighting areas on the east coast and the Great Lakes region of USA. Several major cities in the central and western regions have extended traffic routes, small cities regularly distributed, forming into a city network. In contrast, there is little light in the west, especially in several large cities such as Los Angeles, San Francisco, Seattle, etc.

Land surface Daily variation from FY-3E and FY-3D (2021.10)



FY-3E Tonga Volcano monitoring



- ❑ FY-3G, was successfully launched on 16 April 2023 and became the world's third satellite to measure precipitation with space-borne radar after the TRMM in 1997 and GPM in 2014



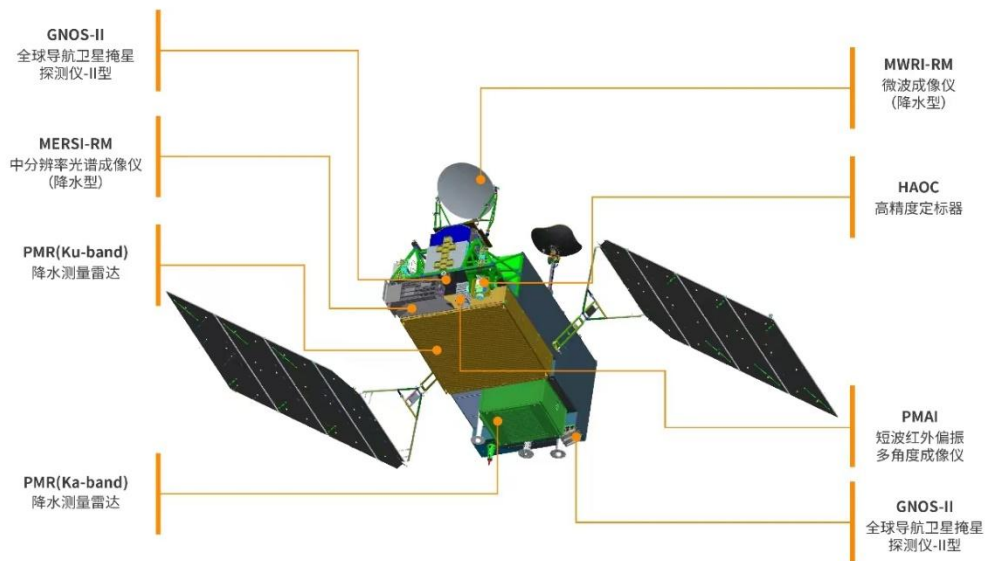
Distinguishing Feature

- ❑ FY-20, 20 satellites in FY family
- ❑ First satellite in China to measure precipitation
- ❑ China has become the only country in the world which operates meteorological satellites in four near-earth orbits (EM, AM, PM, Low Inc.)

Scientific Goal

- ❑ 3D structure of precipitation in high accuracy
- ❑ Global distribution characteristics of precipitation, especially over the ocean and in the mountain areas
- ❑ Enhance understanding on extreme precipitation, energy and water cycle, etc.

Payloads Configuration

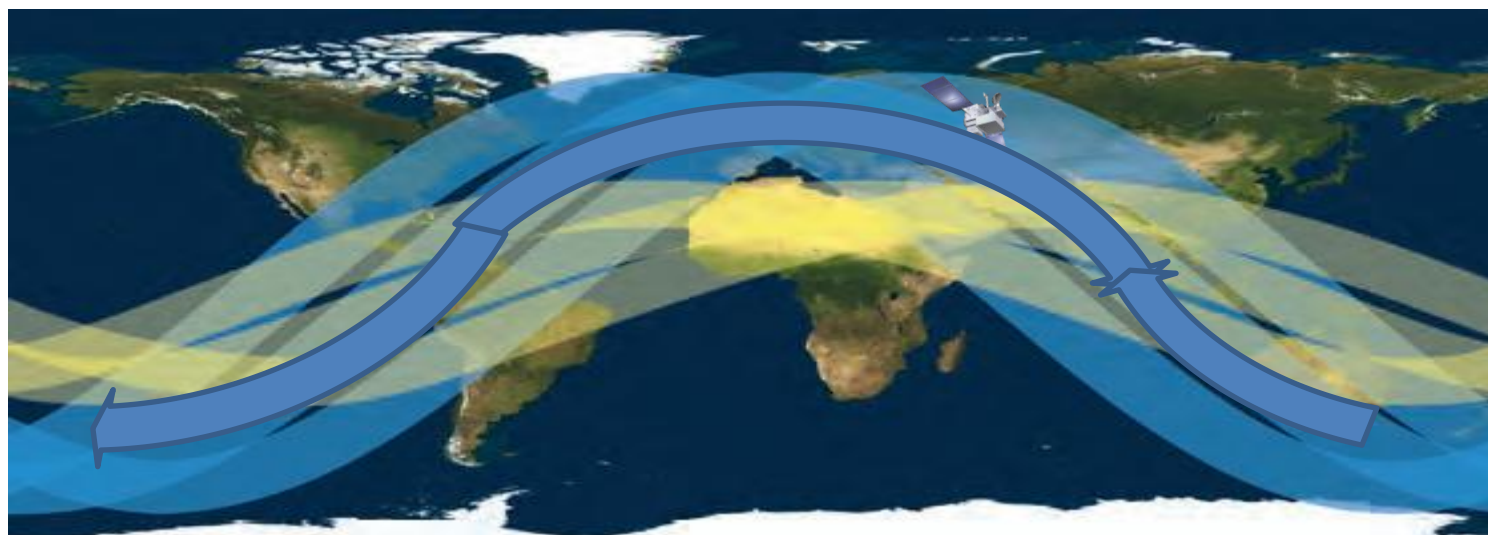


Insturment	Abbr.	Chan No.	Swath Width (km)
Precipitation Measurement Radar	PMR	2	300
Microwave Radiation Imager	MWRI-RM	26	800
Medium Resolution Spectral Imager	MERSI-RM	8	1000
Global Navigation Satellite System Occultation Sounder	GNOS-R	4	--
High Accuracy On-board Calibrator	HAOC	440/220	50
Short-wave Infrared Polarized Multi-Angle Imager	PMAR	12	700

Inclination

TRMM
GPM
FY-3G

35°
65°
50°



□ Operation

□ R & D

Parameters of FY-3G PMR, TRMM PR and GPM DPR

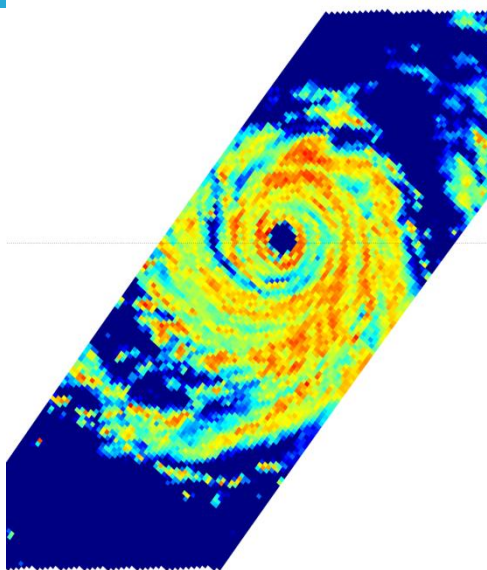
Comparison of the main parameters of PMR with TRMM PR and GPM DPR

Radar Systems	FY-3G PMR	TRMM PR	GPM DPR
Frequency band	dual-frequency (Ku, Ka)	single-frequency (Ku)	dual-frequency (Ku, Ka)
Swath width(km)	>300	215 (@350 km orbit altitude)	245(Ku), 125(Ka)
Horizontal resolution (km)(Nadir)	5	4.3(@350 km orbit altitude)	5.2
Range resolution(m)	250	250	250(Ku), 250/500(Ka)
Observation range(km)	18~—5 ASL	15~—5ASL	18~—5ASL(Ku) 18~—3ASL(Ka)
Minimum detectable precipitation rate(mm/h)	0.5(18 dBZ, Ku), 0.2(12 dBZ, Ka)	0.7(@350 km orbit altitude)	0.5(Ku), 0.2(Ka)
Dynamic range(dB)	≥70	≥70	≥70
Measurement accuracy(dB)	≤ ±1	≤ ±1	≤ ±1
Beam-matching accuracy(°)	≤0.1	/	≤0.14
Antenna peak sidelobe(dB)	≤ 30	≤ 25	≤ 25

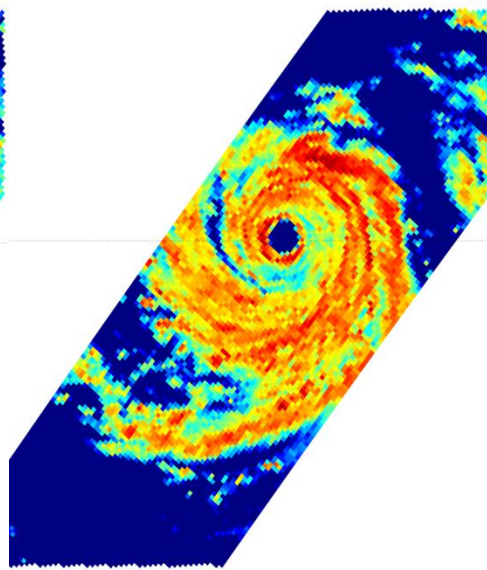
Zhang, P., et al., 2023: FY-3G satellite instruments and precipitation products: first report of China's Fengyun rainfall mission in-orbit. Journal of Remote Sensing, Article ID: 0097. DOI: 10.34133/remotesensing.0097



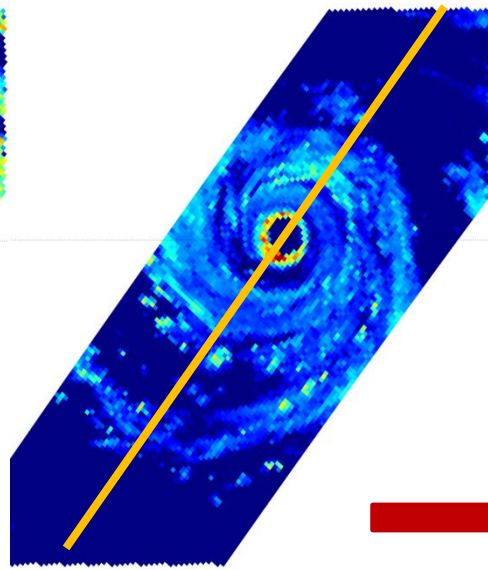
FY-3G PMR VS GPM DPR (2302 Typhoon Mawar on May 25) --- Ku Band



