FY-3E/FY4B commissioning status

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National Satellite Meteorological Center

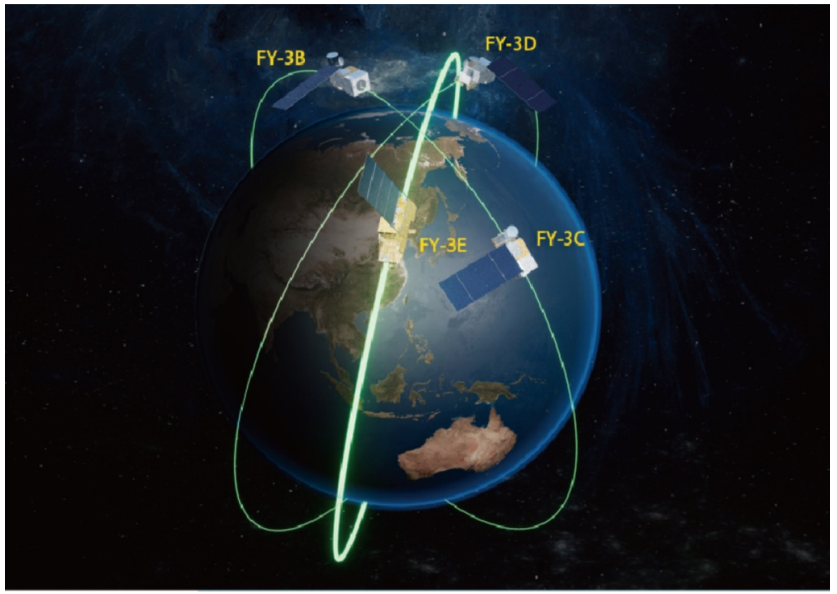
Outline

- FY-3E
- FY-4B
- Data Services Plan

1. FY-3E Brief introduction of FY-3E

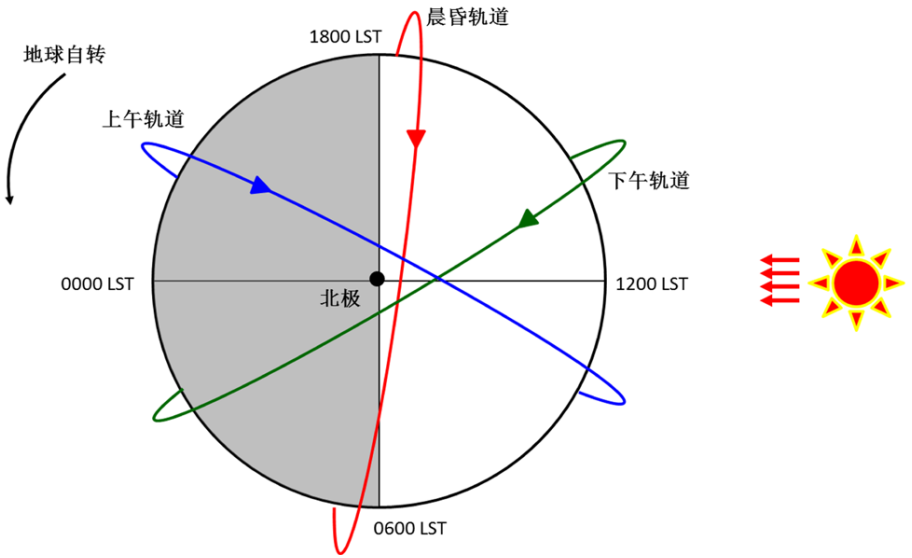
FY-3E, which is the **first early-morning orbit** satellite in China's polar-orbiting meteorological satellite family, was launched on July 5, 2021.

Its local time at descending node is 5:30 AM.

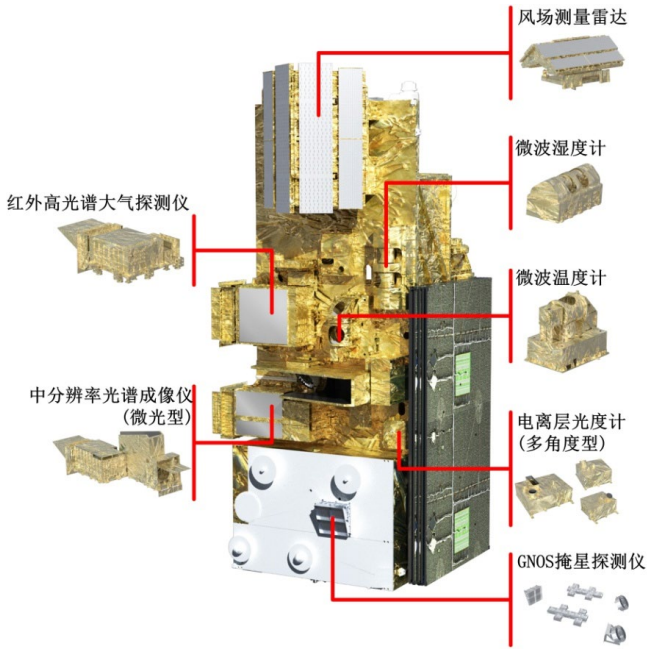


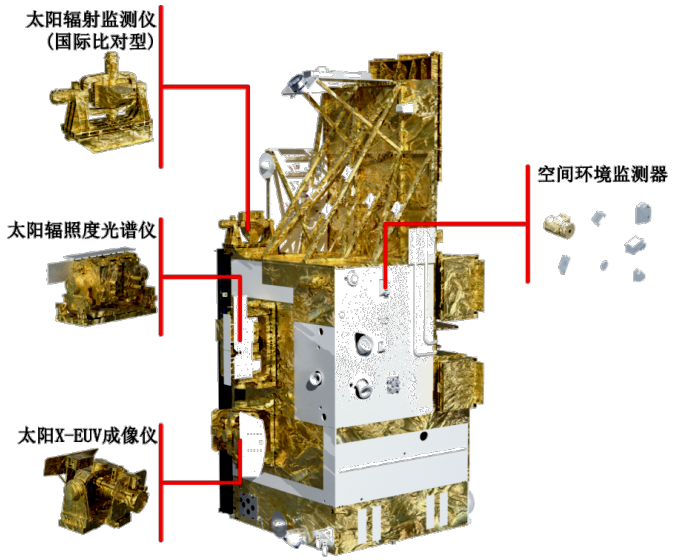
4 capabilities in category of FY-3E:

- **High-precision IR + microwave combined** atmospheric temperature and humidity vertical distribution detection;
- **Active C + Ku Radar** for wind field accurate detection;
- Global optical observation with **low-light imaging** in 250-meter resolution;
- Comprehensive detection of the **sun and space environment**.



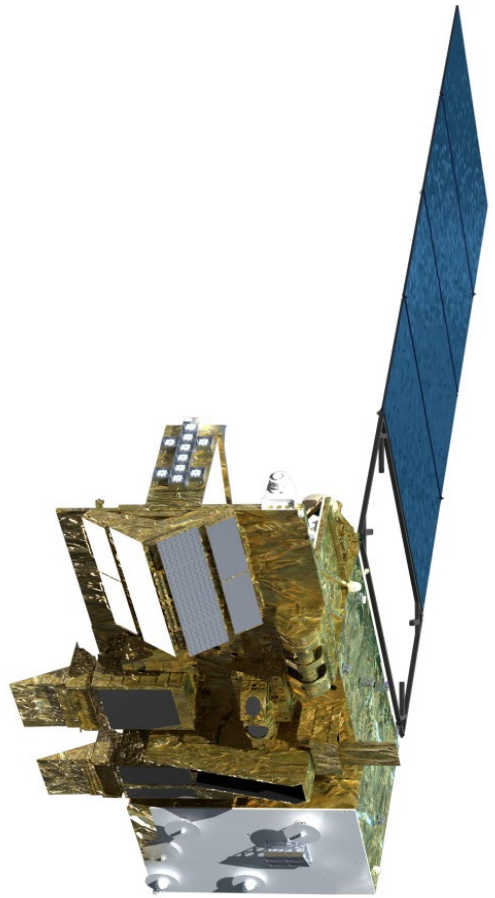
P. Zhang et al., 2022: FY-3E: The first operational meteorological satellite mission in an early morning orbit. Adv. Atmos. Sci., 39(1), 1−8, https://doi.org/10.1007/s00376-021-1304-7



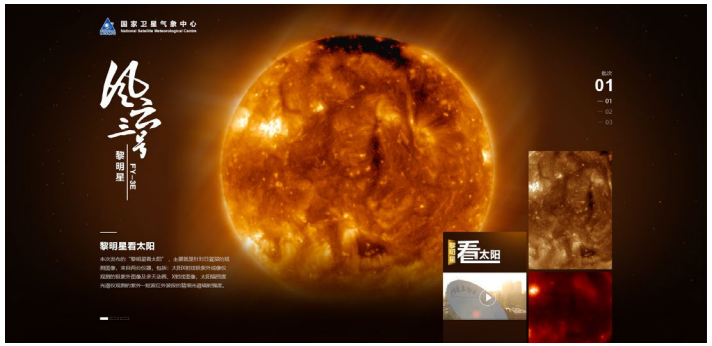


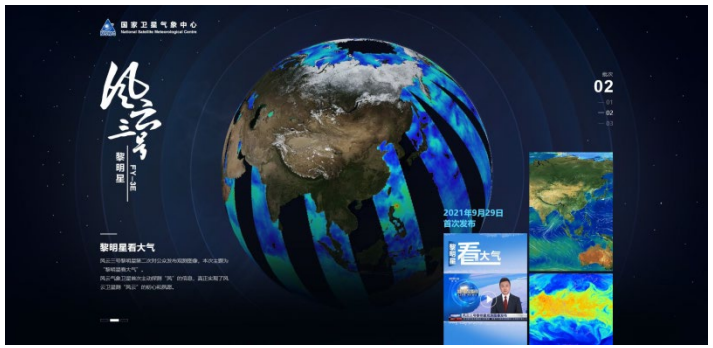
There are 11 instruments on FY-3E, 3 instruments are newly developed, 7 instruments are upgraded, 1 inherited instrument.

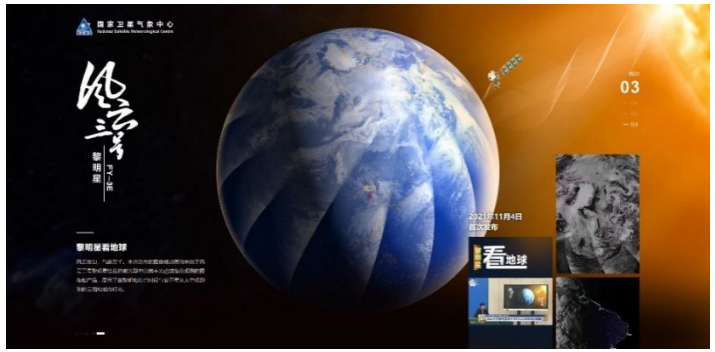
No.	Instruments	Statues
1	Dual- frequency wind radar (WindRAD)	**new**
2	Solar spectral irradiance monitor (SSIM)	
3	Solar X-EUV Imagers (XEUVI)	
4	MERSI-LL	**improved**
5	MWTS-III	
6	HIRAS-II	
7	GNOS-II	
8	SIM-II	
9	SEM	
10	Tri-IPM	
11	MWHS-II	**inherited**

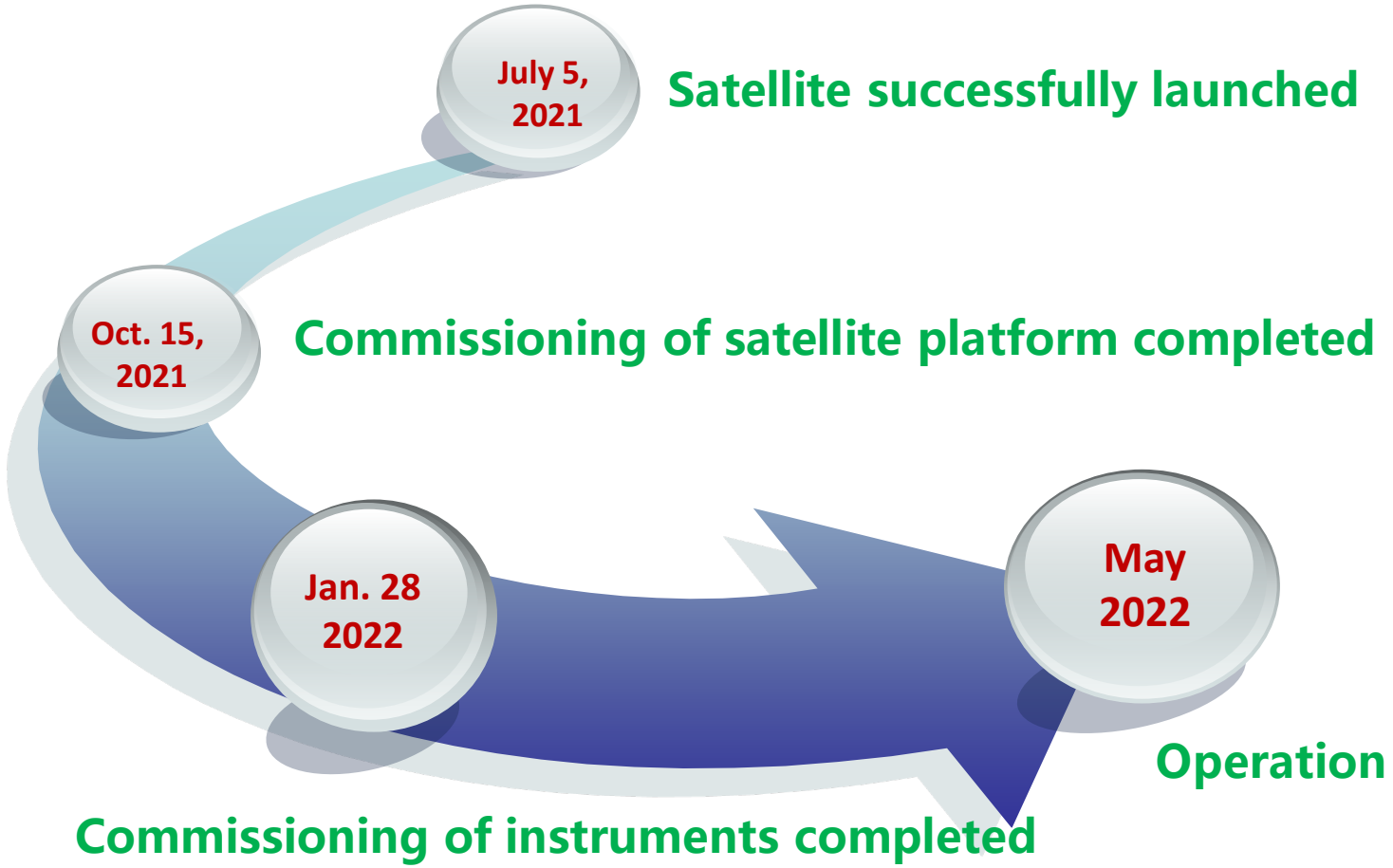


Schedule for the Commission Test of FY-3E





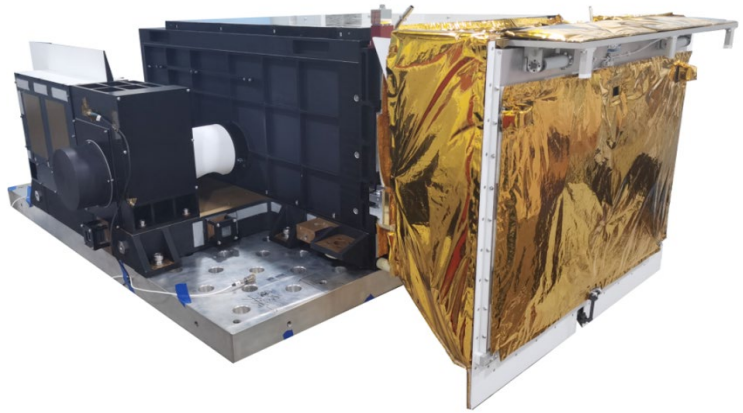




High Spectral Infrared Atmospheric Sounder（HIRAS-II）

HIRAS-II Benefits：
numerical weather forecast

Potential Products:
atmospheric temperature and humidity profiles, sea and land surface temperature, atmospheric composition, dust, cloud cover, etc.