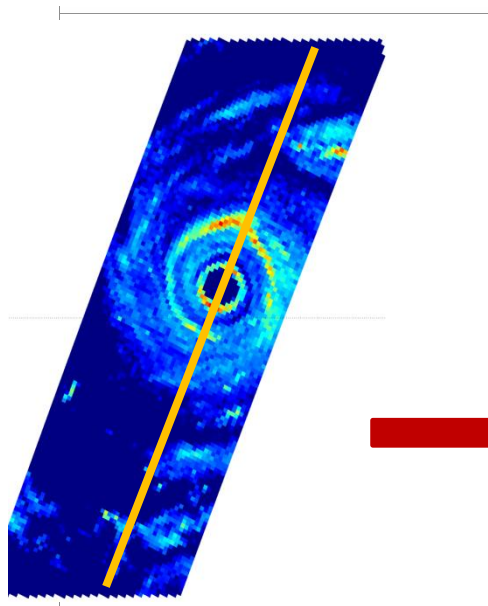
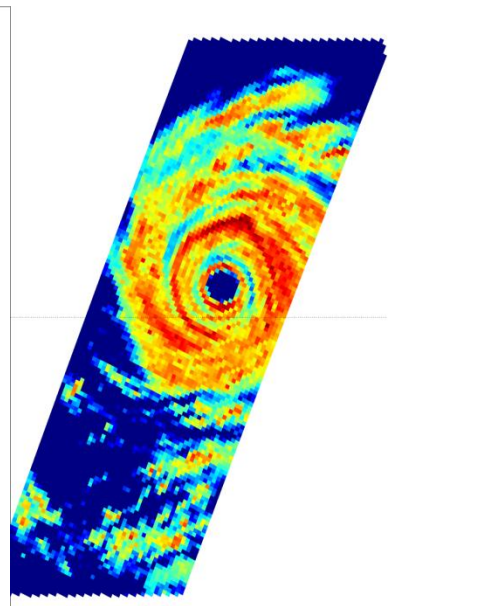
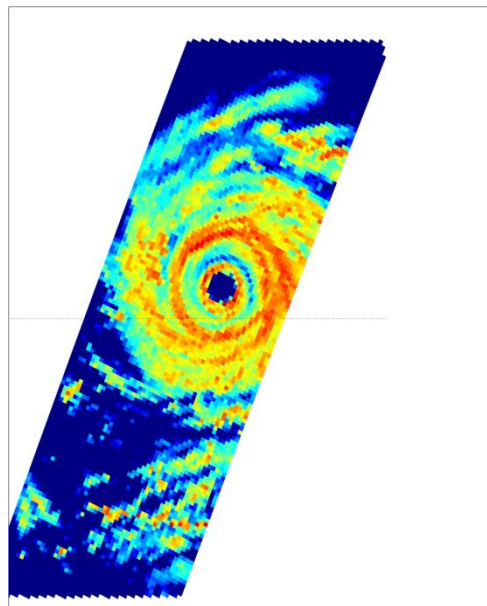
3km Alt.



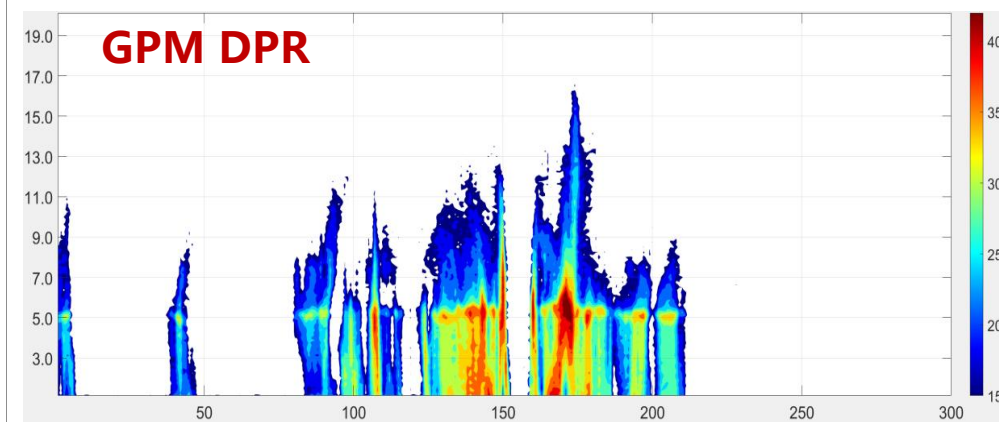
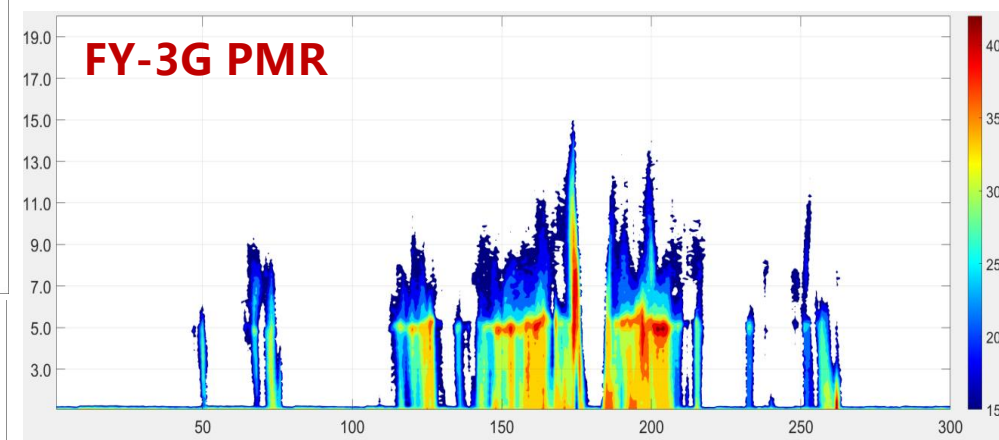
5km Alt.

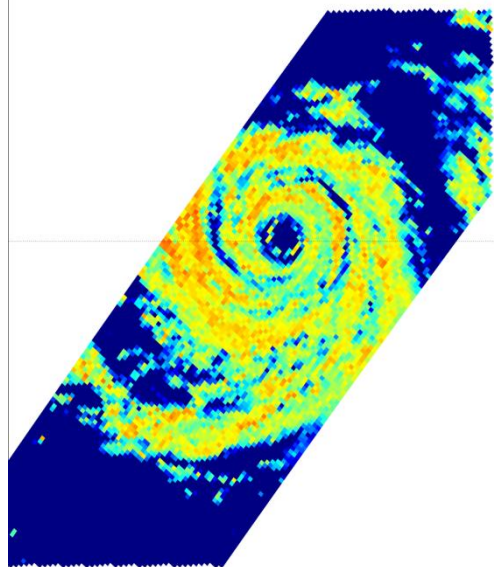


7km Alt.

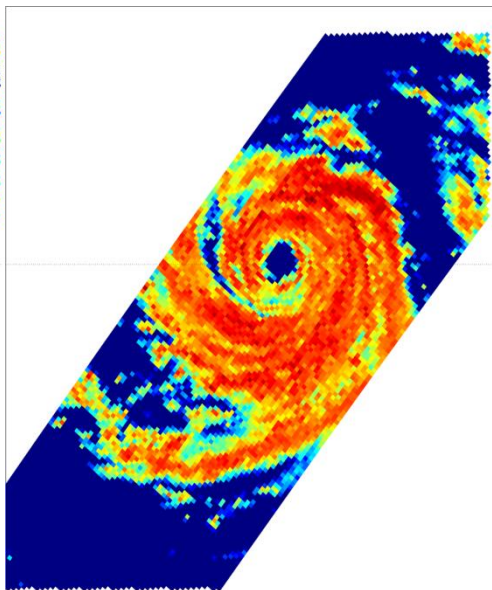


- The structure and value are similar
- Swath is wider
- Minimum detectable precipitation intensity is 15 dbZ (better than the nominal parameter 18 dbZ)

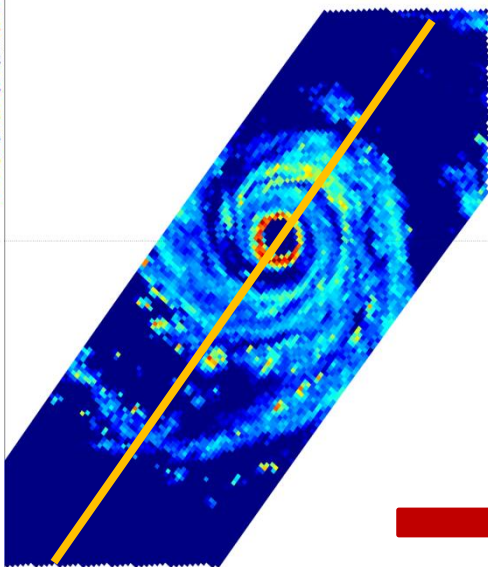




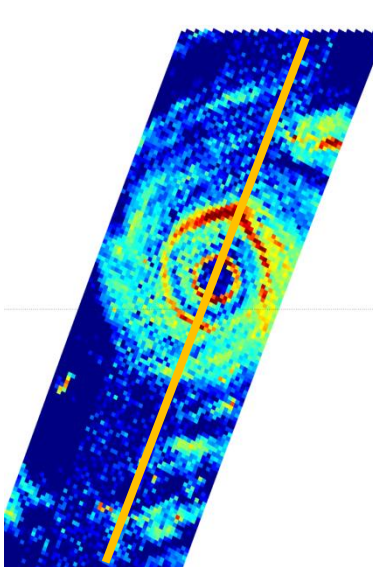
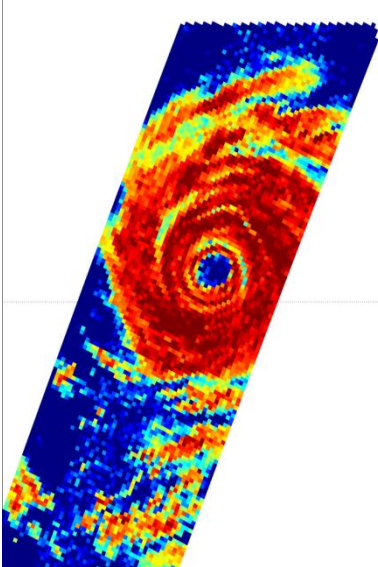
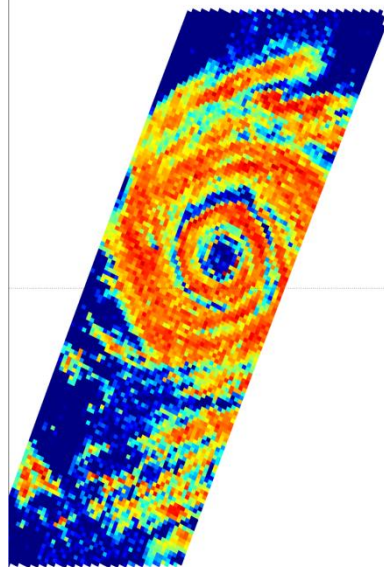
3km Alt.



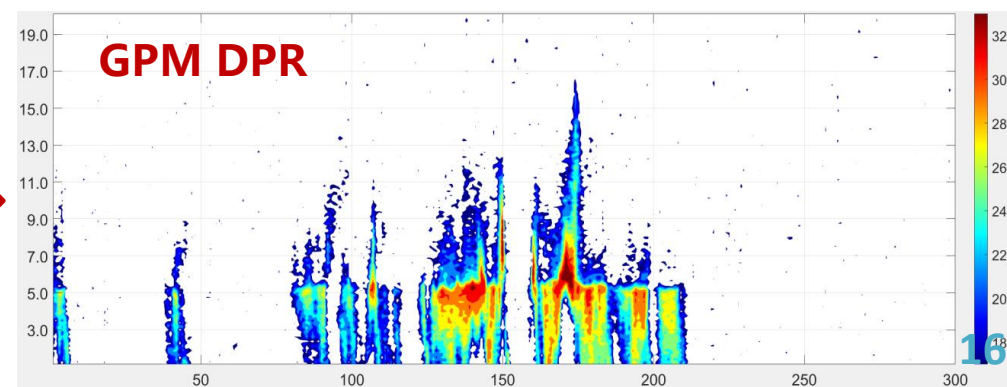
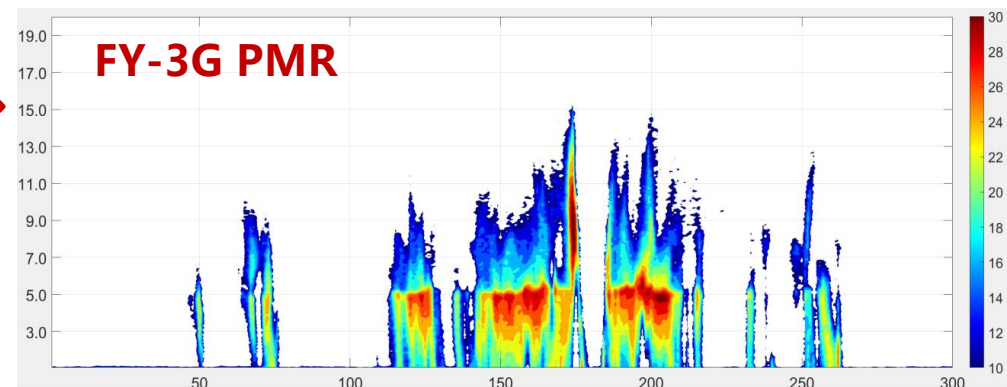
5km Alt.



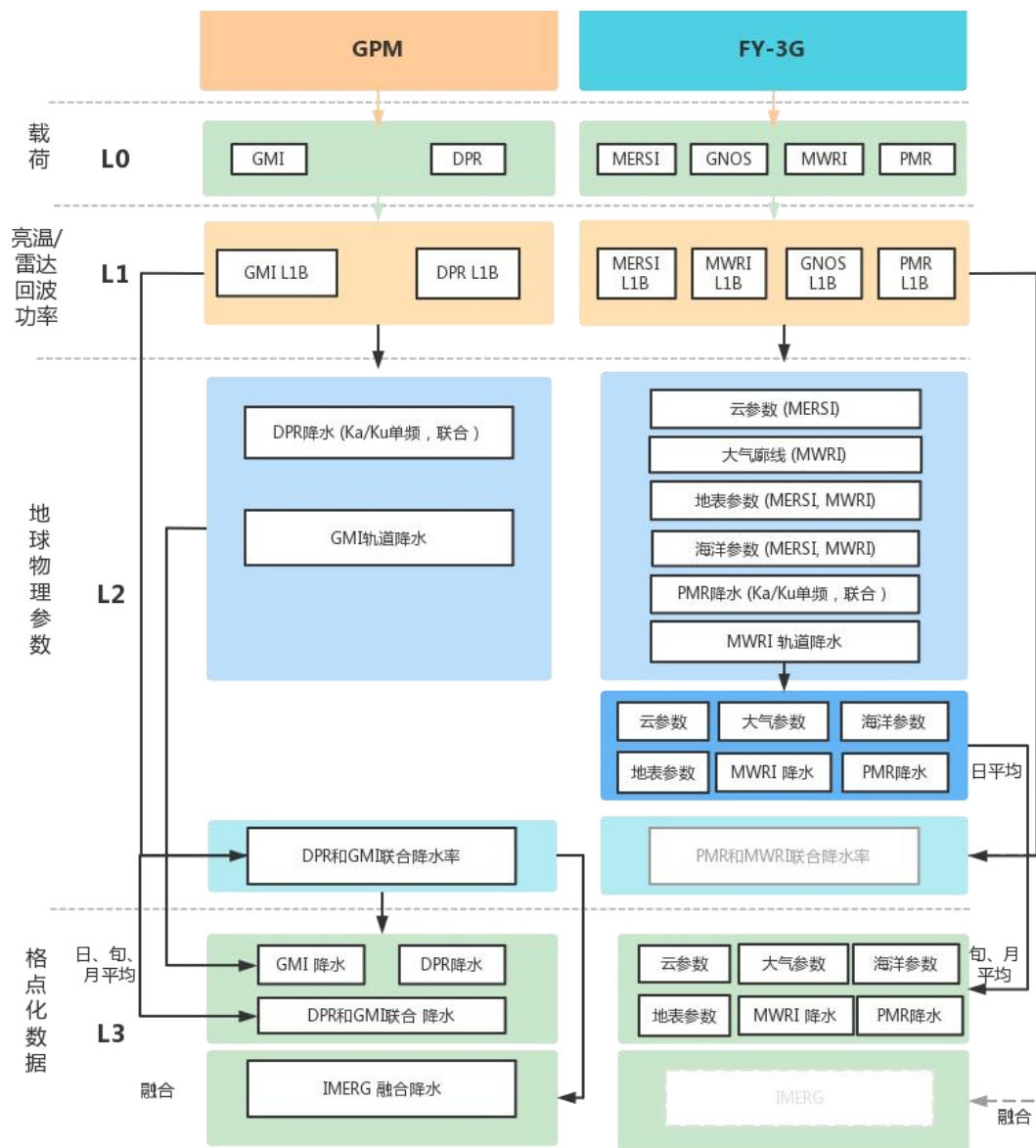
7km Alt.



- Minimum detectable precipitation intensity is 10 dbZ (better than the nominal parameter 12 dbZ)
- The overall performance is equivalent to GPM DPR



FY-3G Satellite Product System Design



DPR

- 1 Ka/Ku 亮带检测
- 2 Ka/Ku 降水相态
- 3 Ka/Ku 降水分类
- 4 Ka/Ku 降水率
- 5 双频降水率
- 6 潜热

GMI

- 1 水凝物廓线
- 2 降水

PMR

- 1 Ka/Ku 亮带检测
- 2 Ka/Ku 降水相态
- 3 Ka/Ku 降水分类
- 4 Ka/Ku 降水率
- 5 双频降水率
- 6 潜热

MWRI

- 1 水凝物廓线
- 2 降水
- 3 大气可降水 (洋面)
- 4 大气温度廓线
- 5 云水含量
- 6 地表发射率
- 7 雪深/雪水当量
- 8 陆表温度
- 9 土壤水分
- 10 土壤冻融



FY-3G Satellite Product System Design



- Totally 28 products, 34 geophysical parameters, including Cloud (3) 、 Land (7) 、 Ocean (3) 、 Atmosphere (9) 、 Space weather (1) 、 Data assimilation support (2) , Data fusion (3).

No.	Group	Products	Parameters	Payloads
1	Cloud & Radiation	cloud mask	clouds, clear sky mask	MERSI-RM
2		cloud amounts	total cloud amounts, effective cloud amounts	
3		cloud phase	cloud phase, cloud classification	
4	Land	land surface temperature	land surface temperature	MERSI-RM
5		snow cover	snow cover	MERSI-RM
6		snow depth/snow water equivalent	snow depth, snow water equivalent	MWRI-RM
7/8		soil moisture	soil moisture	MWRI-RM, GNOS-II
9		soil freeze thaw	soil freeze thaw	MWRI-RM
10		surface emissivity	surface emissivity	MWRI-RM
11	Ocean	sea surface temperature	sea surface temperature	MWRI-RM MERSI-RM
12/13		sea wind speed	sea wind speed	MWRI-RM, GNOS-II
14	Atmosphere	rain rate	rain rate	MWRI-RM
15		hydrometeor profile	cloud water profile, cloud ice profile, rain water profile, temperature, moisture, rain rate, cloud water contents, cloud ice contents	MWRI-RM
16		precipitable water	precipitable water over sea	MWRI-RM
17		dry atmospheric profile	refractivity, density, pressure profiles	GNOS-II
18		moist atmospheric profile	banding angle, temperature, moisture, pressure profiles	GNOS-II
19		Ku-band radar product	bright band, precipitation type, precipitation phase, rain rate	PMR
20		Ka-band radar product	bright band, precipitation type, precipitation phase, rain rate	PMR
21		Dual-band radar product	bright band, precipitation type, precipitation phase, rain rate	PMR
22		latent heating	latent heating	PMR
23	Space weather	electric density profile	electric density profile	GNOS-II
24	Data assimilation support	MWRI-RM data assimilation support	MWRI-RM data assimilation support	MWRI-RM
25		GNOS-II data assimilation support	banding angle, refractivity (thinning)	GNOS-II
26	Data fusion (scientific experimental products)	MWRI-RM/PMR joint retrieved rain rate	rain rate	PMR+MWRI-RM
27		Integrated Multi-satellite Retrievals for FY-3	rain rate	FY-3D,G,F MWRI
28		Integrated Multi-satellite Retrievals for Fengyun geostationary and polar orbits	rain rate	FY-3+FY-4

March 24, 2024 12:52(UTC)

CCTV 13
新闻

CCTV 央视网
com

200km

10km

Liquid Precipitation Data (mm/h)

0.1 0.2

新闻直播间
LIVE NEWS

中国气象局

风云三号G星正式投入业务运行

星期三 11:47

航行试验。

CCTV 新闻

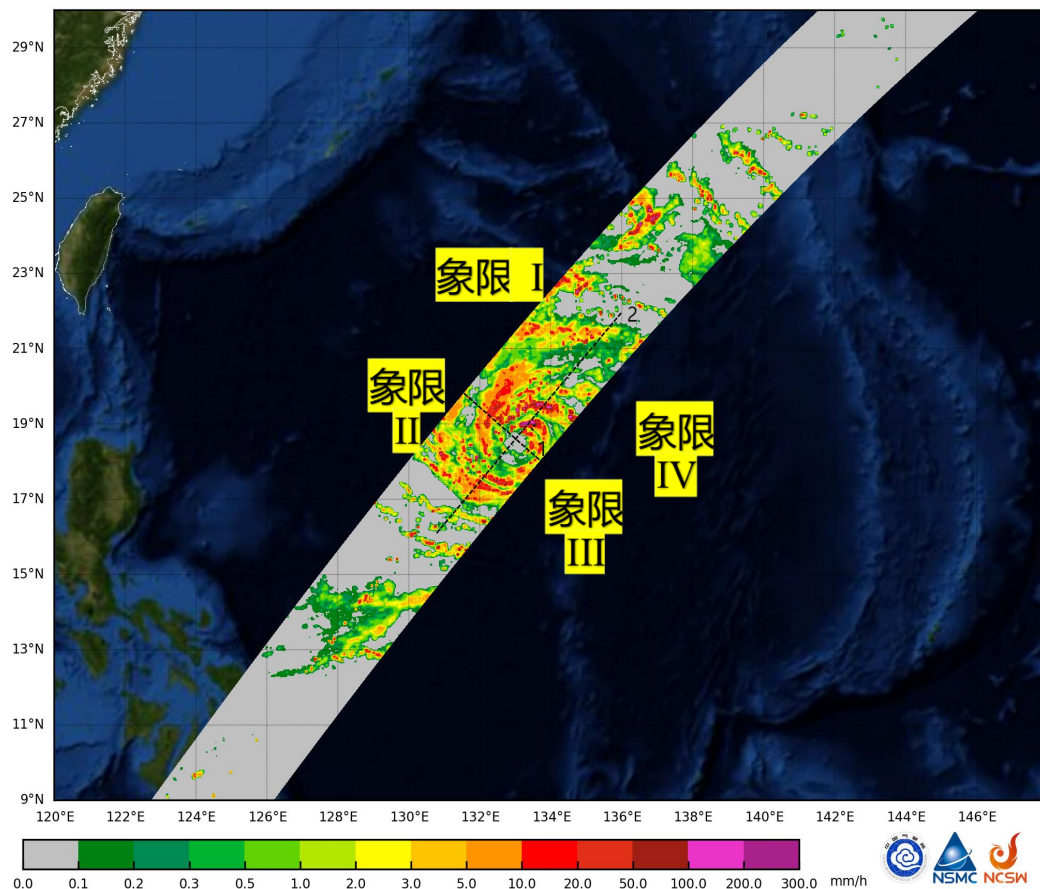
这次海试主要检测验证福建舰动力、电力等系统的可靠性和稳定

On May 1st, FY-3G satellite officially run into operational service.