Instrument Specification

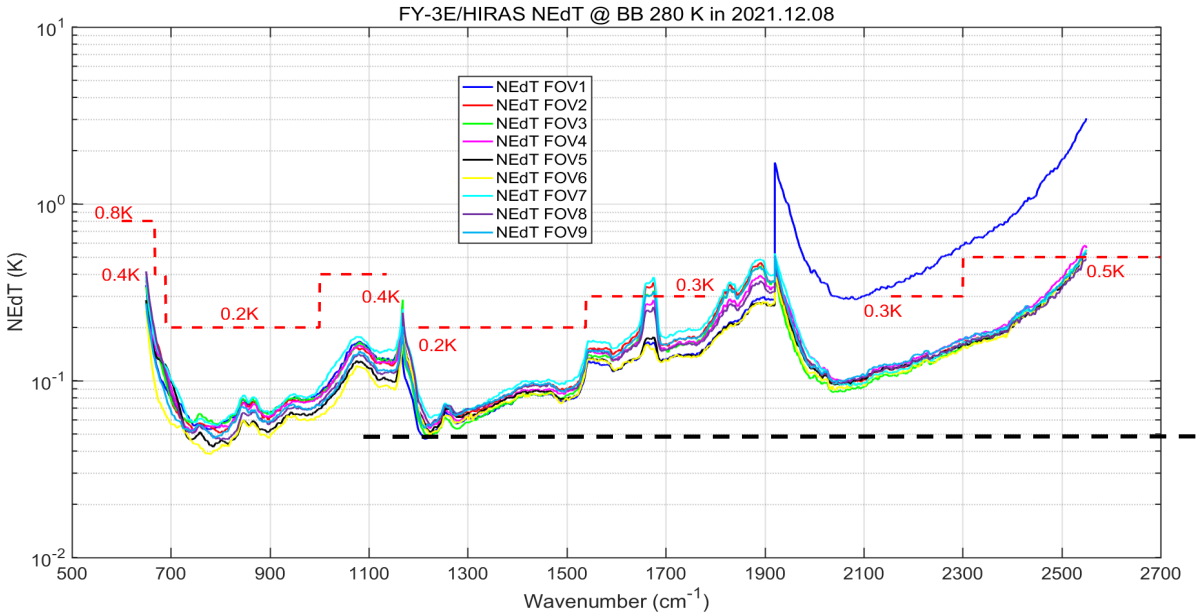
Scanning Technique	84 pixels / scan line, arranged in 3 x 3 arrays; swath 2700 km
Resolution	1 degree (14 km at s.s.p.) IFOV

Channel Characteristics

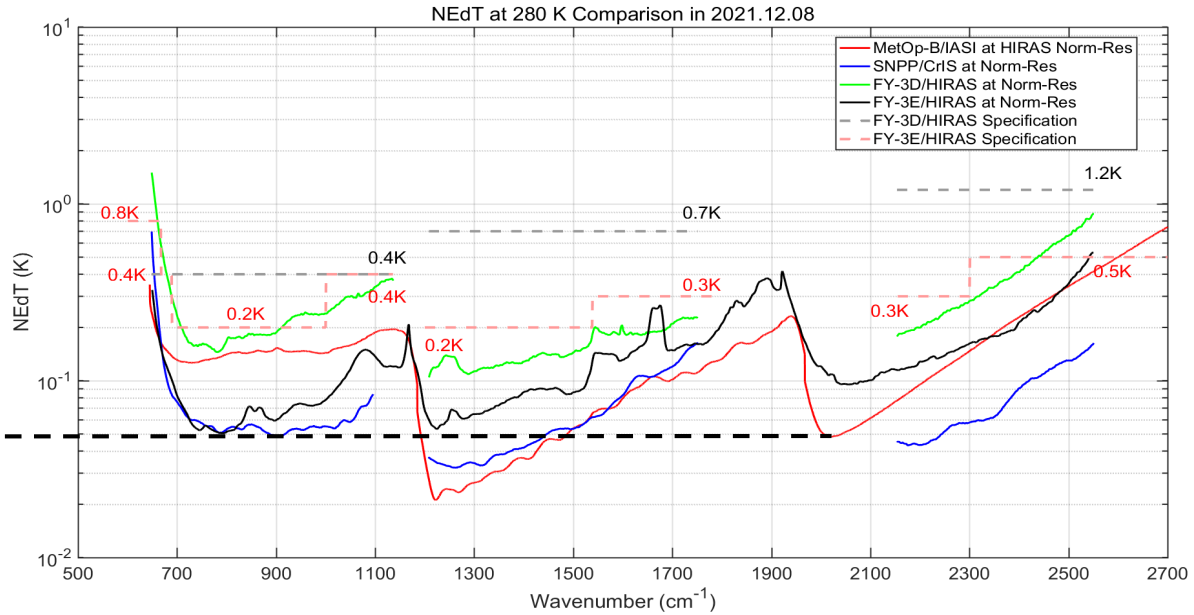
Spectral range (cm^{-1})	Spectral range (μm)	Spectral resolution(cm^{-1})	NEΔT (NEΔT@280K)		Radiometric Calibration Accuracy	Spectral Calibration Accuracy
650～1168.125	15.38～8.56	0.625	650 ～667 cm^{-1}	0.8K	1K/0.8K	7 ppm/5 ppm
			667～689 cm^{-1}	0.4K	0.5K/0.4K	
			689～1000 cm^{-1}	0.2K	0.4K/0.3K	
			1000～1136 cm^{-1}	0.4K	0.5K/0.4K	
1168.75～1920	8.55～5.21	0.625	1210～1538 cm^{-1}	0.2K	0.4K/0.3K	
			1538～1750 cm^{-1}	0.3K	0.5K/0.4K	
1920.625～2550	5.21～3.92	0.625	2155～2300 cm^{-1}	0.3	0.5K/0.4K	
			2300～2550 cm^{-1}	0.5	0.6K/0.5K	

HIRAS-II - NEΔT

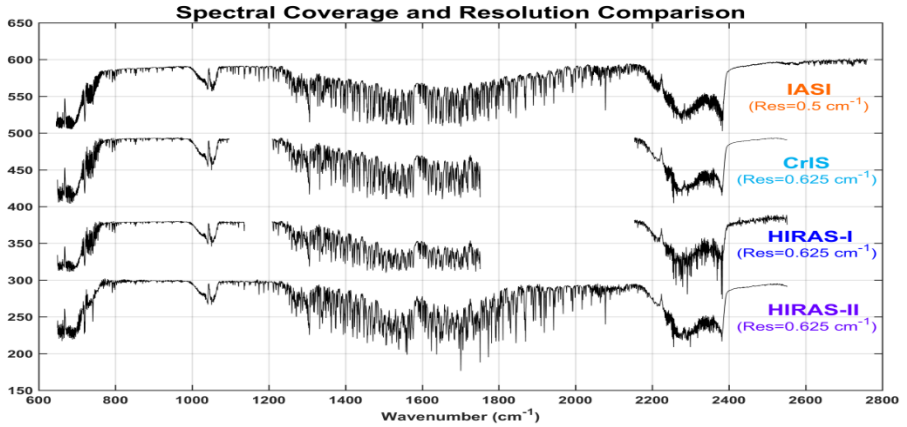
HIRAS-II NEΔT



HIRAS-II NEΔT Compared with similar instruments



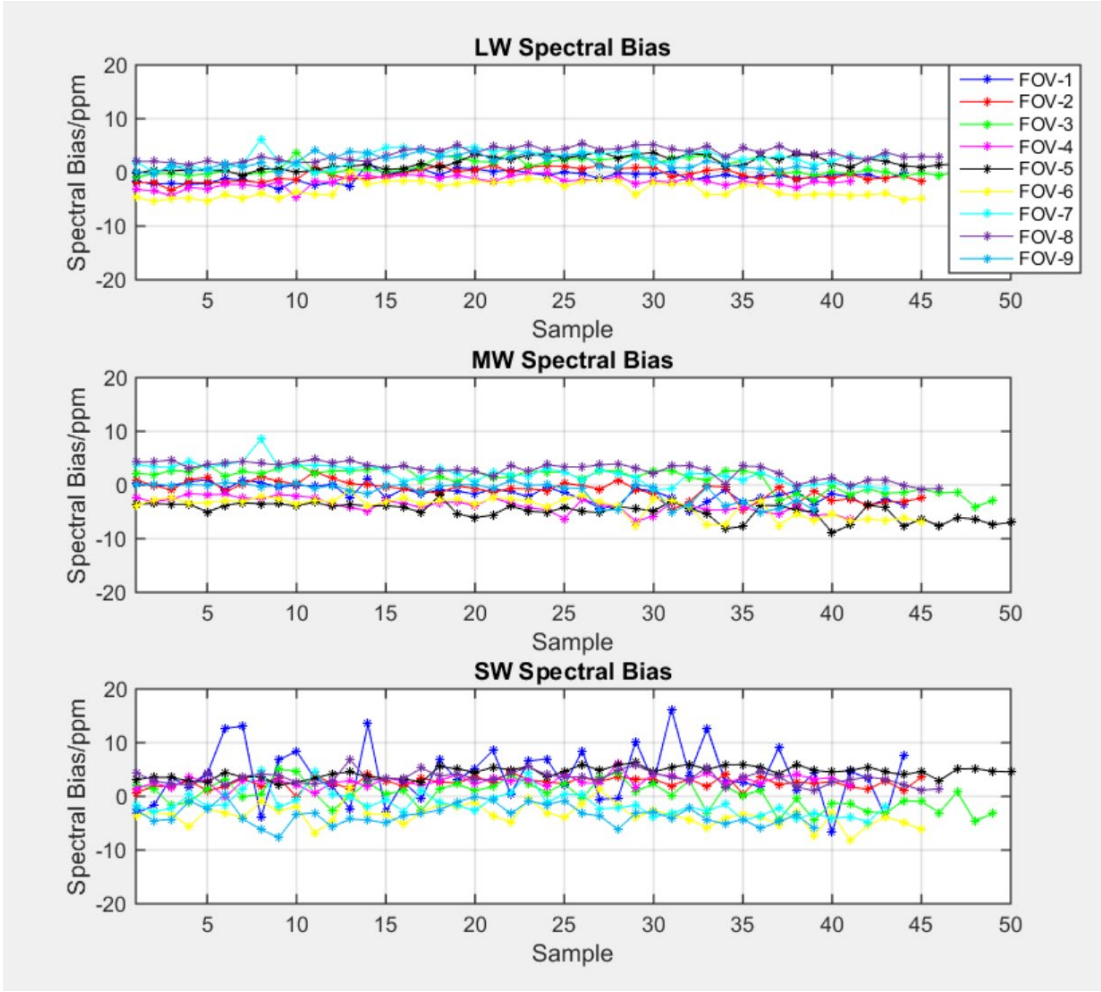
- **All channels in the long-wave band, medium-wave band, and short-wave band meet the performance requirements.**
- **The performance of long-wave and short-wave is comparable to that of the most advanced instruments in the world (IASI, CrIS).**



HIRAS-II - Spectral Calibration Accuracy

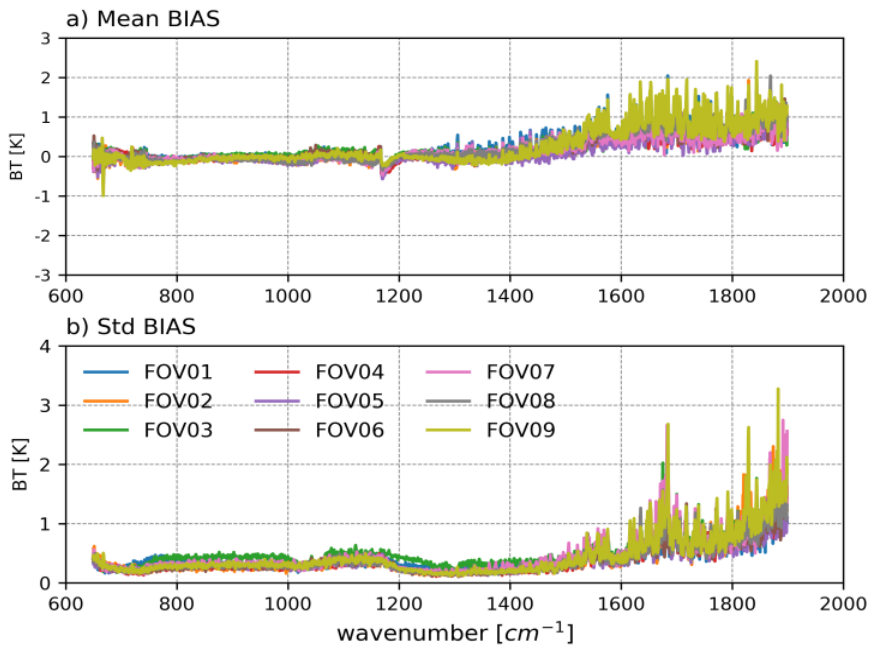
Bias /ppm	FOV1	FOV2	FOV3	FOV4	FOV5	FOV6	FOV7	FOV8	FOV9
LW	-0.8	-0.44	0.98	-1.78	1.69	-3.19	2.74	3.42	1.96
MW	-1.46	-0.92	1.18	-3.75	-5.04	-3.96	2.16	2.8	-1.22
SW	4.03	2.57	0.32	2.84	4.55	-3.46	-1.35	3.44	-3.45
STD /ppm	FOV1	FOV2	FOV3	FOV4	FOV5	FOV6	FOV7	FOV8	FOV9
LW	1.01	1.14	1.39	1.03	1.14	1.41	1.42	1.15	1.31
MW	1.51	1.65	2.01	1.35	1.6	1.77	1.78	1.52	1.84
SW	5.14	1.02	2.44	1.07	1.09	1.97	2.23	1.24	1.84

- **The average deviation of spectral calibration of all detectors in the three bands is better than 5ppm.**
- **The standard deviation of spectral frequency deviation is basically better than 3ppm.**