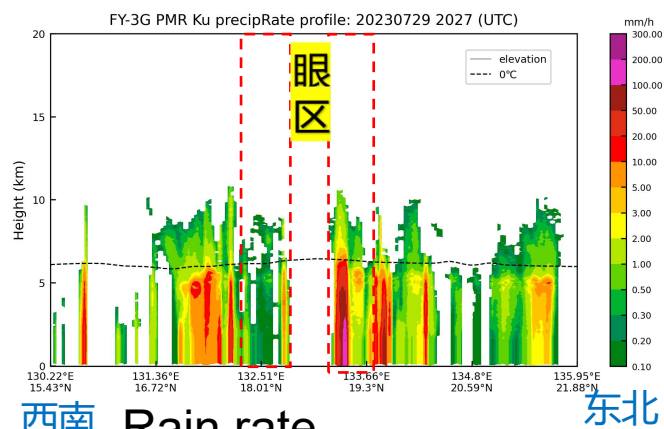
2、Introduction to FY3G Key Products

PMR Ku-Band Radar Product

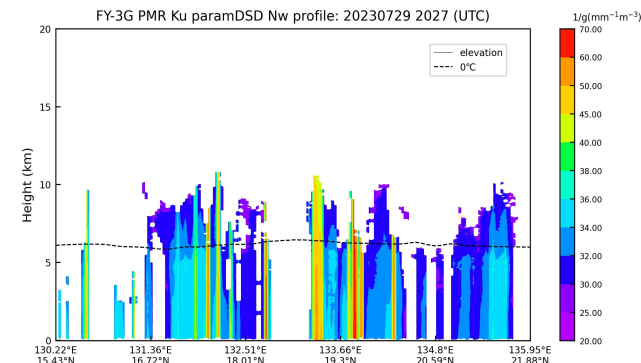
FY-3G PMR Ku NearSurface rainfall on 20230729 2027 (UTC)



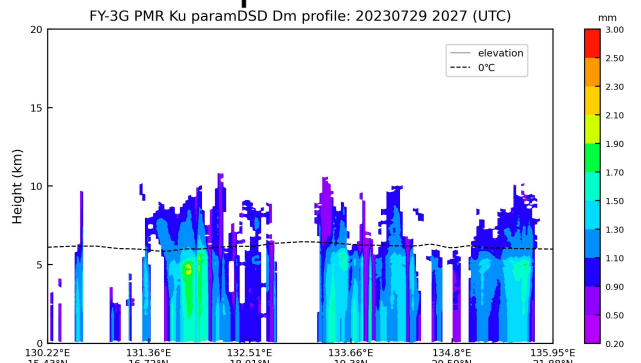
Equivalent reflectivity factor



number concentration



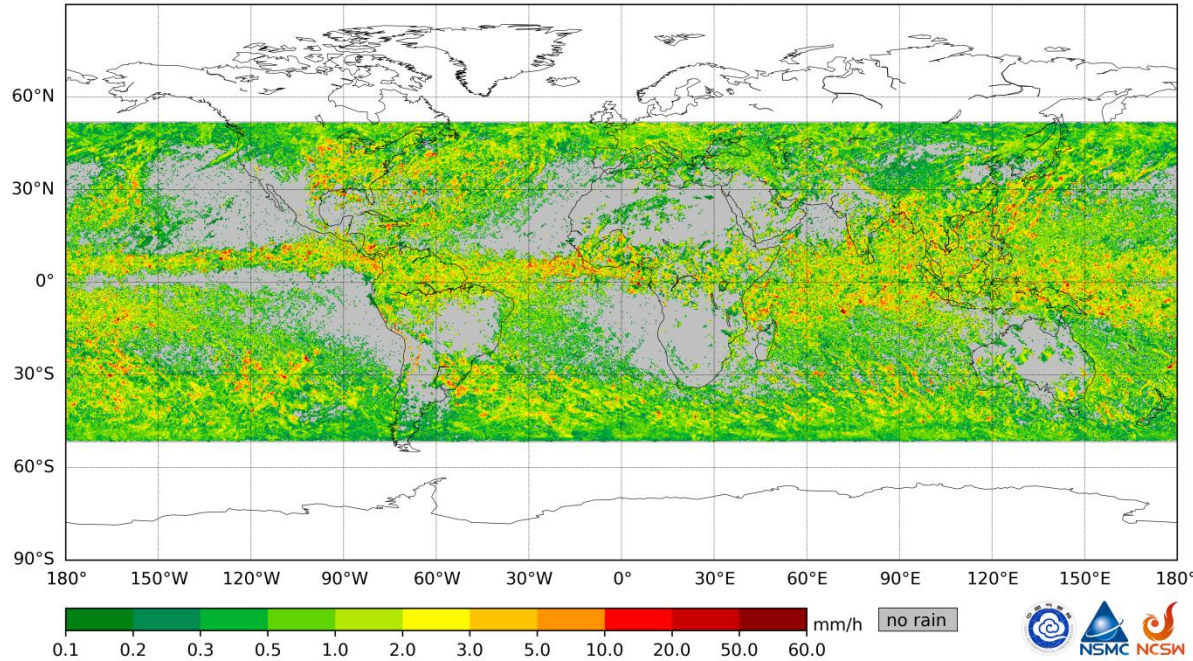
raindrop diameter



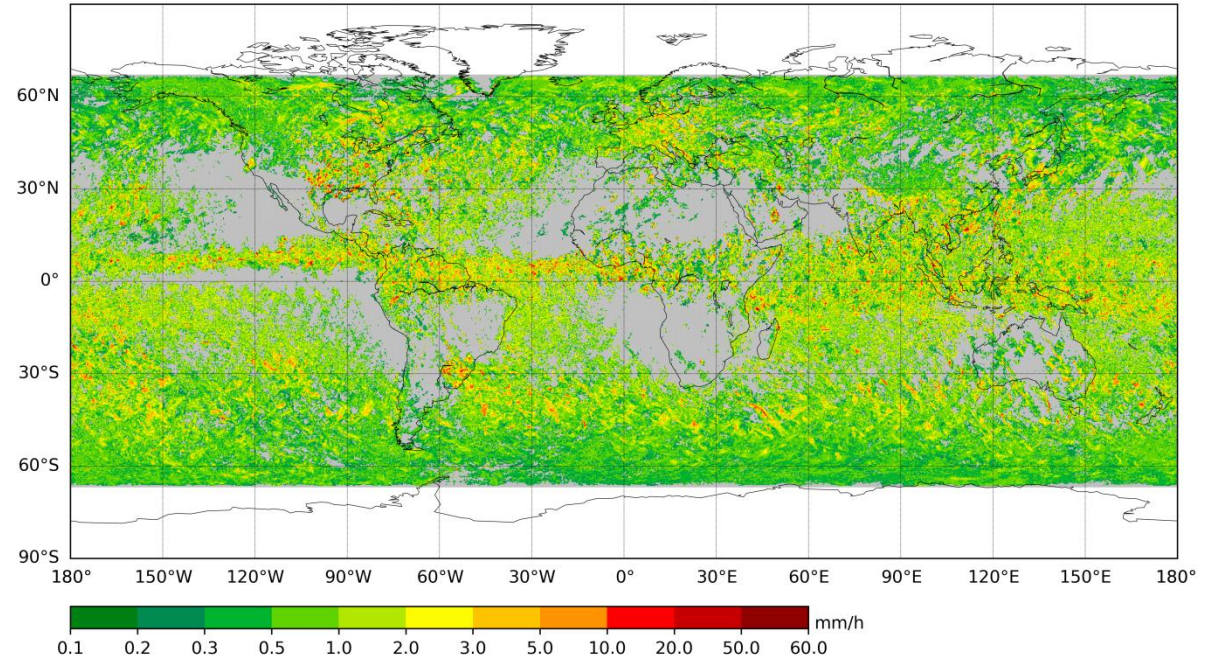
Product	Spatial Resolution (highest)	Coverage	Precision
Ku-band radar product	5 Km(horizontal) 250m (vertical)	55S-55N	Bias<40% (as compared to surface rain observations)

PMR & DPR Monthly Product Comparison

FY3G PMR KuR precipRateESurfMean Monthly Product: 20240531 (UTC)

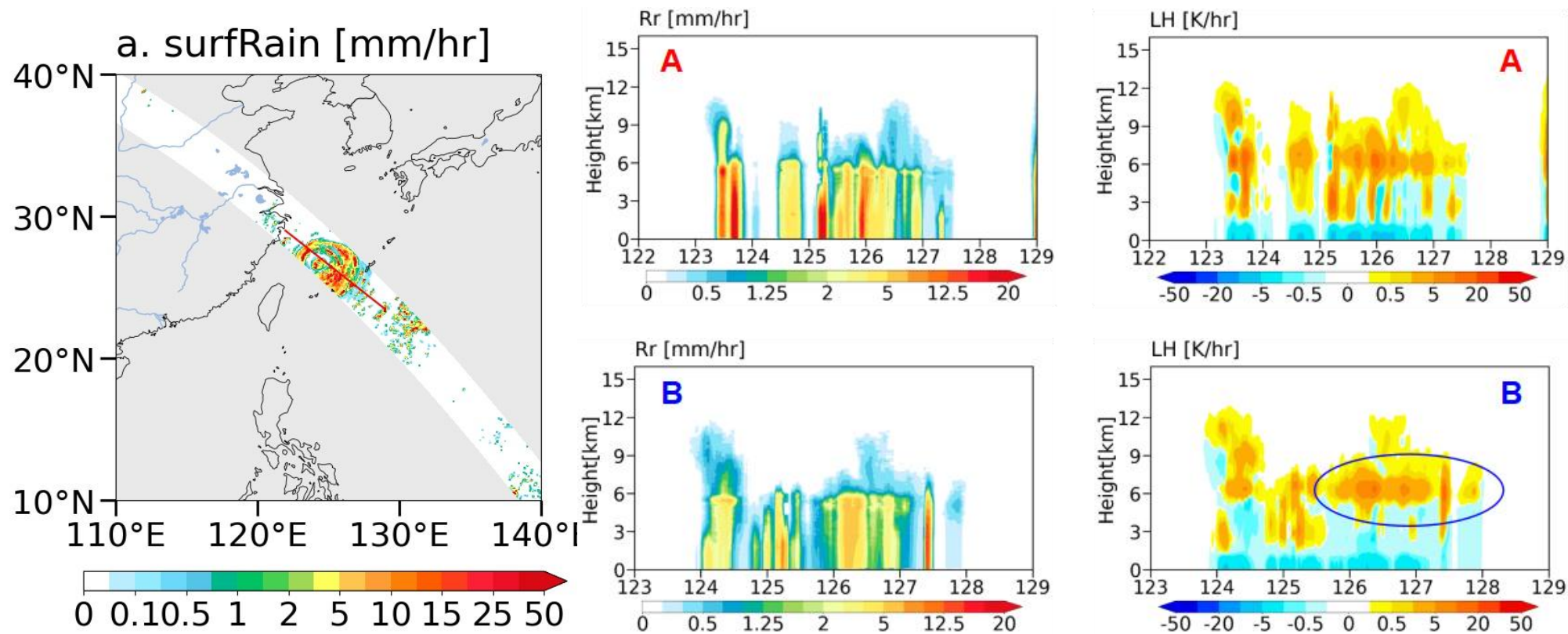


GPM DPR precipRateESurfMean Monthly Product: 20240531 (UTC)



- 1、 The minimum GPM Ze is around 12dBZ, and the minimum PMR Ze is around 10dBZ. The improvement in radar sensitivity results in PMR seeing more weak precipitation.
- 2、 The near surface layer of PMR is about 500 meters higher than that of GPM, and there is more extrapolation of the profile.

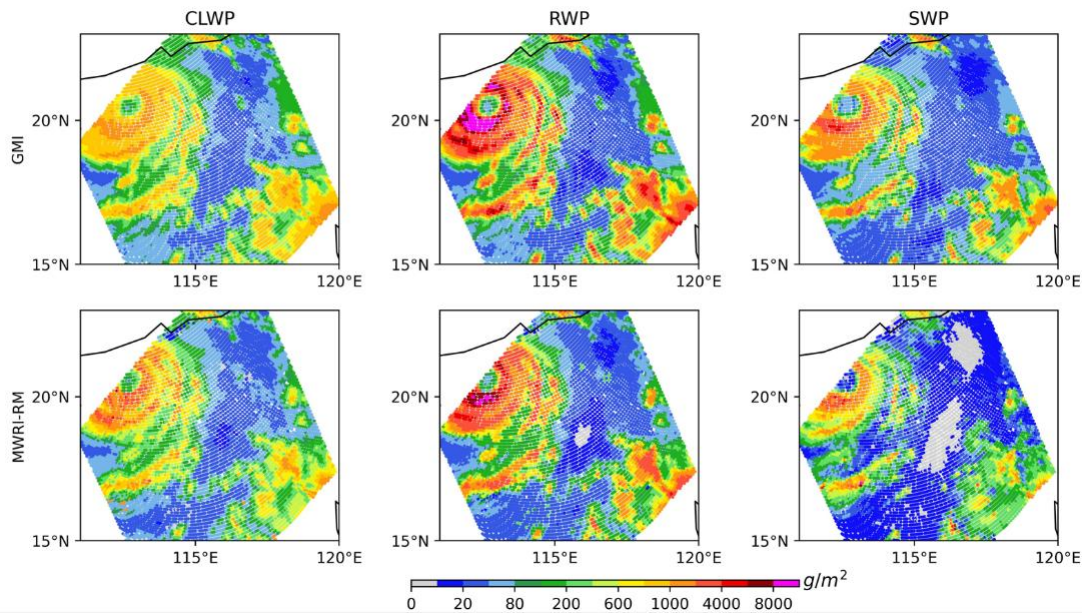
PMR Latent heating



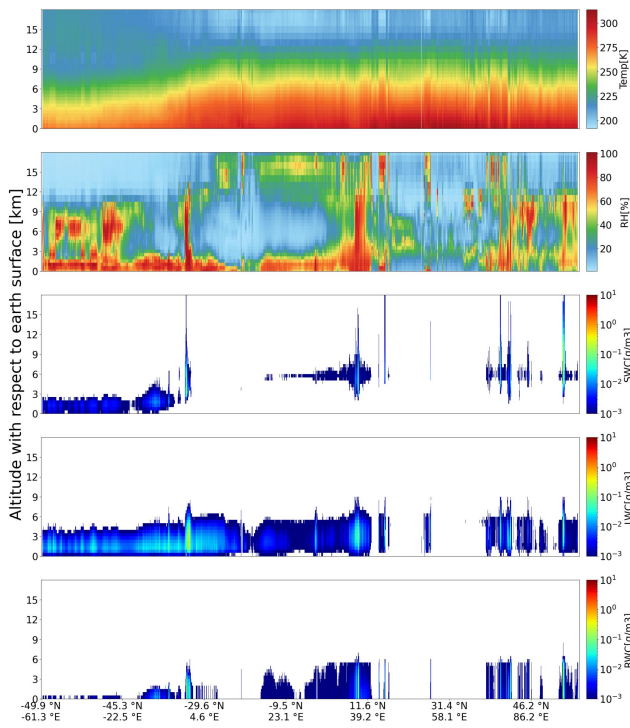
FY-3G PMR Ku band retrieved latent heating for the Super Typhoon Khanun in 2023

Product	Spatial Resolution (highest)	Coverage	Precision
latent heating	5 Km(horizontal) 250m (vertical)	55S-55N	bias: -0.06K/hr

MWRI-RM Hydrometeor profile



FY-3G microwave-retrieved hydrometeor contents (surface rain, ice water, cloud water ,liquid water) for the Super Typhoon Khanun in 2023

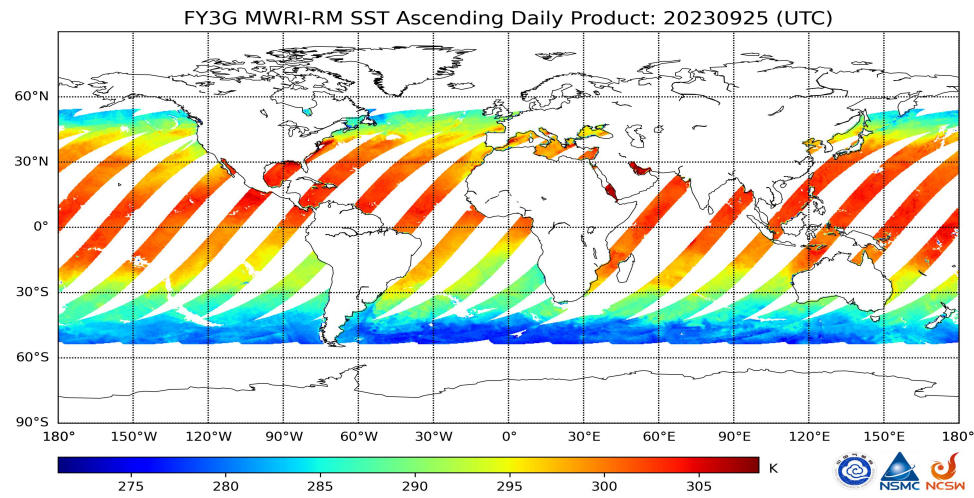


FY-3G microwave hydrometeor profiles (surface rain, ice water, cloud water ,liquid water)

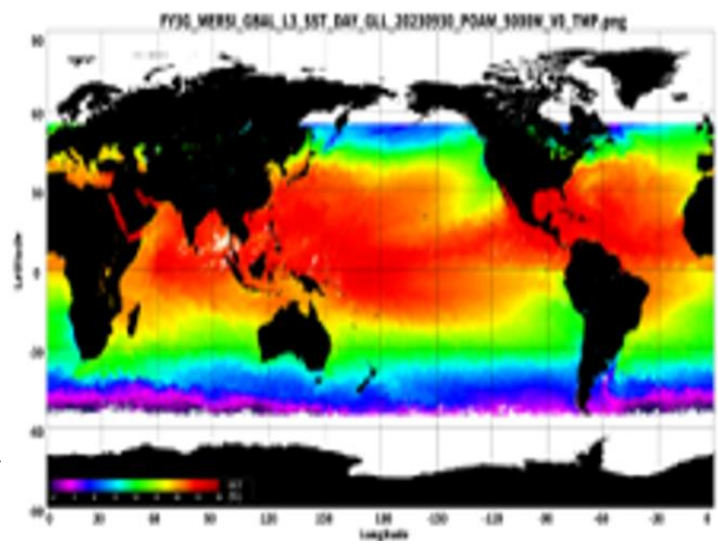
- ❑ The microwave imager (MWRI-RM) onboard the FY3G satellite has 17 channels ranging from 10.65GHz to 183.31 GHz, which can be used to retrieve multiple hydrometeors including ice water, cloud water , liquid water, temperature and moisture profile as well as the hydrometeors contents.
- ❑ The hydrometeor profiles can be applied in understanding the radiative properties and forcing effects of clouds.

Product	Spatial Resolution (highest)	Coverage	Precision
Hydrometeor profile	7 Km(horizontal) 0.5-1km (vertical)	55S-55N	<10%