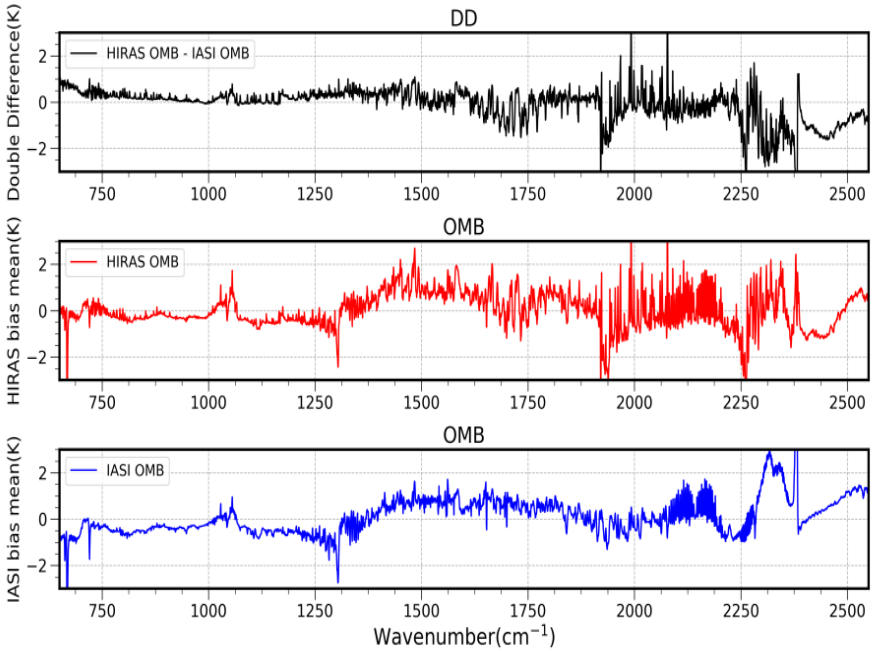


HIRAS-II - Radiometric Calibration Accuracy

SNO compared with IASI



$Diff_{(HIRAS-RTM)}$-$Diff_{(IASI-RTM)}$



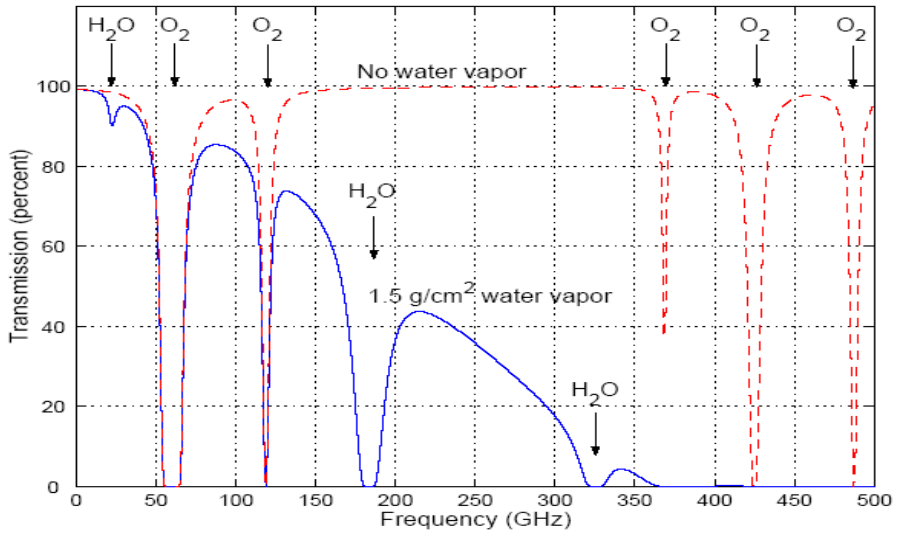
- **The average deviation of radiation calibration is better than 0.3K for most of the long-wave and medium-wave channels, better than 0.5K in the short-wave window region and weak absorption region, and 1~2K in the absorption region channel.**
- **Deviation standard deviation of long-wave and medium-wave channels 0.2~1K, short-wave greater than 1K.**
- **The calibration accuracy of some channels (39/159 channels) of the short-wave spectrum exceeds the index (the index value is 0.5-0.6K, and the calculated value is 0.7-2K).**

Micro-Wave Humidity Sounder -II（MWHS-II）

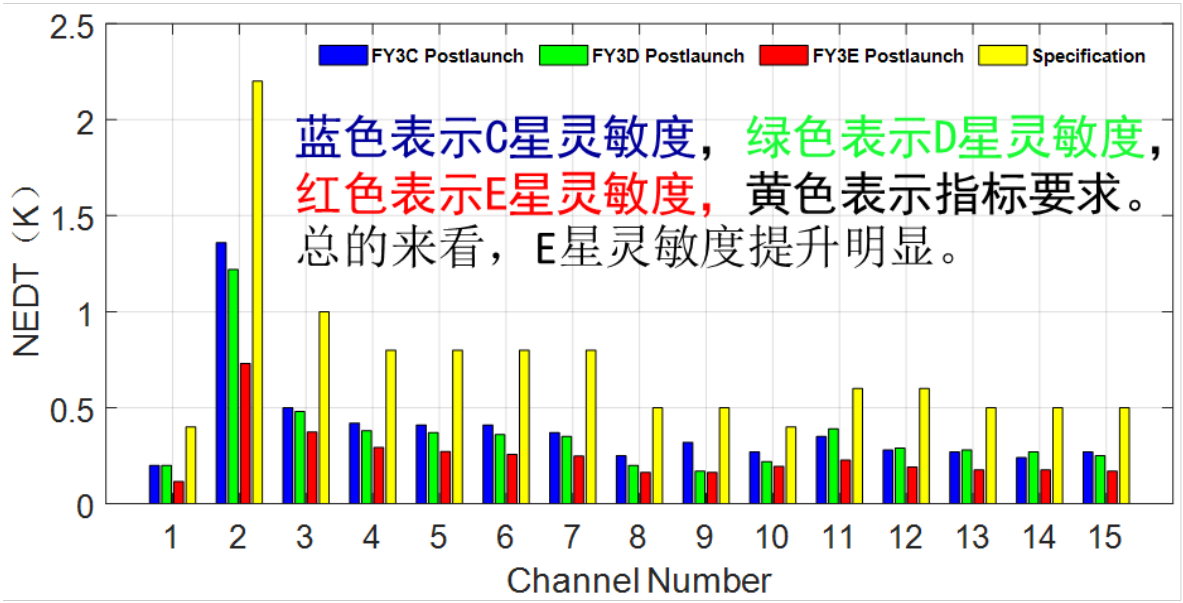
MWHS-II has 4 frequency bands and 15 channels. It inherits the MWHS and improves the overall performance.
The detection frequency of the Atmospheric Window area is changed from 150GHz to 166GHz.

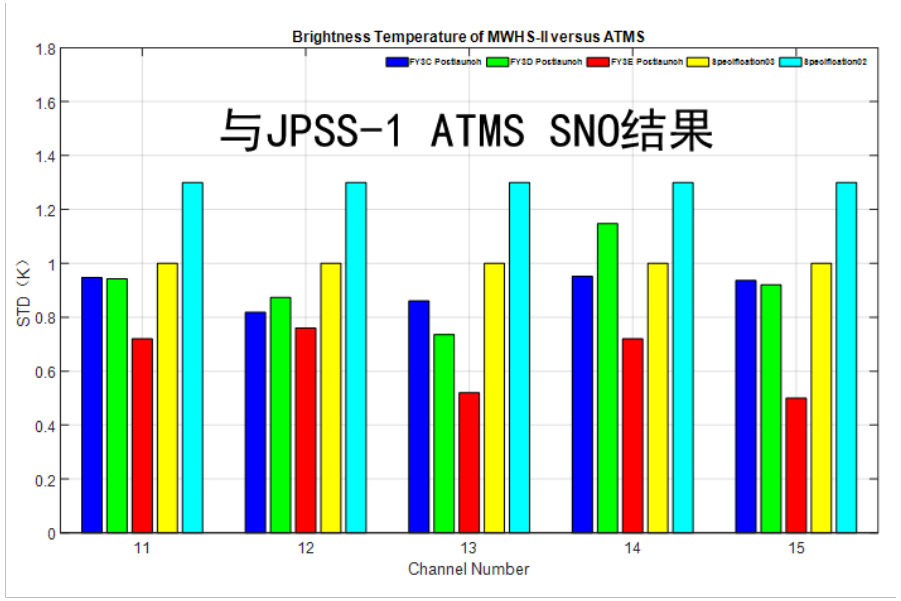
Channel Characteristics

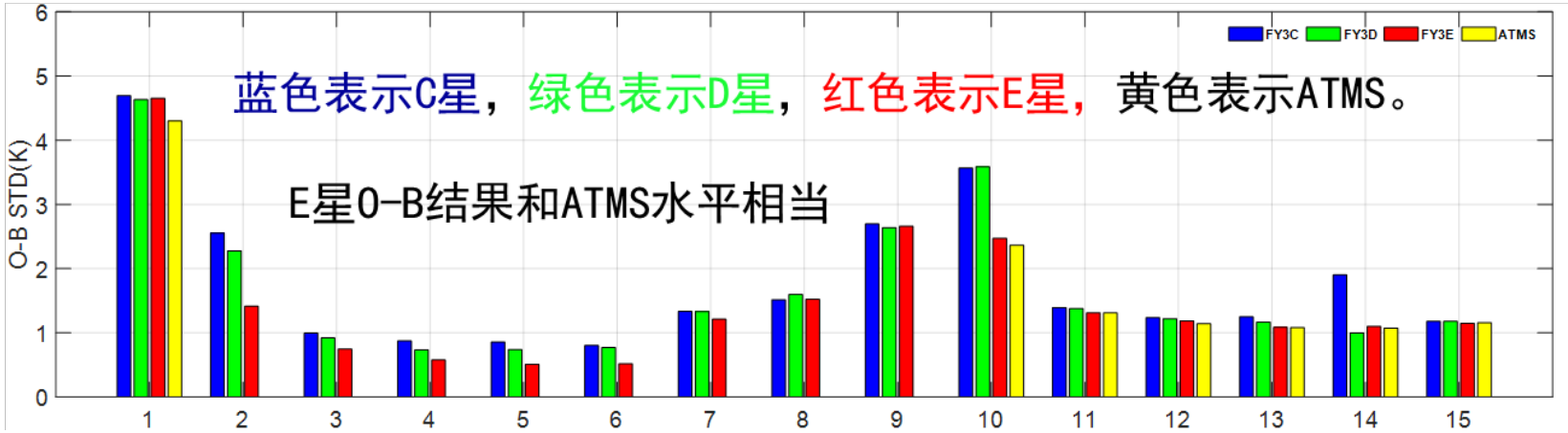
Channel No.	Central frequency (GHz)	Bandwidth (MHz)	Dynamic Range (K)	NEΔT (K)	Calibration accuracy (K)
1	89.0	1500	3—340	0.4	1.0/0.8
2	118.75±0.08	20	3—340	2.2	2.4/2.2
3	118.75±0.2	100	3—340	1.0	1.2/1.0
4	118.75±0.3	165	3—340	0.8	1.2/1.0
5	118.75±0.8	200	3—340	0.8	1.2/1.0
6	118.75±1.1	200	3—340	0.8	1.0/0.8
7	118.75±2.5	200	3—340	0.8	1.0/0.8
8	118.75±3.0	1000	3—340	0.5	1.0/0.8
9	118.75±5.0	2000	3—340	0.5	1.0/0.8
10	166.0	1500	3—340	0.4	1.0/0.8
11	183.31±1	500	3—340	0.6	1.0/0.8
12	183.31±1.8	700	3—340	0.6	1.0/0.8
13	183.31±3	1000	3—340	0.5	1.0/0.8
14	183.31±4.5	2000	3—340	0.5	1.0/0.8
15	183.31±7	2000	3—340	0.5	1.0/0.8



MWHS-II - NEΔT, calibration accuracy

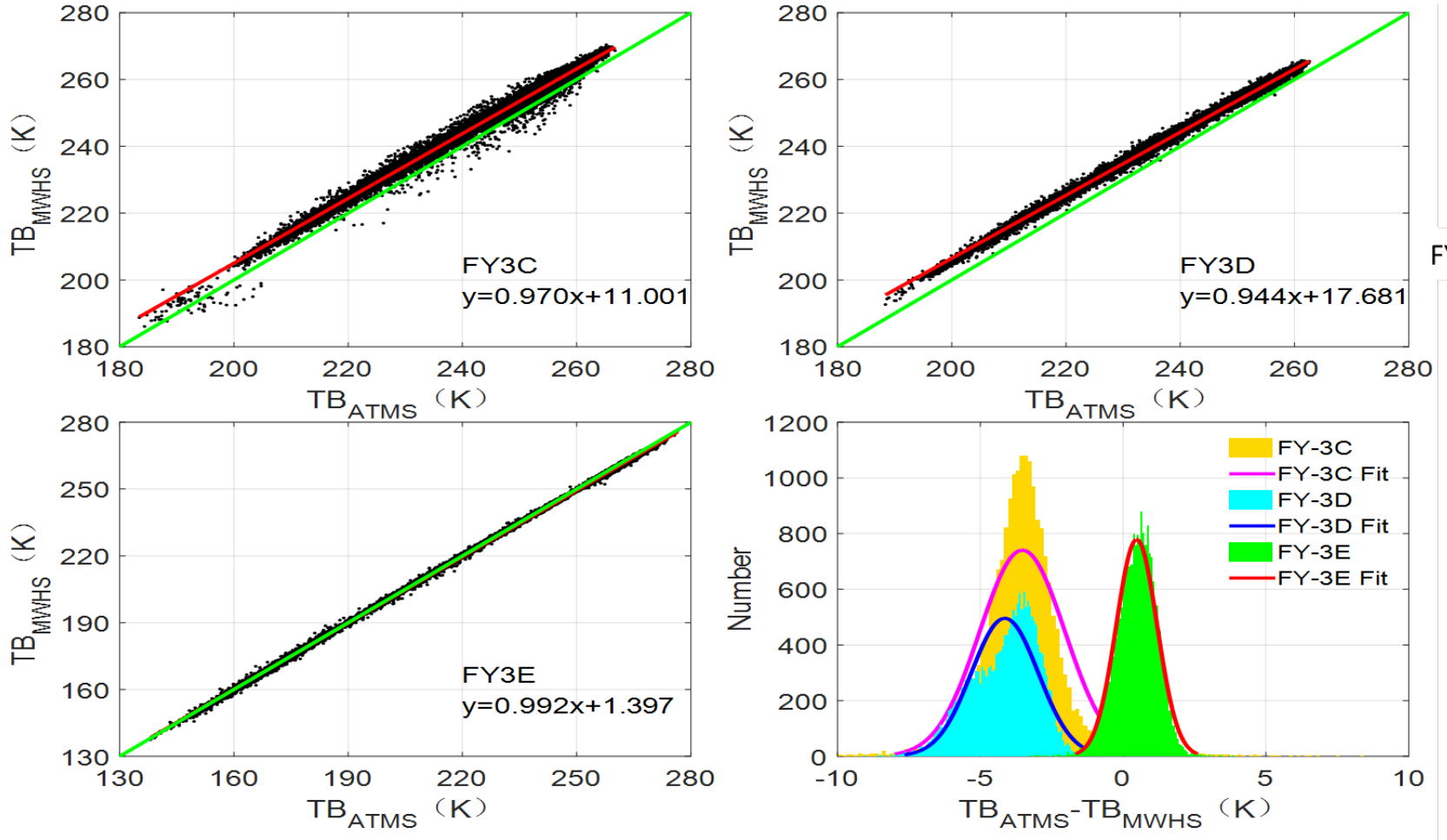






MWHS-II - calibration accuracy

The NEDT and calibration accuracy of MWHS-II are significantly improved.