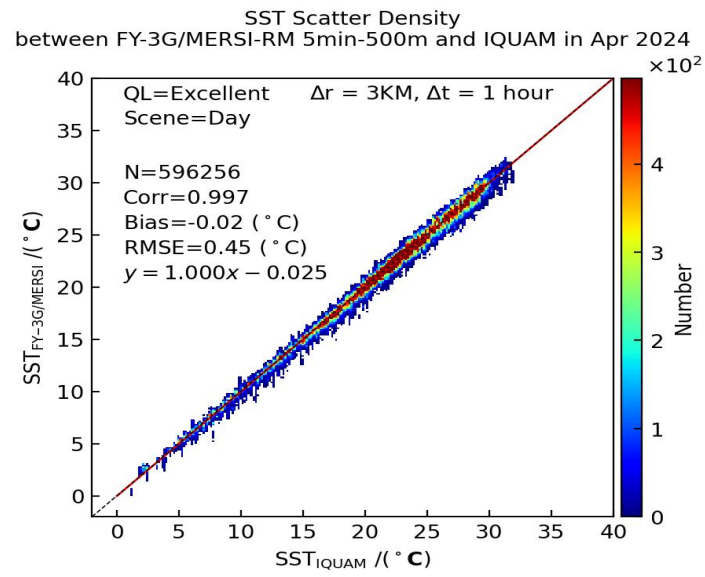
FY-3G sea surface temperature



MWRI SST



MERSI SST

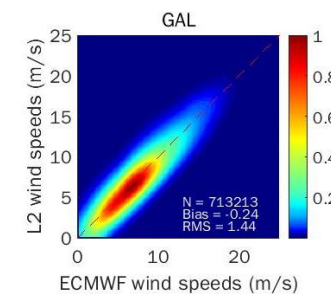
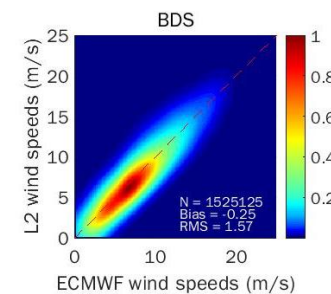
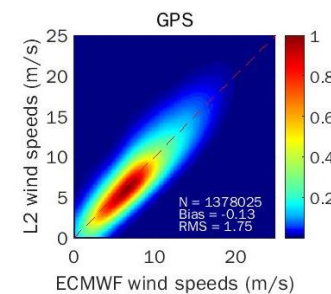
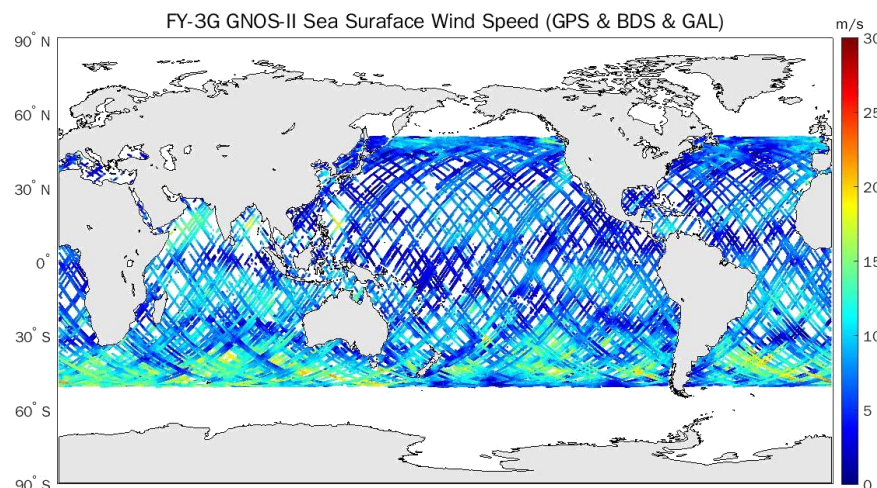


Product	Payloads	Spatial Resolution	Coverage	Precision
SST	MWRI-RM	21×35km	55S-55N	0.8K
	MERSI-RM	500m	55S-55N	0.5K

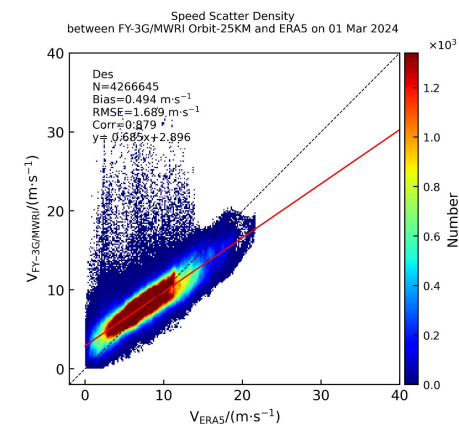
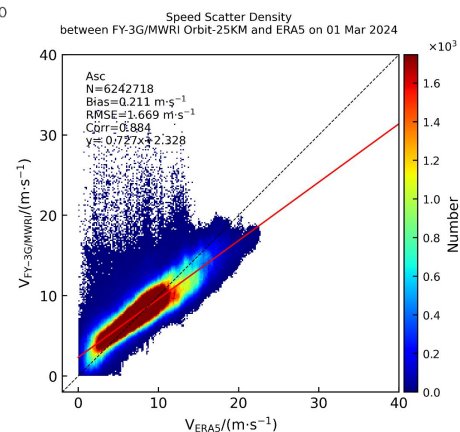
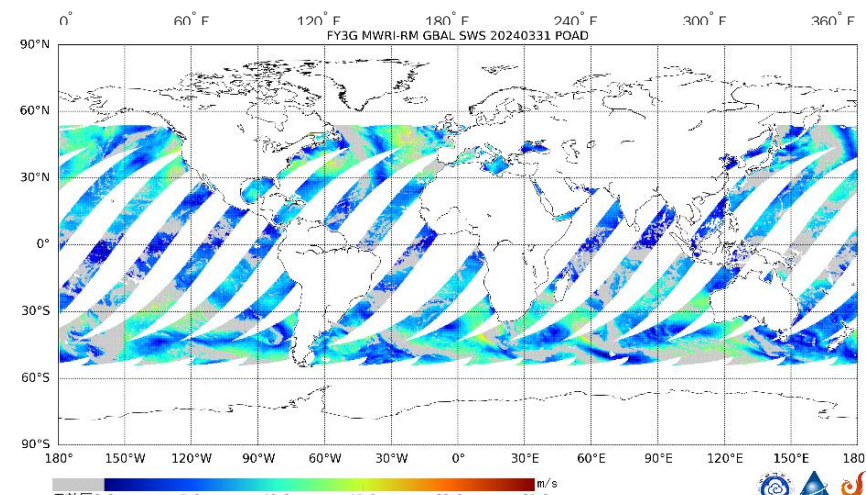
FY-3G Sea surface wind speed



GNOS SSW



MWRI SSW

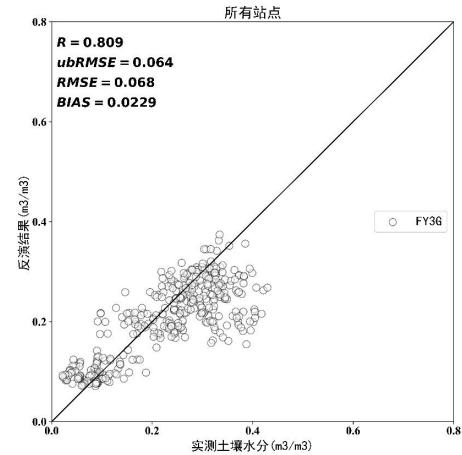
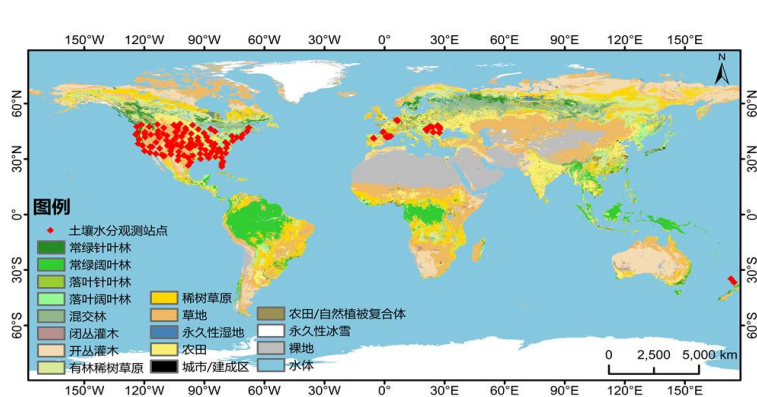
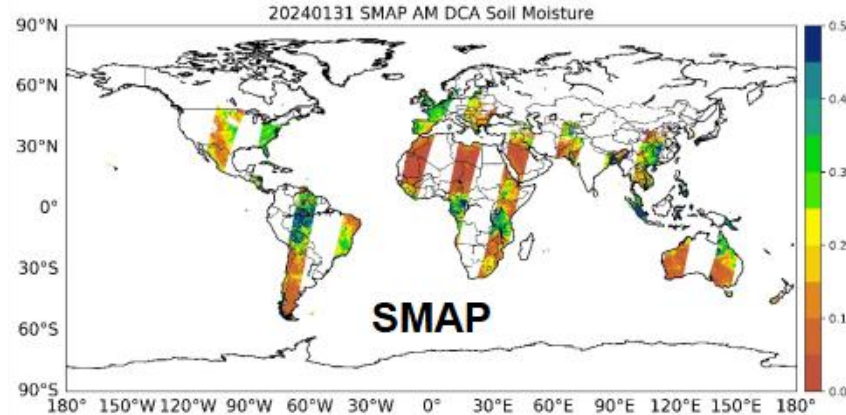
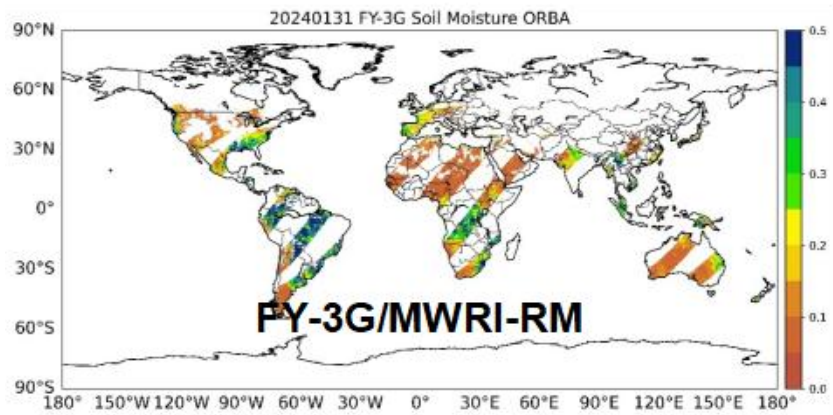


Product	Payloads	Spatial Resolution (highest)	Coverage	Precision
sea surface wind speed	GNOS-II	25km	55S-55N	GPS : 1.71m/s BDS : 1.91m/s GAL : 1.46m/s
	MWRI-RM	25km	55S-55N	Ascend: 1.832m/s Descend: 1.704m/s

FY-3G Soil moisture



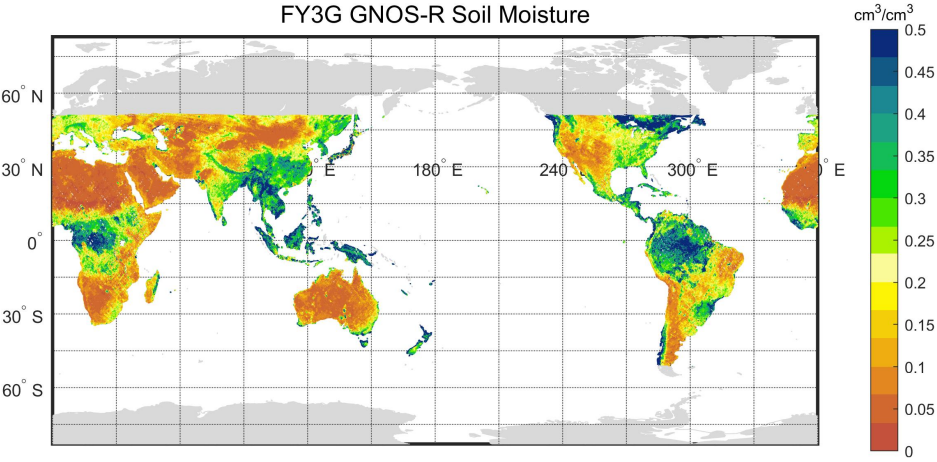
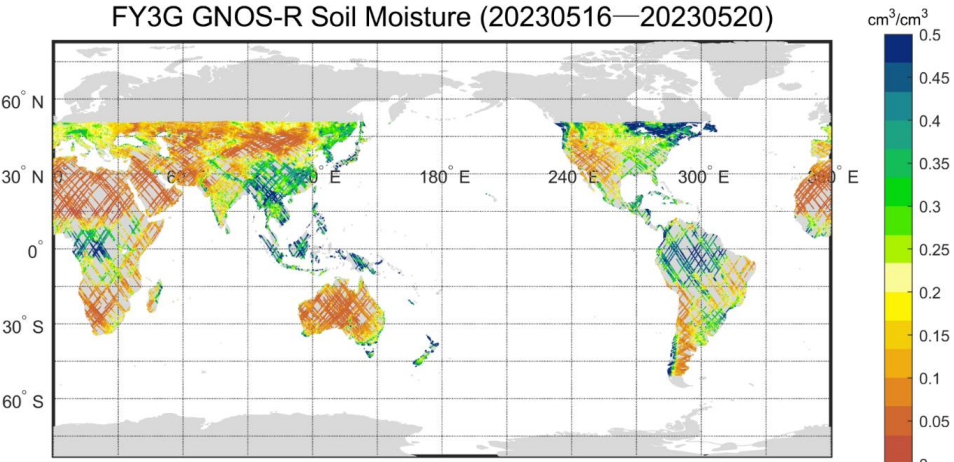
MWRI SVM



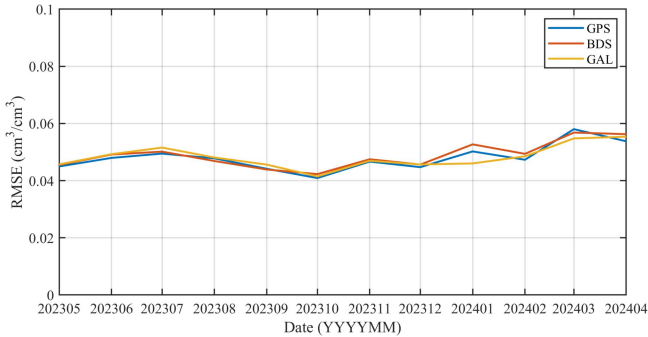
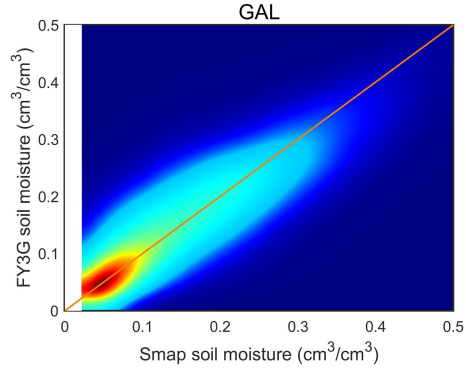
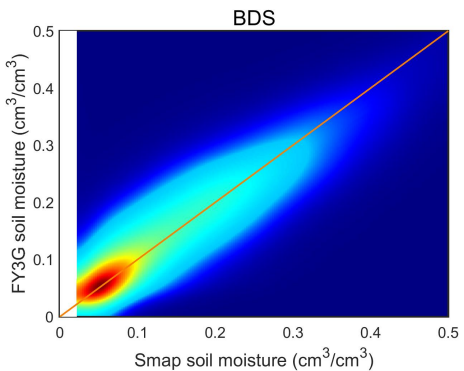
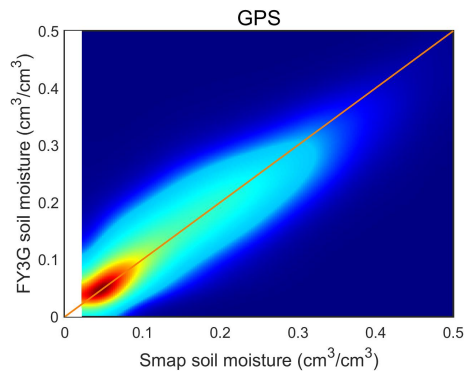
Product	Payloads	Spatial Resolution (highest)	Coverage	Precision
soil moisture	MWRI-RM	25km	55S-55N	0.06cm³/cm³
	GNOS	6km	55S-55N	0.05cm³/cm³



FY-3G Soil moisture



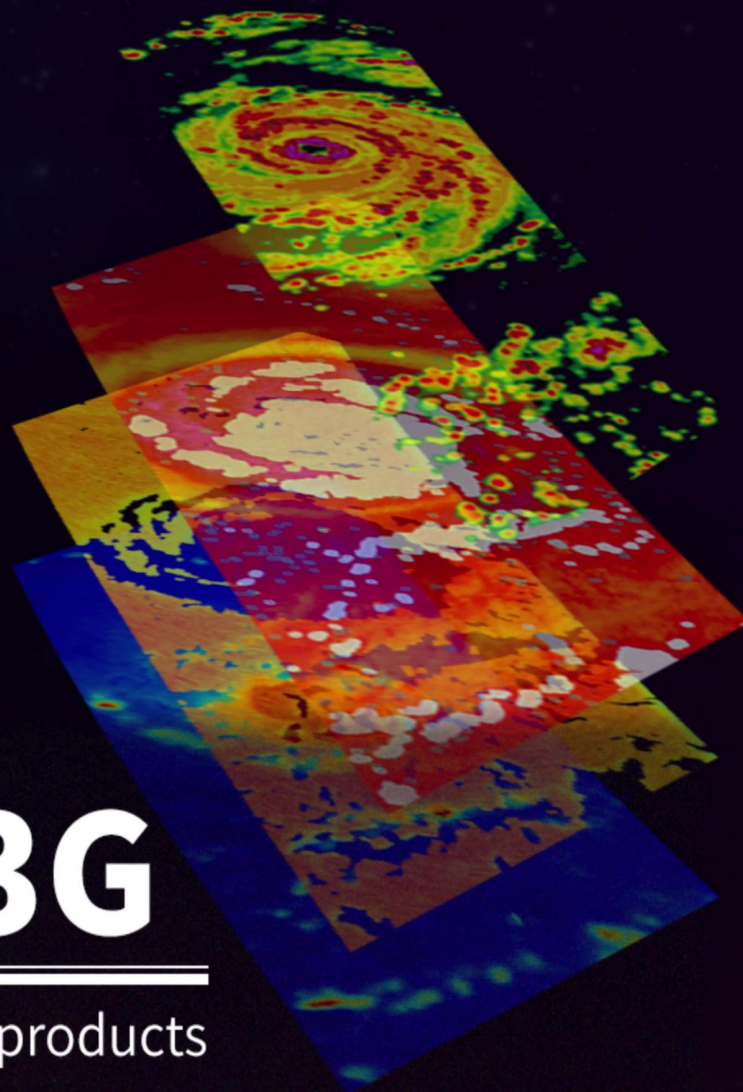
Monthly GNOS VSM



	GPS	BDS	GAL
RMSE(cm³/cm³)	0.049	0.049	0.048
Corr_Coeff	0.86	0.86	0.87

FY3G

Data and products



→ 降水率

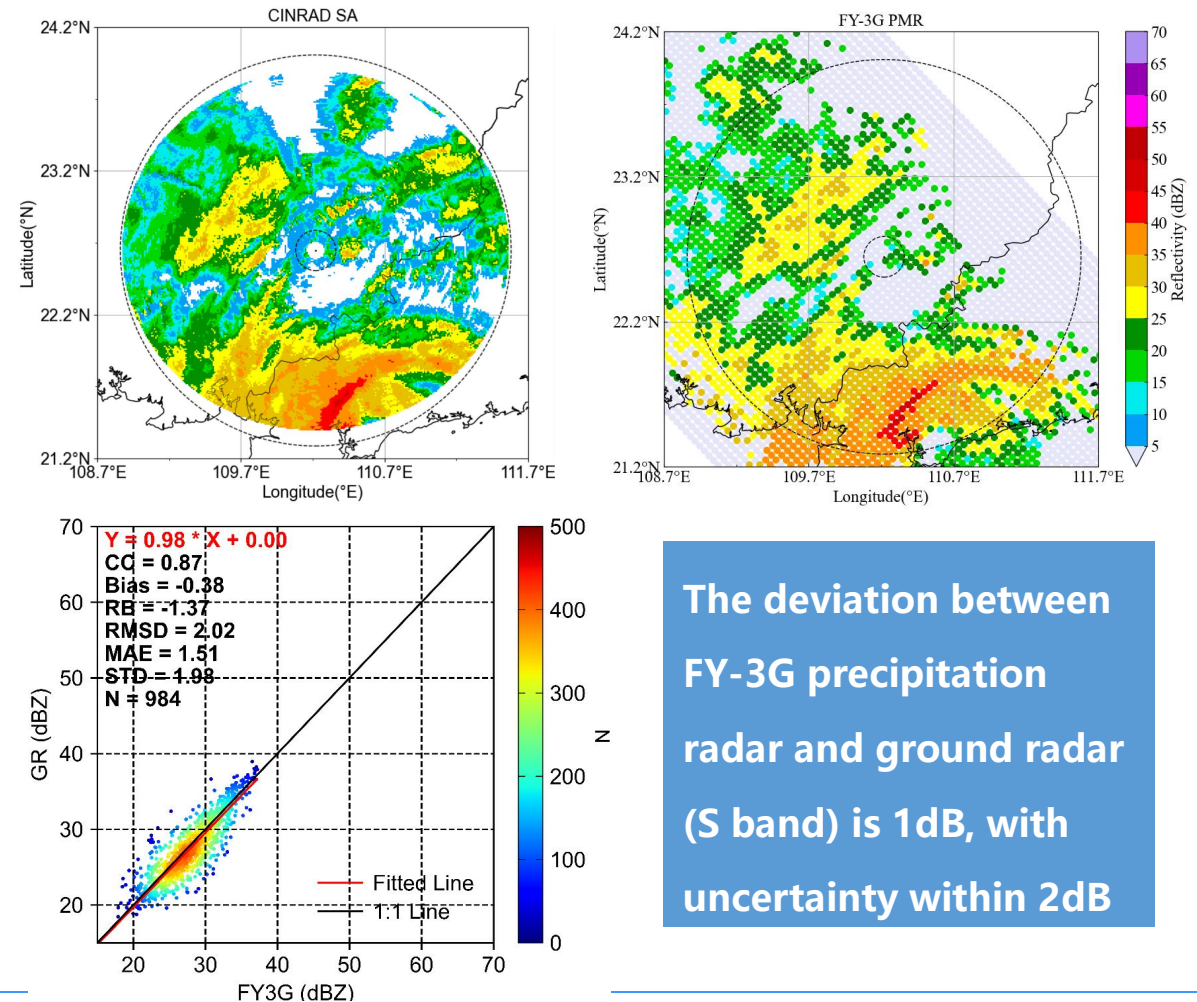
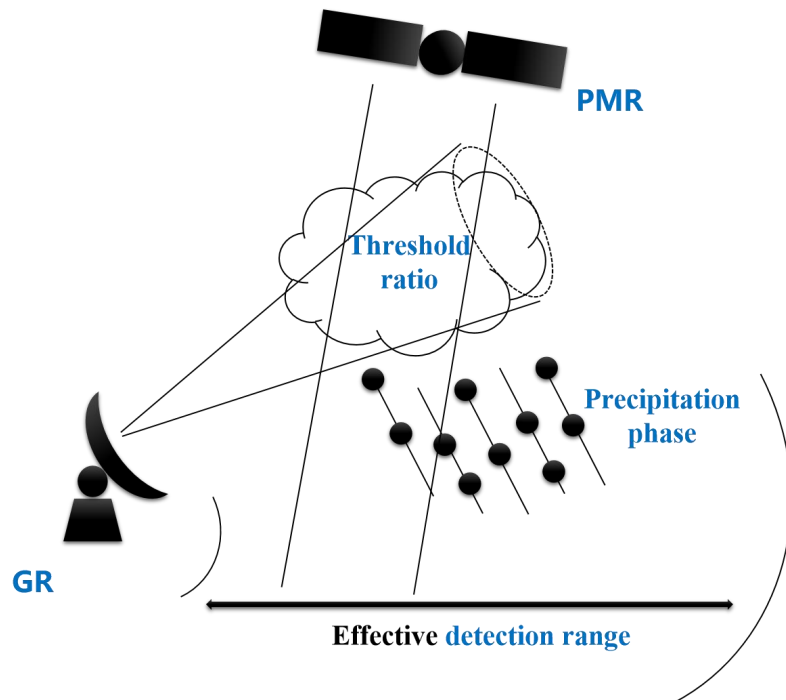
→ 洋面大气可降水