通道14

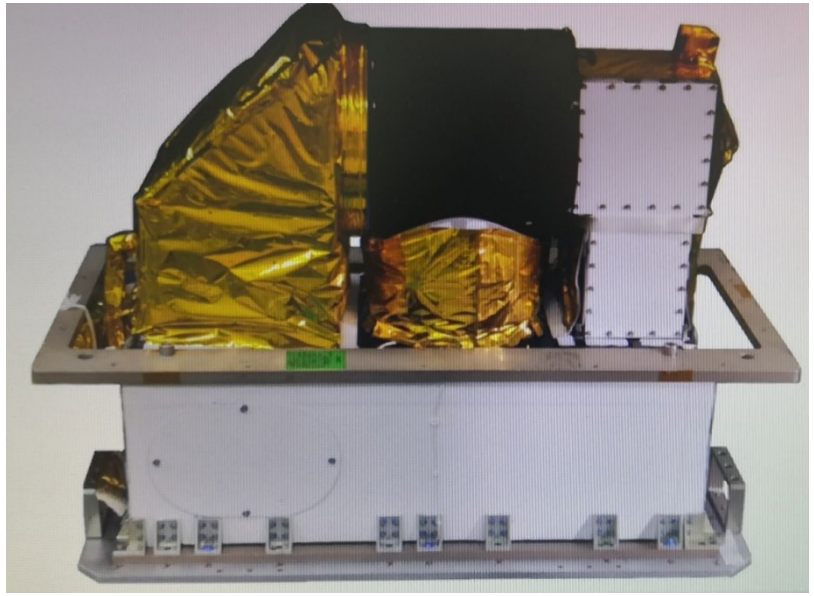
FY302：-3.58K/-4.13K

FY3E： 0.46K

Micro-Wave Temperature Sounder -III（MWTS-III）

The MWTS-III has improved detection. The 13 channels in the original 50~60GHz frequency band have been increased to 17 channels, including:

- Added 23.8GHz water vapor column total measurement channel.
- Add 31.4GHz window channel.
- Added 53.246 ± 0.08GHz and 53.948 ± 0.081GHz channels for tropospheric temperature detection at 4km and 6km.



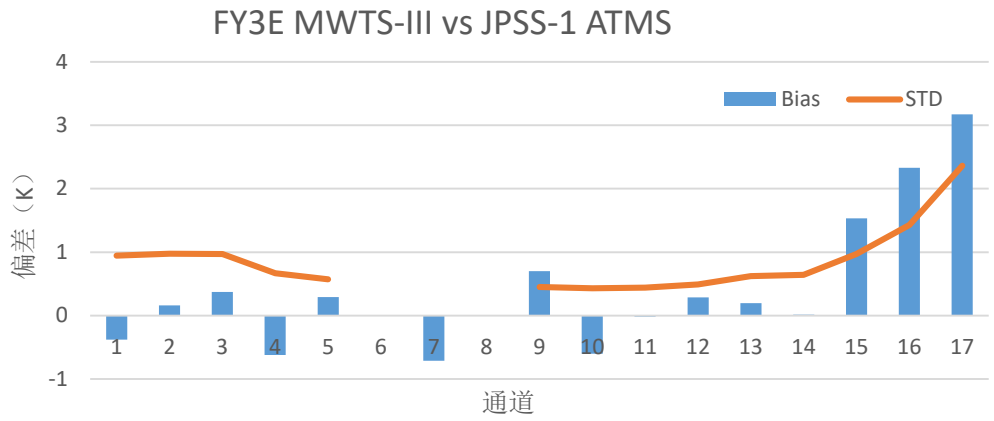
Channel Characteristics

Channel No.	Central frequency (GHz)	Bandwidth (MHz)	NEΔT (K)	Polarization	Calibration accuracy (K)
1	23.8	270	0.4/0.3	QH	1.2/0.8
2	31.4	180	0.45/0.35	QH	1.2/0.8
3	50.3	180	0.45/0.35	QV	1.2/0.8
4	51.76	400	0.3/0.3	QV	1.2/0.8
5	52.8	400	0.3/0.3	QV	1.2/0.8
6	53.246±0.08	2*140	0.35/0.35	QV	1.2/0.8
7	53.596±0.115	2*170	0.3/0.3	QV	1.2/0.8
8	53.948±0.081	2*142	0.35/0.35	QV	1.2/0.8
9	54.40	400	0.3/0.3	QV	1.2/0.8
10	54.94	400	0.3/0.3	QV	1.2/0.8
11	55.50	330	0.3/0.3	QV	1.2/0.8
12	57.290344(fo)	330	0.7/0.6	QV	1.5/1.2
13	fo±0.217	2*78	0.9/0.7	QV	1.5/1.2
14	fo±0.3222±0.048	4*36	0.9/0.8	QV	1.5/1.2
15	fo±0.3222±0.022	4*16	1.3/1.0	QV	1.5/1.2
16	fo±0.3222±0.010	4*8	1.6/1.2	QV	1.5/1.2
17	fo±0.3222±0.0045	4*3	2.8/2.1	QV	2.5/1.5

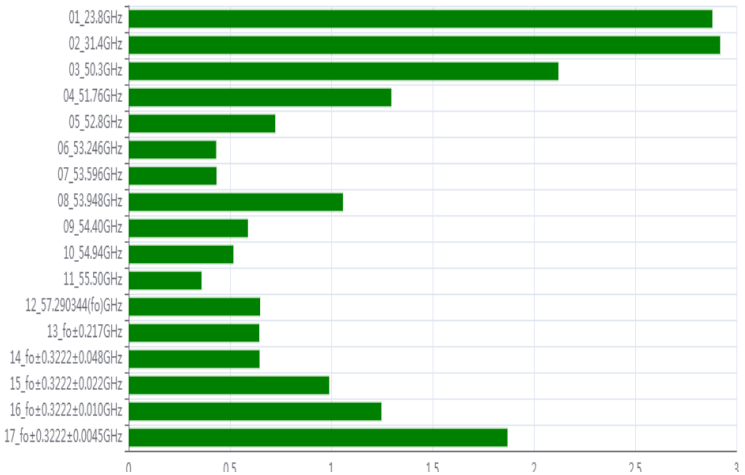
MWTS-III - calibration accuracy

Channel	Specification	Calibration result
1	1.2/0.8	0.9393
2	1.2/0.8	0.9343
3	1.2/0.8	0.9496
4	1.2/0.8	0.9431
5	1.2/0.8	0.9431
6	1.2/0.8	0.9432
7	1.2/0.8	0.9452
8	1.2/0.8	0.9412
9	1.2/0.8	0.9412
10	1.2/0.8	0.9412
11	1.2/0.8	0.9432
12	1.5/1.2	0.95456
13	1.5/1.2	0.9684
14	1.5/1.2	0.9686
15	1.5/1.2	1.0148
16	1.5/1.2	1.1129
17	2.5/1.5	1.3549

cross calibration



O-B (STD)



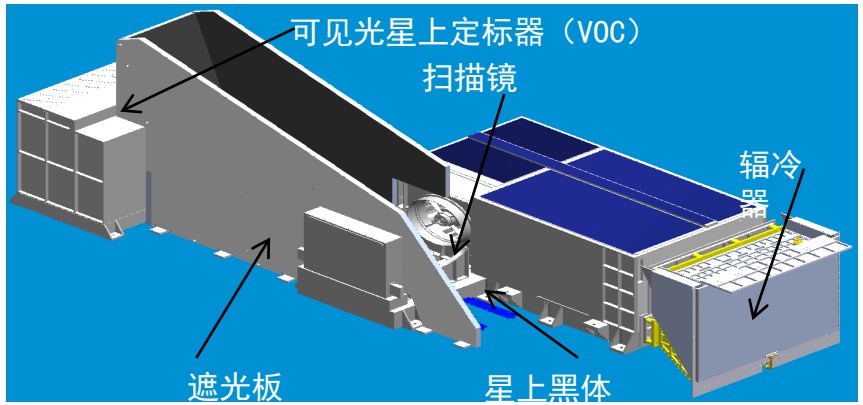
On-orbit calibration uncertainty, the results of 17 channels all meet the requirements.

Compared with the simulation brightness temperature, the standard deviation of the calibration brightness temperature meets the requirements.

Compared with the synchronous observation data of JPSS-1 ATMS, most of the channel deviations and standard deviations are less than 1K.

Medium Resolution Spectral Imager (MERSI-LL)

- MERSI-LL has a total of 7 channels, including 1 low-light channel and 6 thermal infrared channels, of which two infrared split window channels (10.8 and 12.0 microns) have a spatial resolution of 250m, and the remaining channels have a spatial resolution of 1000m.
- MERSI-LL 400nm bandwidth low-light channel, through 3-level gain settings, can realize the observation of visible light reflected radiation with a large dynamic span near the twilight line.



Channel Characteristics

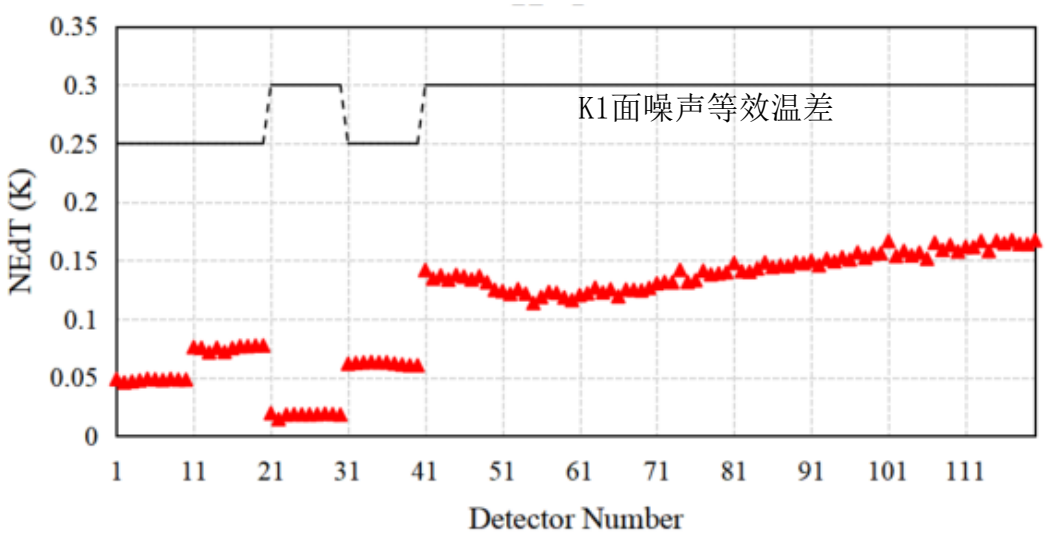
NO.	Center wavelength(mm)	Lmax/Tmax W/m2/sr	Lmin/Tmin W/m2/sr	Ltyp/Ttyp W/m2/sr	SNR/ NEΔT Ltyp/Ttyp	IFOV at s.s.p.
1	0.70	90	3e-5	4e-5(night)	7	1000 m
				50(day)	200	1000 m
2	3.8	350K	186K	300K	0.25K	1000 m
3	4.05	380K	185K	300/380K	0.25K	1000 m
4	7.2	270K	186K	270K	0.30K	1000 m
5	8.55	330K	185K	270K	0.25K	1000 m
6	10.8	345K	185K	300K	0.30K	250 m
7	12.0	345K	185K	300K	0.30K	250 m

MERSI-LL

Result - IR channel NEdT

Infrared channel performance significantly improved

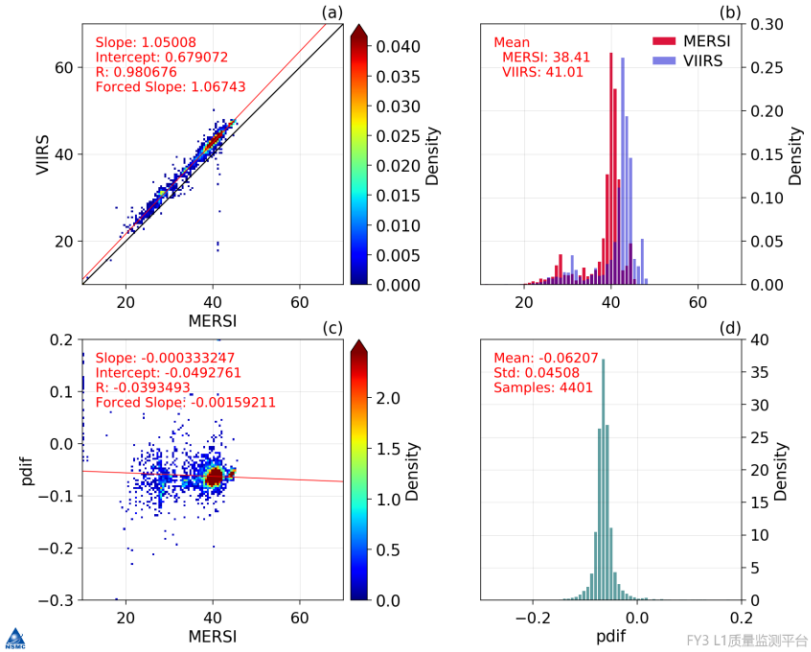
- NEdT of 1km infrared channel is better than 0.1K.
- The NEdT of the 250m channel is better than 0.18K, and some detectors are better than 0.15K.



Result- Low-light channel calibration accuracy

cross calibration result

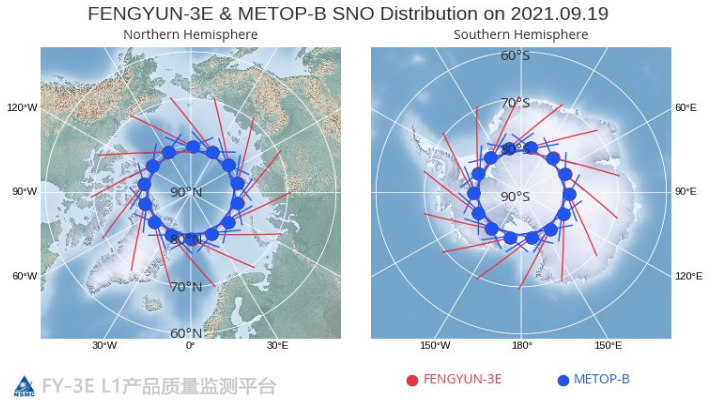
- reference instrument： JPSS-1/VIIRS
- channel： low light
- assessment time： Aug. 10 -13, 2021
- Compared with J1/VIIRS, the calibration deviation of the low-light channel LGS is -6.2%, and the calibration accuracy meets the requirements.



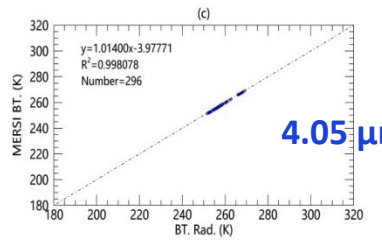
MERSI-LL

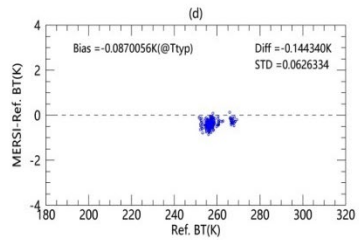
Result - Infrared channel calibration accuracy

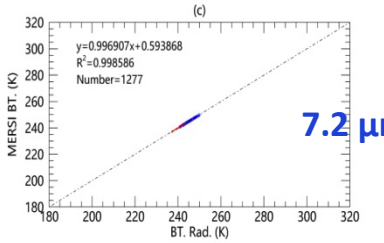
cross calibration result

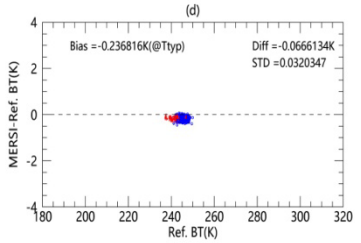


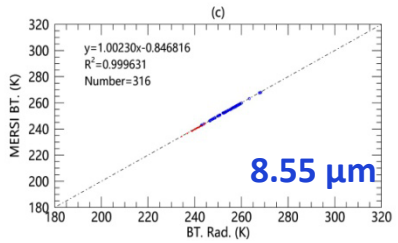
reference instrument： Metop / IASI

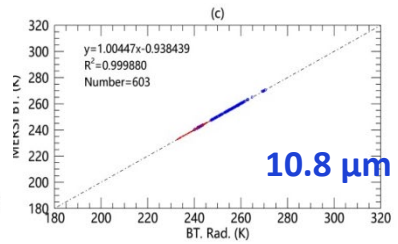


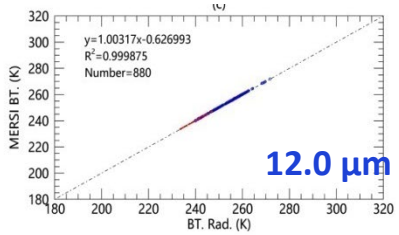


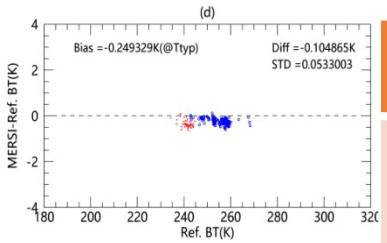


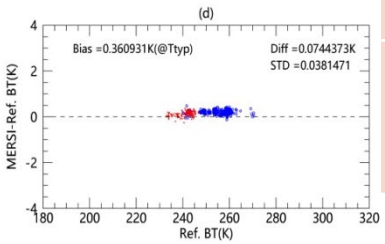


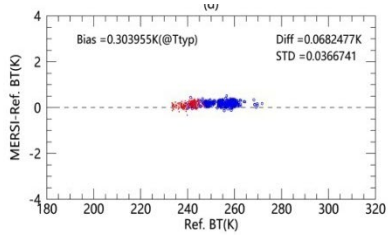








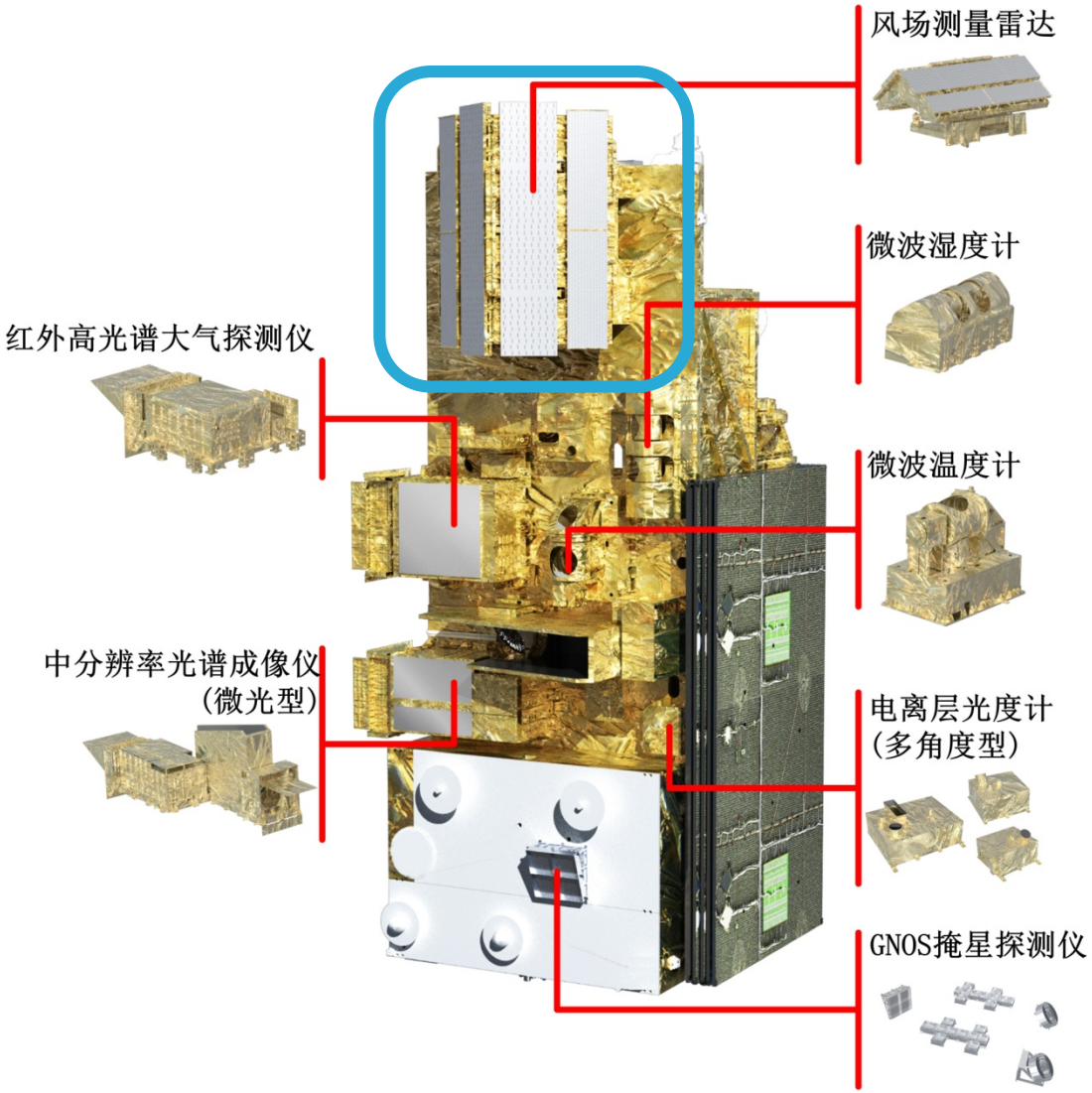




参考仪器		CH3	CH4	CH5	CH6	CH7
A-IASI	mean bias	-0.144	-0.067	-0.105	0.074	0.068
	STD	0.063	0.032	0.053	0.038	0.037
C-IASI	mean bias	-0.152	-0.086	-0.098	-0.050	0.043
	STD	0.215	0.157	0.191	0.215	0.230

Calibration accuracy meets the requirements.

Wind Radar (WindRAD)



WindRAD is the first active microwave remote sensing instrument of the Fengyun series satellites.

- It is a dual-frequency, dual-polarization radar.
- It adopts a fan-beam conical scanning system with an observation width of over 1200km and a minimum detectable wind speed of 3m/s.
- It adopts C and Ku dual bands to work simultaneously, each band includes two polarization measurement methods, horizontal and vertical.

Wind Radar (WindRAD)

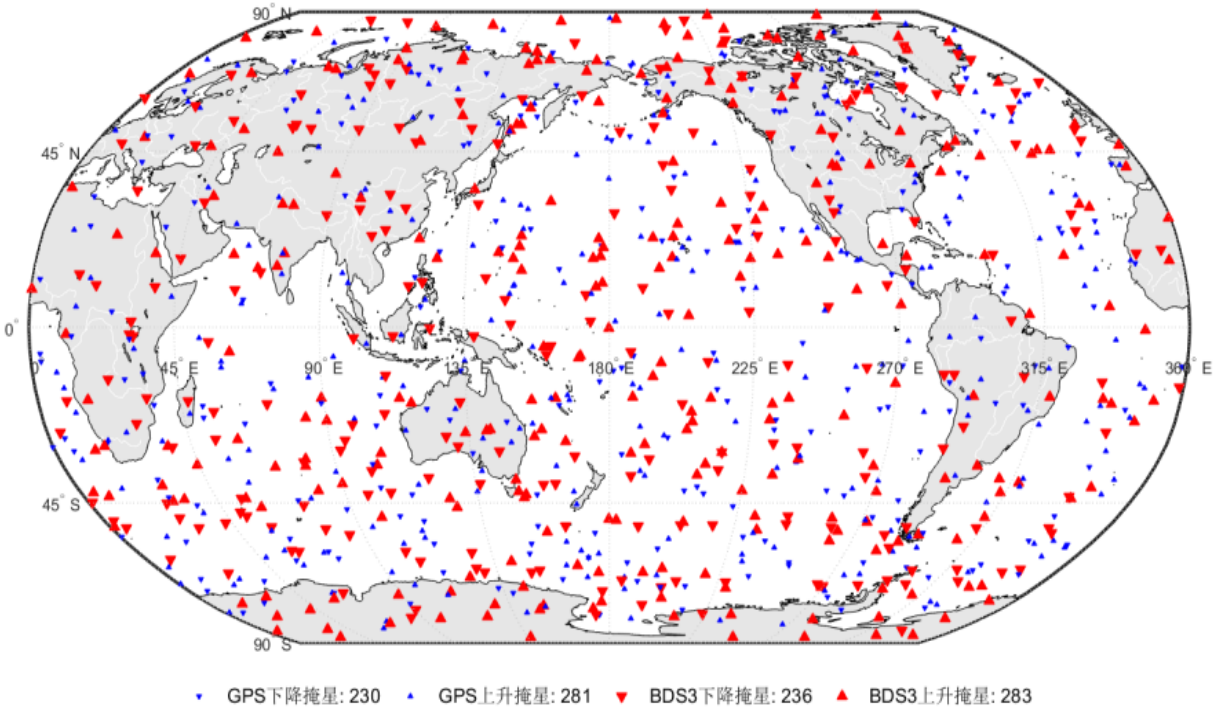
Item	Specification	Commisionning result
Central frequency	C-band：5.4±0.010 GHz， Ku-band：13.256±0.006 GHz	C-band：5.4 GHz， Ku-band：13.256 GHz
Polarization	VV、HH	VV、HH
Resolution	C-band：25 ×0.5km Ku-band：10 ×0.5km	C-HH：22.92km × 0.22km; C-VV：23.17km × 0.22km; Ku-HH：10.24km × 0.25km; Ku-VV：10.62km × 0.25km
Swath	> 1200km	C-HH：1337km; C-VV：1327km; Ku-HH：1273km; Ku-VV：1272km
Sensitivity of wind speed	C-band：3 m/s(-26.2dB) Ku-band：3 m/s(-30.8dB)	C：<3m/s; Ku：<3m/s
Radiometric resolution	0.5dB（wind speed≥ 5 m/s） 1.0dB（wind speed = 3 m/s）	C-HH：0.3306/0.3545 dB; C-VV：0.2912/0.3276 dB; Ku-HH：0.3263/0.3450 dB; Ku-VV：0.3113/0.3319 dB
Radiation accuracy	≤ 0.6dB	C：0.2399 dB; Ku：0.1937 dB

The test results show that all performance parameters of WindRAD meet the requirements for use.

GNSS Radio Occultation Sounder-II（GNOS-II）

occultation events

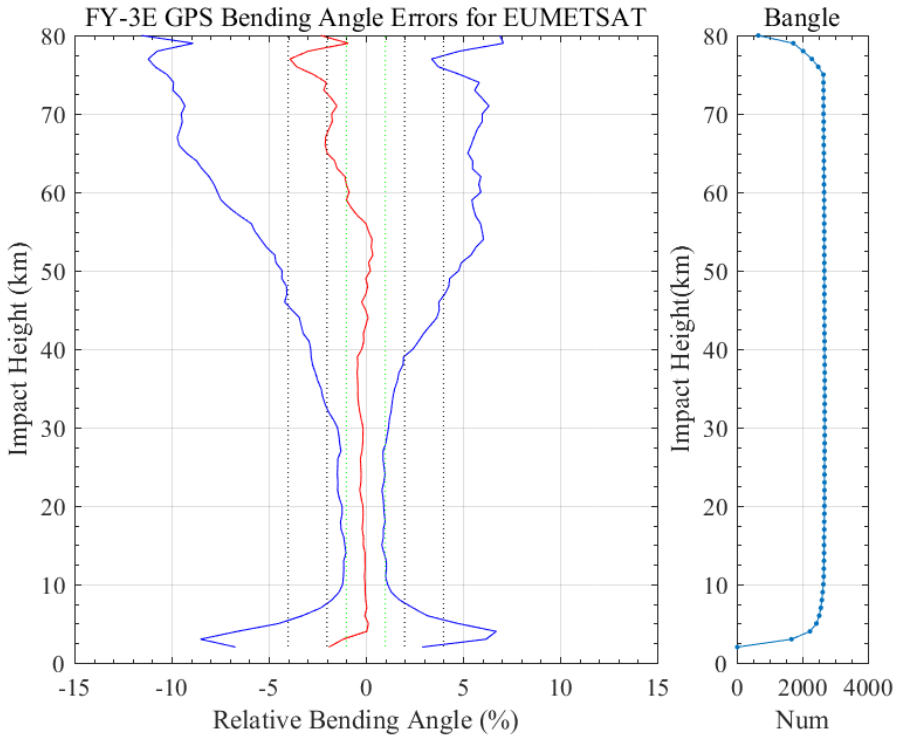
Global distribution map of GNOS-II ionospheric occultation events



GPS/BDS atmospheric occultation ＞1000

GPS/BDS ionospheric occultation ＞1200

bending angle



Data time: July 20-26

Comparative data: 137-layer ECMWF reanalysis field data

Evaluation results: STD is less than 2% (10~35km)

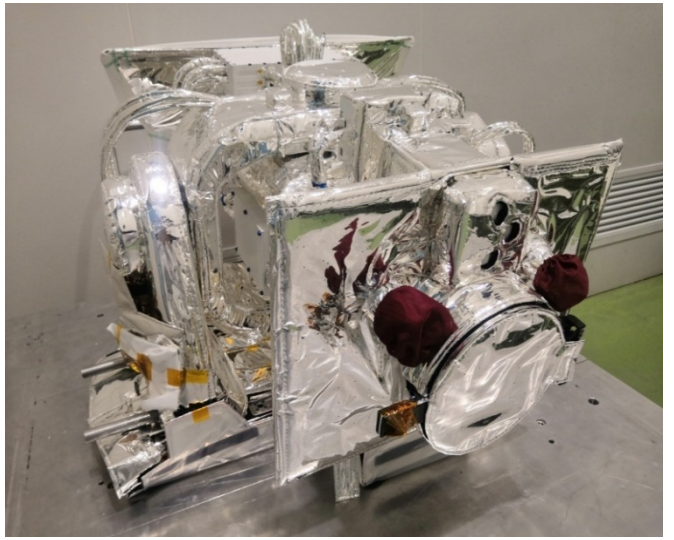
Solar X-ray and Extreme Ultraviolet Imager（X-EUVI）