→ 海面温度

→ 海面风速

Consistency comparison of Satellite and Ground Radar

In the evaluation of the consistency of the FY-3G satellite with Ground Radar, we breaking through many key technologies such as radar frequency correction for all phases and precipitation types, pixel level matching within the effective irradiation volume of satellite and ground radar, and the impact of 3D field of view error correction, radar beam congestion factor and precipitation phase were also considered.



The deviation between FY-3G precipitation radar and ground radar (S band) is 1dB, with uncertainty within 2dB



Products service

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国家卫星气象中心
(国家空间天气监测预警中心)

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风云四号 碳卫星 风云三号 风云二号 风云一号 EOS/MODIS

仪器选择

PMR MWRI MERSI GNOS

产品分类

1级

产品

Ku波段降水率(KuR) 潜热(VPH)

产品名称	格式	分辨率	开始日期
☐ PMR降水率轨道产品 (降轨)	HDF	5000M	2024-01-
☐ PMR降水率轨道产品 (升轨)	HDF	5000M	2024-01-

时间选择

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仪器选择

PMR MWRI MERSI

产品分类

1级

产品

海表温度(SST) 晴空大气

产品名称	格式
☐ MWRI海面温度轨道产品(降轨)	HDF
☐ MWRI海面温度轨道产品(升轨)	HDF

时间选择

风云卫星遥感数据服务网

国家卫星气象中心
(国家空间天气监测预警中心)

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仪器选择

PMR MWRI MERSI GNOS

产品分类

1级

产品

云检测(CLM) 云分类/相

卫星介绍 仪器介绍 产品介绍

全球导航卫星掩星探测仪-II型(GNOS)

全球导航卫星掩星探测仪-II型(GNOS) 可为数值天气预报和气候监测提供高精度、高垂直分辨率的对流层、平流层大气弯曲廓线测量。从弯曲角可以反演大气折射率、大气温度、大气湿度廓线。此外，全球导航卫星掩星探测仪还可作为空间天气监测提供电离层电子密度信息。风云三号(03批)卫星全球导航卫星掩星探测仪(GNOS)在继承02批卫星仪器基础上，重点增加掩星通道数，新增反射探测功能。

数据概况

全球导航卫星掩星探测仪-II型(GNOS)

数据起止日期: 2023-10-23—Today

文件数: 143.5万个

数据量: 1970.2GB

产品名称	格式	分辨率	开始日期	最新日期	文件数	数据量(GB)	连续性	相关文档
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(GNSS反射)	HDF	--	2023-10-23	2024-06-15	54925	1365.1	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(大气附加相位-外部星历)	NC	--	2023-10-23	2024-06-15	132836	186	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(大气附加相位/BDS自主星历)	NC	--	2023-10-23	2024-06-15	120288	159.7	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(大气附加相位/GPS自主星历)	NC	--	2023-10-23	2024-06-15	124018	173.8	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(电离层附加相位/BDS自主星历)	NC	--	2023-10-23	2024-06-15	190621	16.8	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(电离层附加相位/GPS自主星历)	NC	--	2023-10-23	2024-06-15	174614	16.4	查看	格式
☐ FY-3G全球导航卫星掩星探测仪II型L1数据(电离层附加相位/外部星历)	NC	--	2023-10-23	2024-06-15	182754	17.2	查看	格式

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Products service

How to get FY-3G Products

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TANSAT FY-4 FY-3 FY-2 FY-1 EOS/MODIS NOAA MTSAT MSG SWGO JPSS GSICS OBS/NWP XIBU

OtherData METOP

FY-3G FY-3E FY-3D FY-3C FY-3B FY-3A

Instrument: PMR MWRI MERSI GNOS

Product: L1 Data

Product: Product

Data Overview

FY-3G

File Count: 160,510,000
Volume: 22.5TB

Data Level	File Count	Volume(GB)
L1	1108614	18612
L2	496688	4424

Product	Format	Resolution	Start Date	Last Date	File count	Volume(GB)	Availability	Quality Report
☒ FY-3G PMR L1 Data (Descend)	HDF	5000M	2023-10-23	2024-06-11	3658	4693.5	View	
☐ FY-3G PMR L1 Data (Ascend)	HDF	5000M	2023-10-23	2024-06-11	3653	4736.8	View	

Time Range

☐ Last 3 days ☐ Last Week ☐ Last Month

Start Date: 2024-06-11 Start Time: 00:00:00

End Date: 2024-06-12 End Time: 23:59:59

Time range: ☐ Each Day

☒ Availability

Spatial Selection ☒ Whole Area

Coverage Type: ☒ Intersect ☐ Entirely Within

Search scope: North 53° 31' West 73° 27' 135° 3' East 3° 47' South Refresh

Preset range: ☐ Beijing ☐ Shanghai ☐ Tianjin ☐ Chongqing ☐ Anhui ☐ Fujian ☐ Gansu ☐ Guangdong ☐ Guizhou ☐ Hainan ☐ Hebei More...

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☐	FY3G_PMR--_ORBD_L1_20240611_2022_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 20:22:49	1.31GB	Download
☐	FY3G_PMR--_ORBD_L1_20240611_1850_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 18:50:12	1.31GB	Download
☐	FY3G_PMR--_ORBD_L1_20240611_1717_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 17:17:35	1.31GB	Download
☐	FY3G_PMR--_ORBD_L1_20240611_1544_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 15:44:57	1.31GB	Download
☐	FY3G_PMR--_ORBD_L1_20240611_0151_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 1:51:22	1.30GB	Download
☐	FY3G_PMR--_ORBD_L1_20240611_0018_5000M_V1.HDF		L1	FY-3G PMR L1 Data (Descend)	5000M	--	2024/6/11 0:18:44	1.17GB	Download

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Future Plan

In the year of 2025, CMA will launch FY3H, FY4C(optical) and FY4M(micro wave)

风云卫星布局 2025

静止卫星

FY-4B [光学]

FY-4B 星是我国新一代静止气象卫星的首发业务星，它在继承 A 星的基础上性能进一步提升。FY-4B 星计划于 2021 年发射，接续静止气象卫星的业务。

FY-4C [光学]

FY-4C 星在前两颗星的基础上性能要全面达到和超过国际先进水平。FY-4C 星计划于 2022 年发射，定点位置将视那时的技术状态等因素来确定。

FY-4M [微波 1]

风云四号微波卫星 FY-4M 星在静止轨道上对大气温度和湿度进行微波探测，50GHz 以上空间分辨率优于 50km。

极轨卫星

FY-3E [晨昏]

FY-3E 星是晨昏轨道卫星，交点地方时为 6:30，计划于 2021 年发射。FY-3E 星侧重数值天气预报的应用目标，对天气会商、热带气旋和其它极端气象灾害预警、气候监测、空气质量监测、太阳和空间天气观测具有独特优势。

FY-3F [上午]

FY-3F 星是上午轨道卫星，交点地方时为 10:00，计划于 2022 年发射。它在确保极轨气象卫星全球成像和大气垂直探测观测业务的基础上，侧重地球表面成像观测，主要应用于天气预报、生态、环境、灾害监测业务及研究。

FY-3G [降水]

FY-3G 星为倾斜轨道卫星，主要用于降水测量，计划于 2022 年发射。FY-3G 星主要用于灾害性天气系统强降水监测，提供全球中低纬度地区降水三维结构信息，对提高降水气象预报准确率提供支持。

FY-3H [下午]

FY-3H 星是下午轨道卫星，交点地方时为 14:00，计划于 2023 年发射。FY-3H 星侧重大气成份定量探测和气候变化监测，探测数据可用于天气预报、大气化学和气候变化监测业务及研究等方面。



Reference



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- Peng ZHANG; Xiuqing HU; Ling SUN; Na Xu; Lin Chen; Anjun Zhu; Manyun Lin; Zhongdong Yang; Jun Yang; Jingsong Wang. The on-orbit Performance of FY-3E in an Early Morning Orbit. DOI: 10.1175/BAMS-D-22-0045.1. Bulletin of the American Meteorological Society.
- Peng Zhang, Songyan Gu, Lin Chen et al. FY-3G satellite instruments and precipitation products: first report of China's Fengyun rainfall mission in-orbit. Journal of Remote Sensing. 2023. DOI: 10.34133/remotesensing.0097
- Tianlei Yu, Lin Chen*, Na Xu, Hanlie Xu, Xiuqing Hu, Xingying Zhang. Fengyun-3E Low Light Observation and Nighttime Lights Product. January 2023. IEEE Transactions on Geoscience and Remote Sensing PP(99):1-1. DOI: 10.1109/TGRS.2023.3292236
- Xiaochun Zhai, Rui Xu, Zhixiong Wang, Zhaojun Zheng, Yixuan Shou, Shengrong Tian, Lin Tian, Xiuqing Hu, Lin Chen, Na Xu. Classification of Arctic Sea Ice Type in CFOSAT Scatterometer Measurements Using a Random Forest Classifier. February 2023. Remote Sensing 15(5):1310. DOI: 10.3390/rs15051310
- ZHANG Peng, CHEN Lin, XIAN Di, XU Zhe, GUAN Min. Update on Fengyun Meteorological Satellite Program and Development. Chin. J. Space Sci., 2020, 40(5): 884-897. DOI: 10.11728/cjss2020.05.884
- Peng Zhang, Naimeng Lu, Chuanrong Li, Lei Ding, Xiaobing Zheng, Xuejun Zhang, Xiuqing Hu, Xin Ye, Lingling Ma, Na Xu, Lin Chen and Johannes Schmetz. Development of the Chinese Space-Based Radiometric Benchmark Mission LIBRA. Remote Sens. 2020, 12, 2179; doi:10.3390/rs12142179



THANKS

感谢倾听