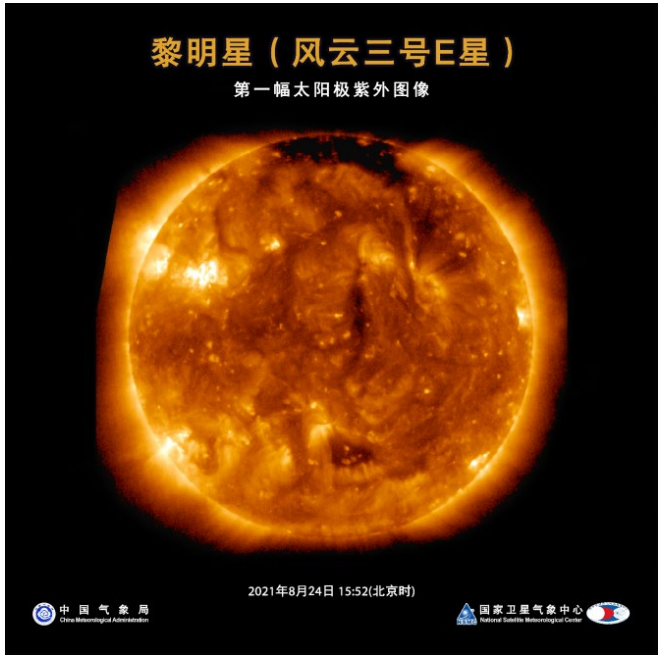
- the world's first solar X-ray-extreme ultraviolet dual-band imager and the first domestic space solar telescope
- Two bands: X ray (0.6-8nm) and EUV (19.5nm)
- 8 channels:

  X1:0.6-8.0 nm X2:0.6-6.0 nm X3:0.6-5.0 nm

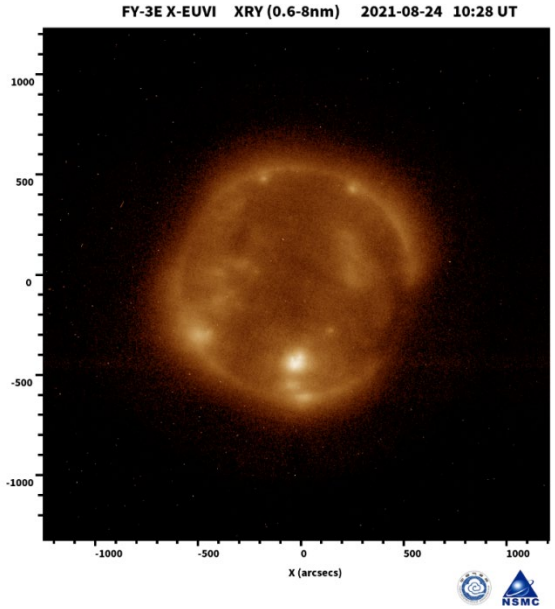
  X4:0.6-2.0 nm X5:0.6-1.6 nm X6:0.6-1.2 nm

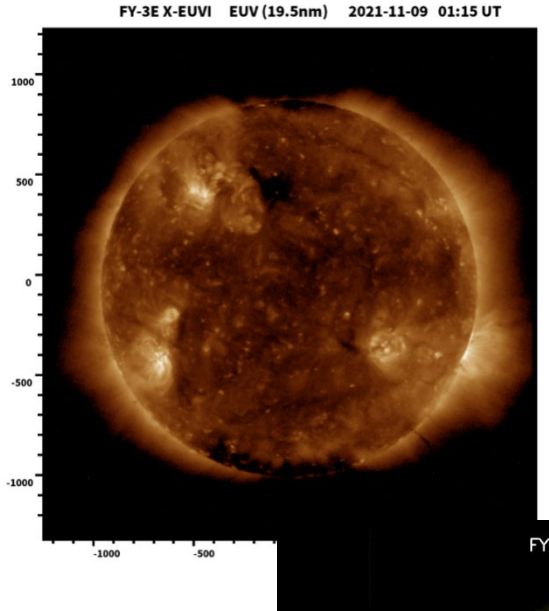
  EUV1（19.5 nm） EUV2（19.5 nm）
- Through on-orbit radiometric calibration, the absolute brightness distribution image of the sun can be obtained (for the first time in the world)
- The first solar X-ray-extreme ultraviolet image was taken, which was officially released on September 2, 2021.





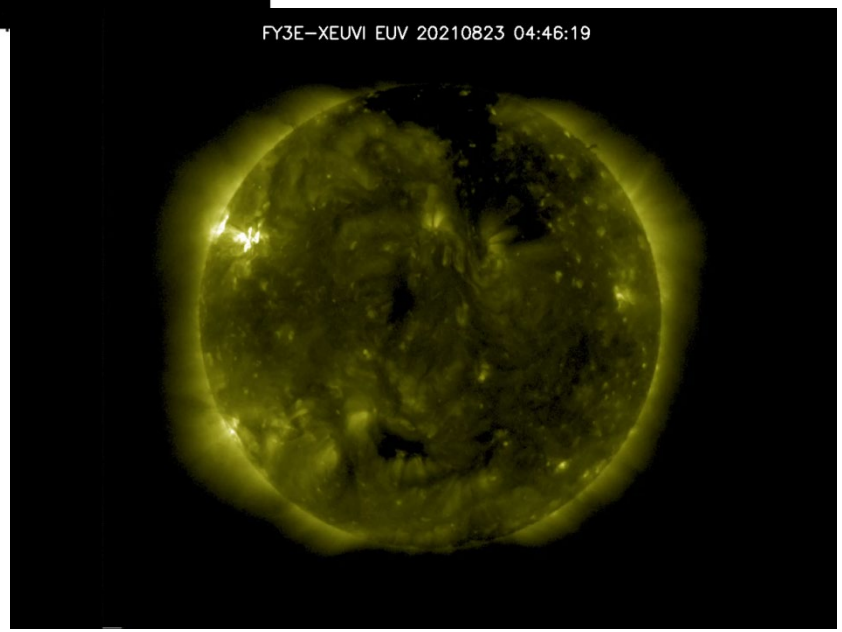
Solar X-ray and extreme ultraviolet images



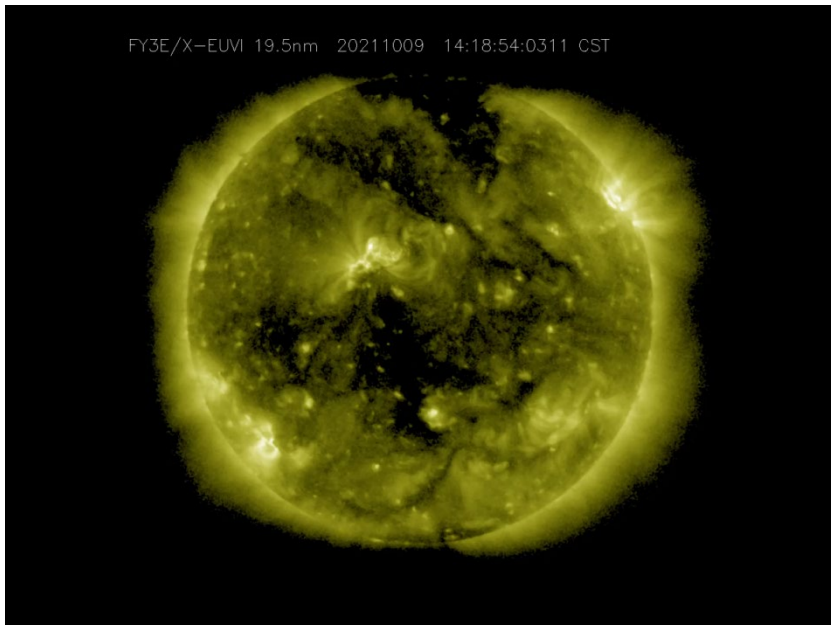


All performance parameters of XEUV meet the requirements.

Solar activities



Active Areas on the Solar Surface, 23-30 August 2021



M1.6 solar flare on October 9, 2021

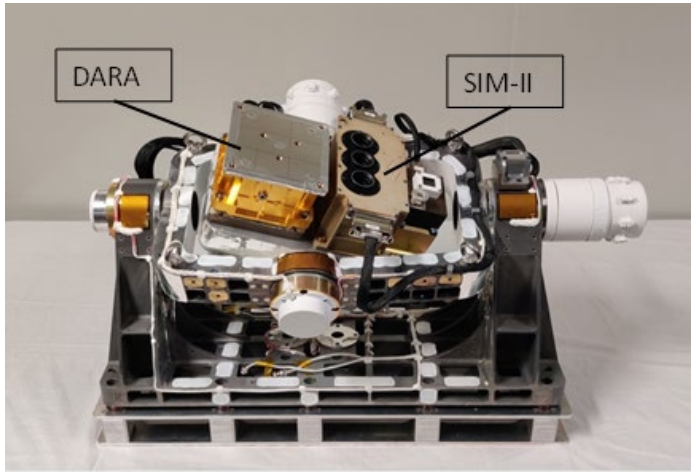
Solar Irradiance Monitor -II（SIM-II）

The combination of SIM-II and DARA has realized the international joint observation of total solar irradiance.

- Solar Radiation Monitor-II (SIM-II) is a high-precision absolute radiometer with automatic sun tracking function independently developed by China.
- DARA (Digital Absolute Radiometer): It is a high-precision total solar radiation observation instrument developed by the Davos Physical Meteorological Observatory/World Radiation Center (PMOD/WRC) in Switzerland.

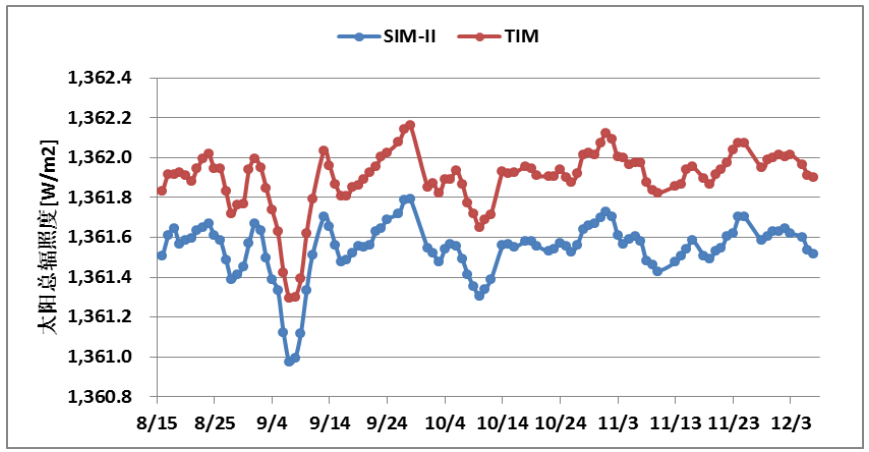
Detailed characteristics

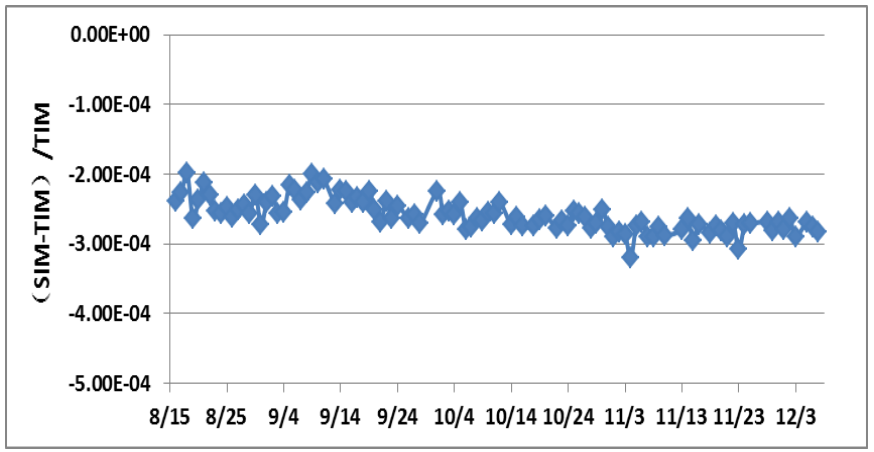
Parameter	Requirement
Spectral range	0.2μm ~ 20μm
Measurement range	0 ~ 1450W/m^2
Sensitivity	≤0.05W/m^2
Calibration error	0.001

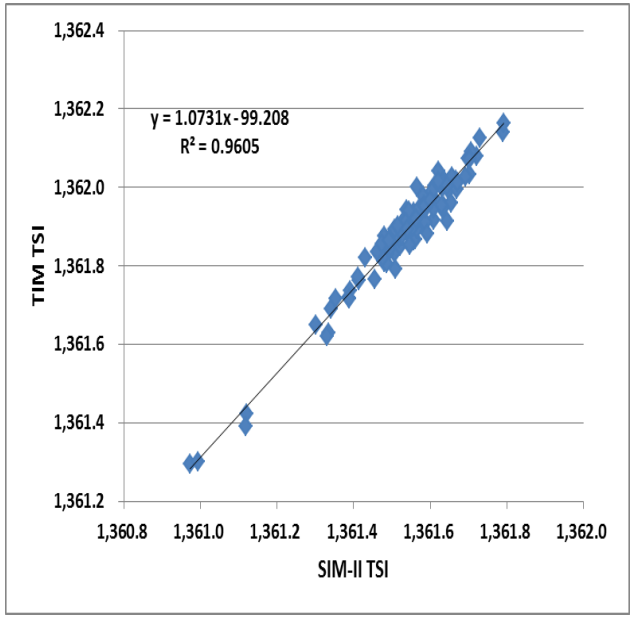


SIM-II - Calibration accuracy

The cross-comparison result of SIM-II conventional observation radiometer AR1 and American TSIS-1/TIM in 8.16-12.7 is -0.35±0.032W/m2; the relative deviation of the two is -0.03%, and the correlation coefficient is 0.98.







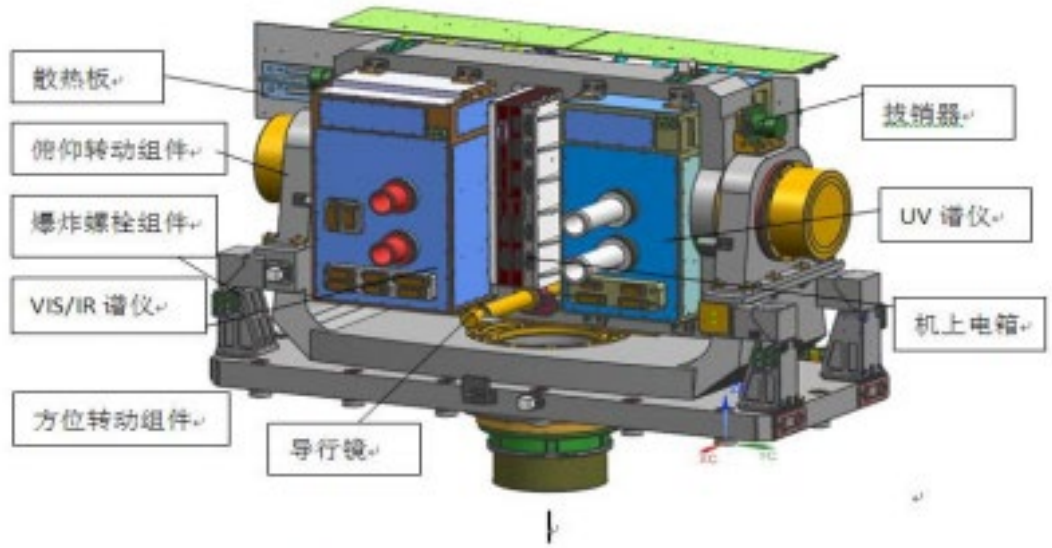
For the first time, the quasi-synchronous observation of the domestic instrument and the foreign instrument has been realized on the same platform.

The relative deviation of the measurement results of the two is better than 0.05%; the accuracy of the total solar irradiance product is comparable to the international level of similar products.

Solar Spectral Irradiance Monitor（SSIM）

Parameter	specification
Spectral range（nm）	UV：165-320 VIS：285-700 NIR: 650-1650*
Spectral resolution（nm）	UV: ≤1 VIS: ≤1 NIR: ≤8
Wavelength Calibration Accuracy（nm）	UV: ≤0.05 VIS: ≤0.05 NIR: ≤0.1
Absolute Radiometric Calibration Accuracy	165nm-240nm: ≤3% 240nm-1650: ≤2%
sun tracking accuracy	≤0.1°

It is the first time of solar spectral irradiance observation by Fengyun satellite. It measures the solar spectral irradiance through the ultraviolet, visible and infrared channels to obtain the solar spectral irradiance characteristics and capture the influence of solar activity on the spectral irradiance.



wavelength（nm）	180-220	220-250	250-300	300-500	500-800	800-1000	1000-1650
SNR	100-350	350-500	500-1000	1000	1000-2000	2000-3000	3000-1200

*1650nm-2400nm is the test band

SSIM

wavelength	UV1 [nm]			UV2[nm]			VIS[nm]		
	185	254	297	185	254	297	435	507	546
Spectral resolution	0.9096	0.8656	0.8262	1.016	1.0092	0.9794	0.8028	0.7438	0.7136
uncertainty	0.00167	0.00219	0.00192	0.00141	0.00363	0.00152	0.00259	0.00217	0.00207

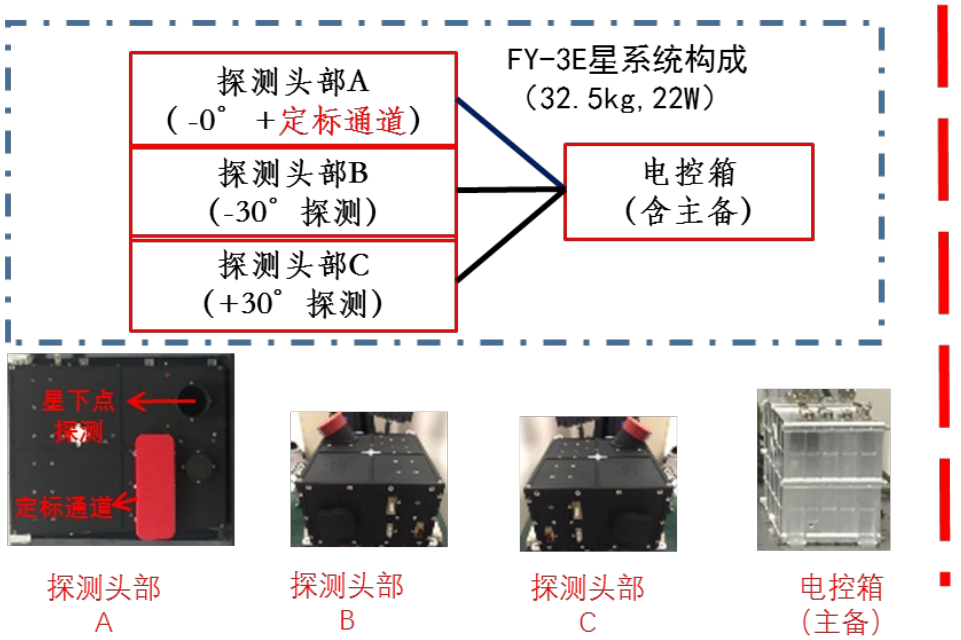
wavelength	UV1 [nm]			UV2[nm]			VIS[nm]		
	185	254	297	185	254	297	435	507	546
Wavelength Calibration Accuracy	-0.00724	0.01274	0.01704	-0.0188	-0.01462	0.00958	-0.03025	-0.00468	0.02053
uncertainty	0.00145	0.00195	0.00297	5.22E-4	0.00152	0.00156	0.00415	0.00487	0.00205

Absolute Radiometric Calibration Accuracy: **165-240nm≤3%； 240-1650nm ≤2%**

All performance parameters of SSIM meet the requirements.

Triple-angle Ionospheric PhotoMeter（ Tri-IPM ）

- It is the first instrument in the world to carry out high-sensitivity thermospheric-ionospheric airglow detection for on-board multi-angle detection for early morning orbit.
- For the special orbit of the descending node 5:40, three detection channels are set up to capture the fast changing characteristics of the thermospheric-ionospheric airglow from 17:10-18:00 on the dusk side and 5:10-6:00 on the morning side. Different dynamical processes on the morning and evening sides can be analyzed by differential processing of the three probes.

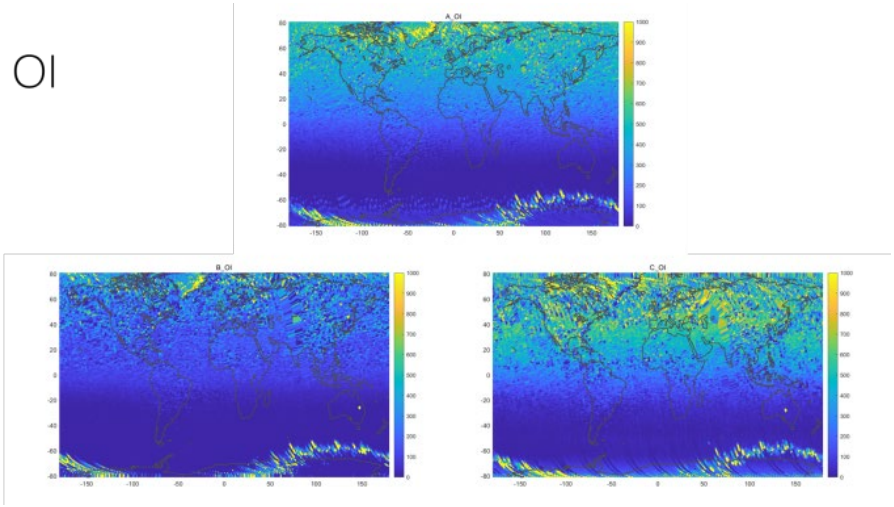


- In order to ensure the consistency of the data of the three probes and obtain reliable airglow variation characteristics, Tri-IPM set up the on-board calibration channel for the first time. In addition to monitoring the long-term stability of the instrument, it also serves as a transmission benchmark to ensure the consistency of the data of the three probes.

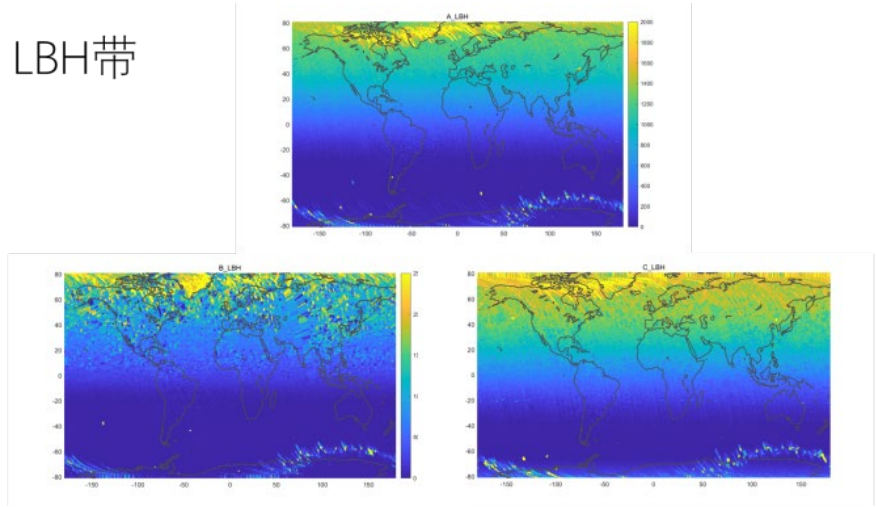
Tri-IPM

Global distribution of airglow

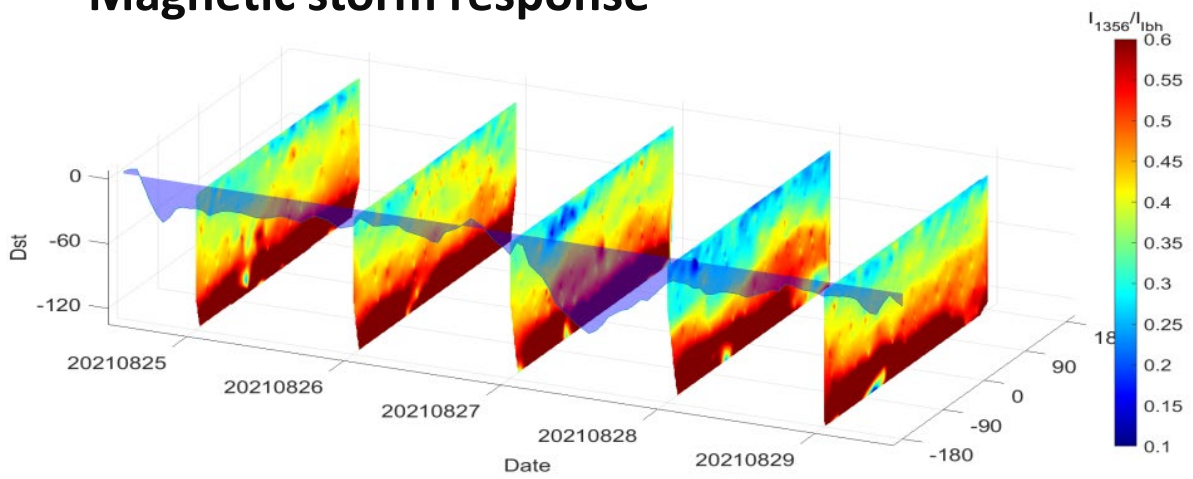
OI



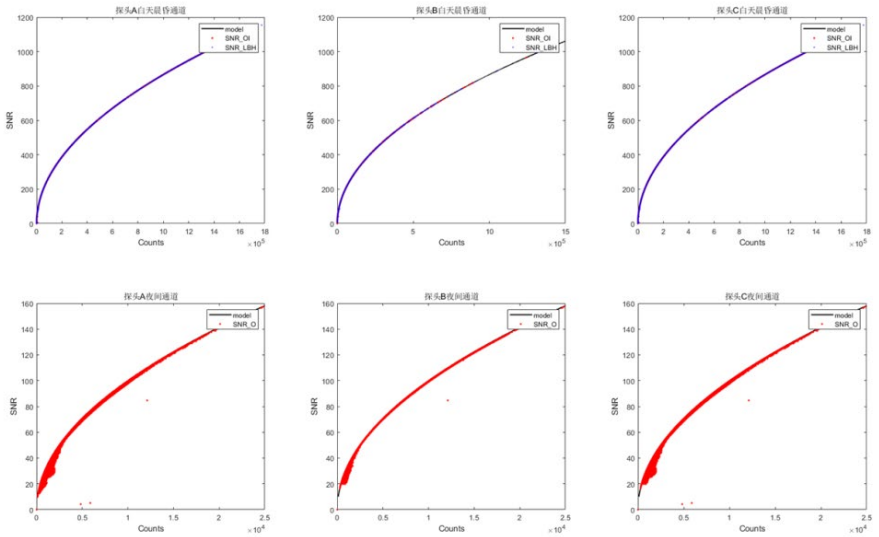
LBH带



Magnetic storm response

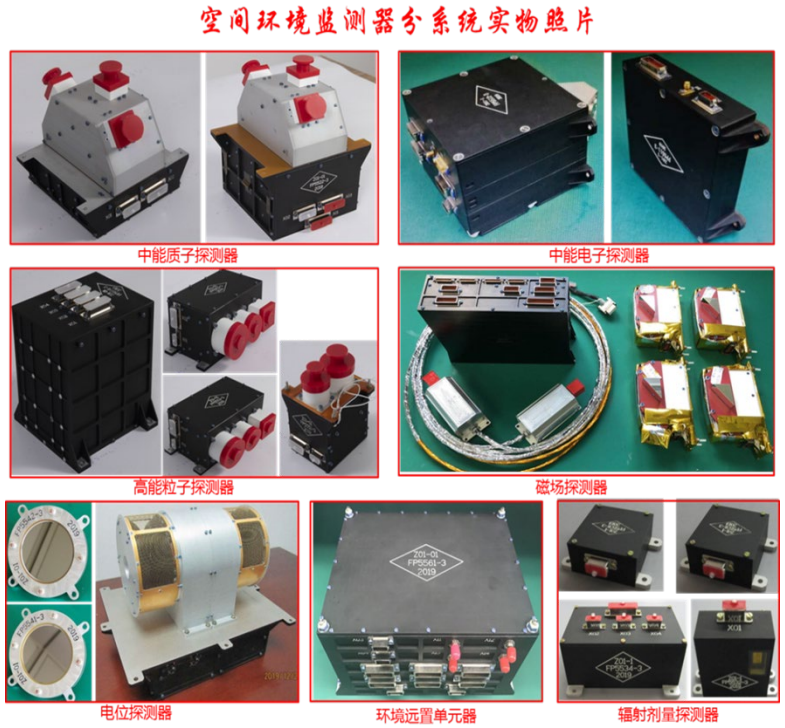


SNR

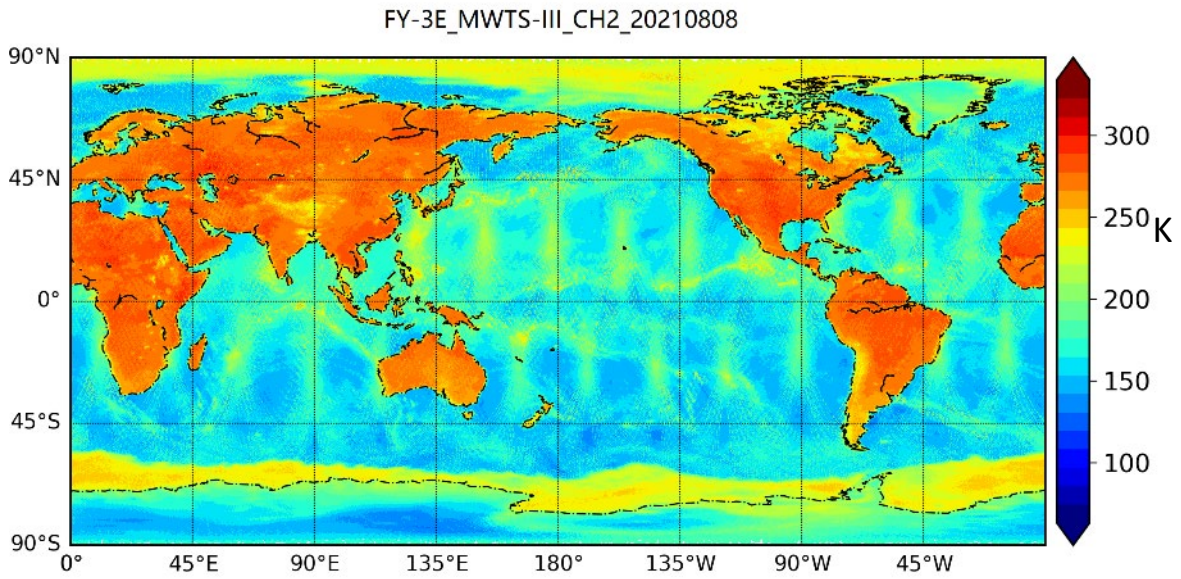


Space Environment Monitor -II（ SEM-II ）

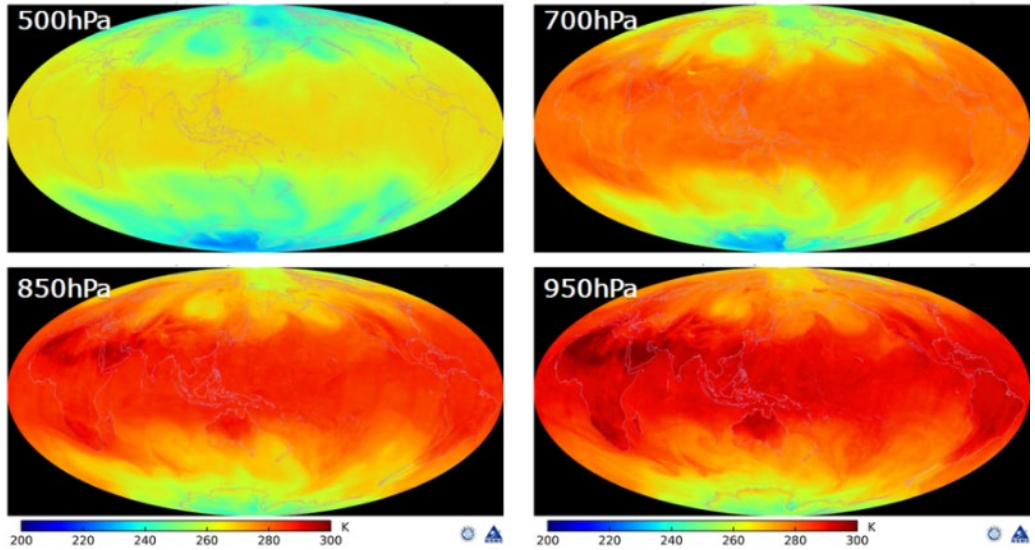
- Achieved multi-directional full energy spectrum (30 eV ~ 300 MeV) particle detection.
- Realize the magnetic field vector detection without extension rod, the particle measurement accuracy is better than 25%, and the magnetic field measurement accuracy is about 1%.
- Detect the distribution, structure and dynamic characteristics of medium and high-energy particles in satellite orbits, changes in magnetic field vectors, monitor the evolution trend of radiation belts in real time, and predict radiation environmental disturbance events and radiation effects.

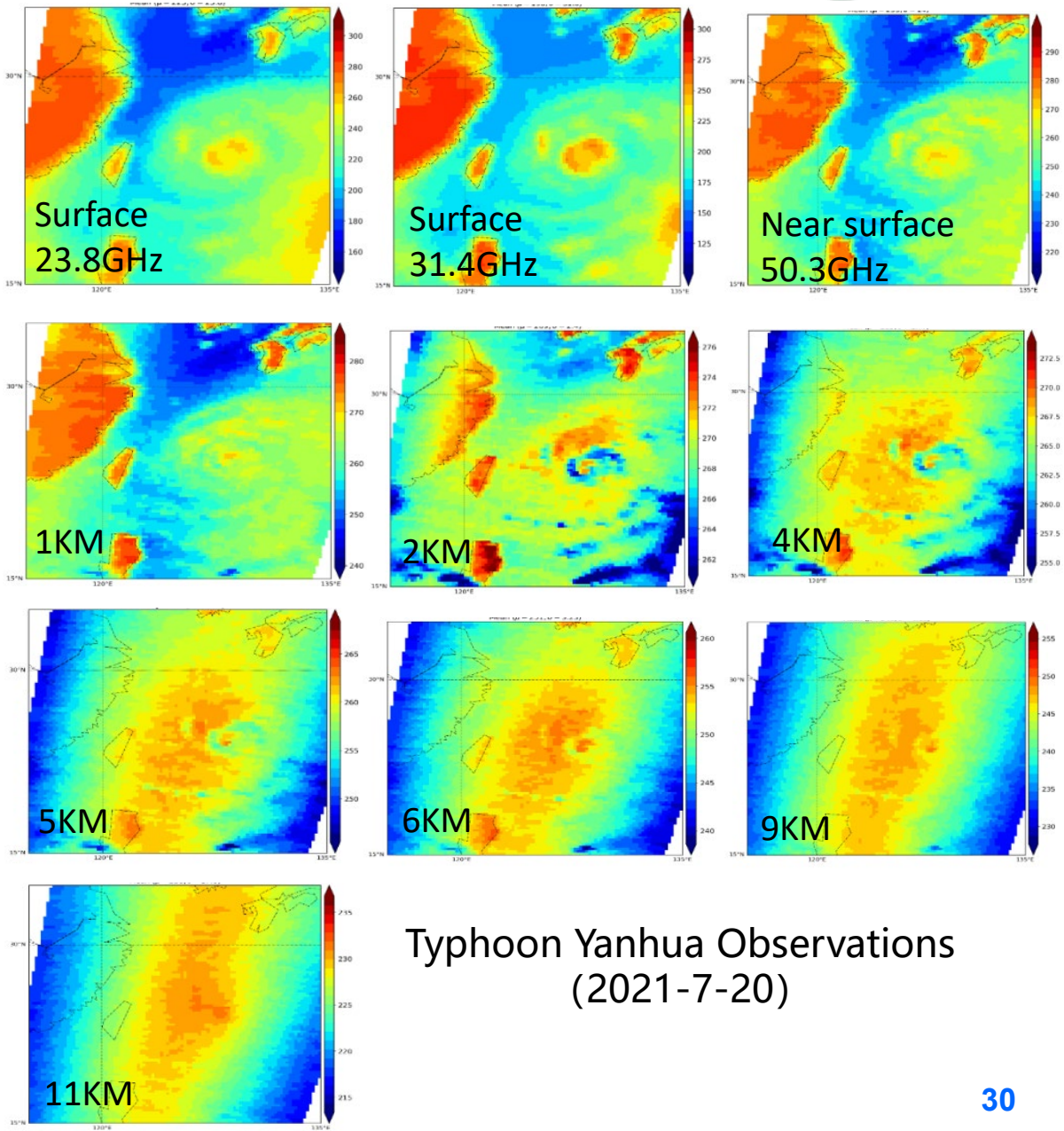


Atmospheric temperature profile from MWTS-III



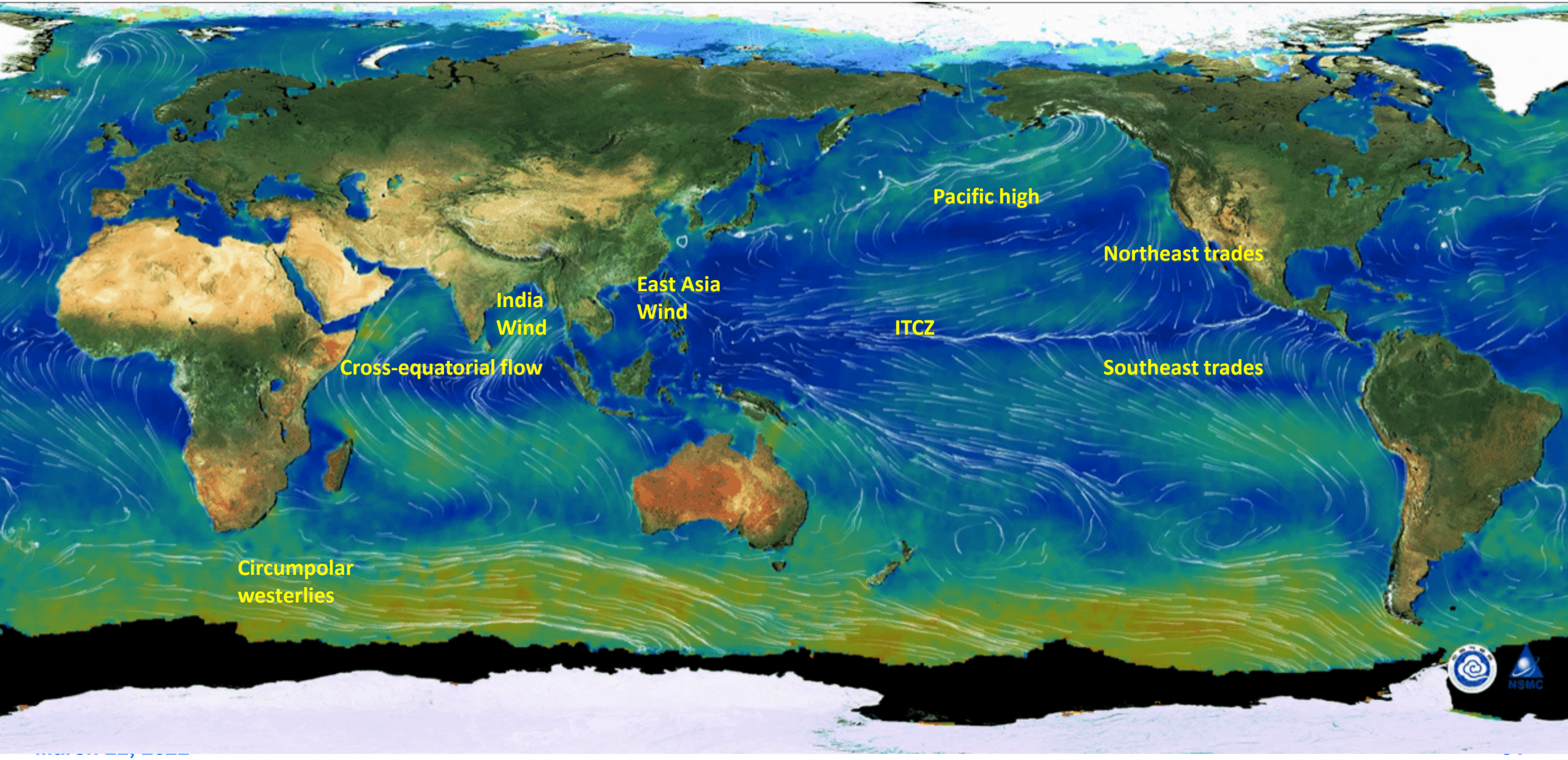
Vertical atmospheric temperature



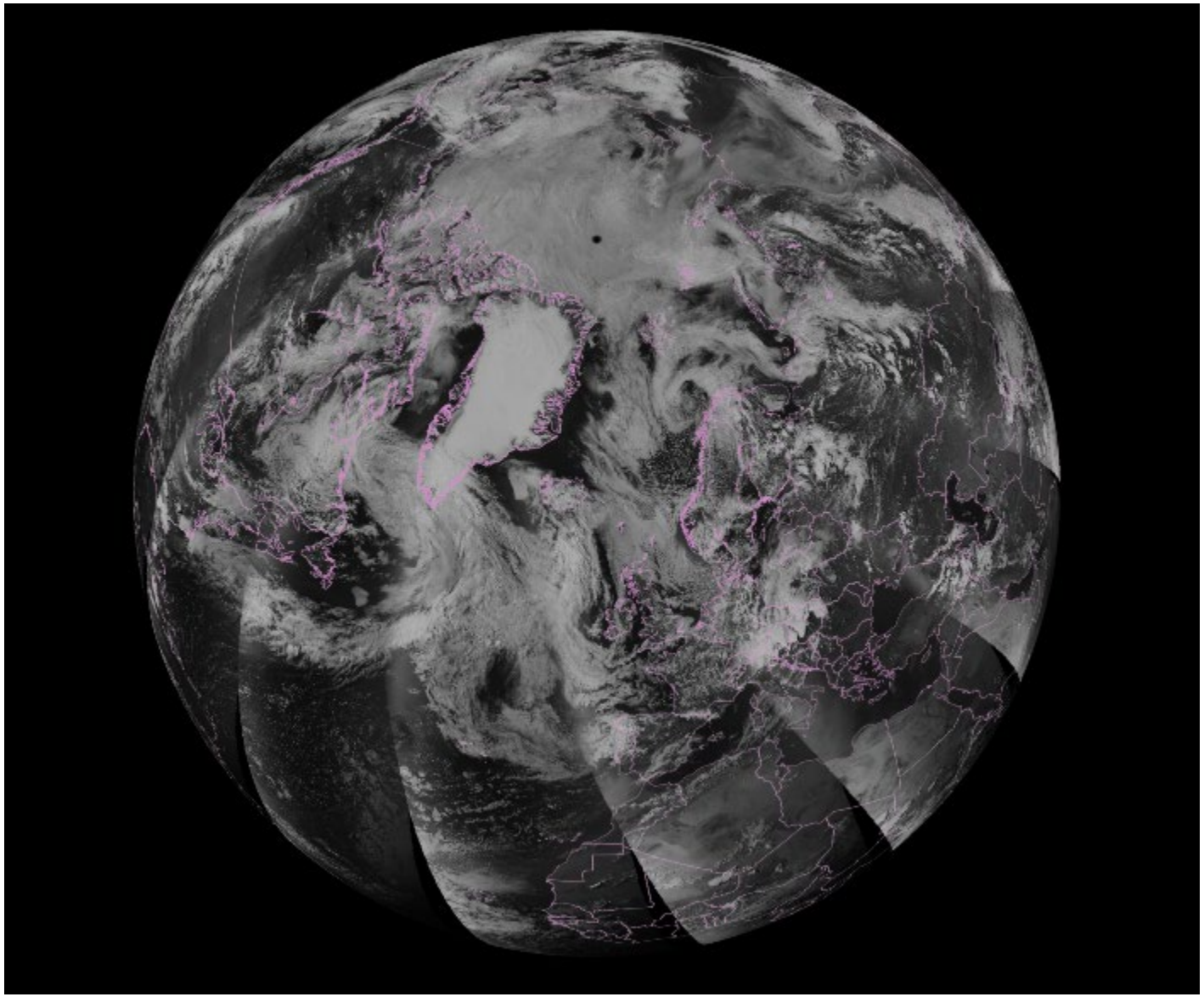


Typhoon Yanhua Observations
(2021-7-20)

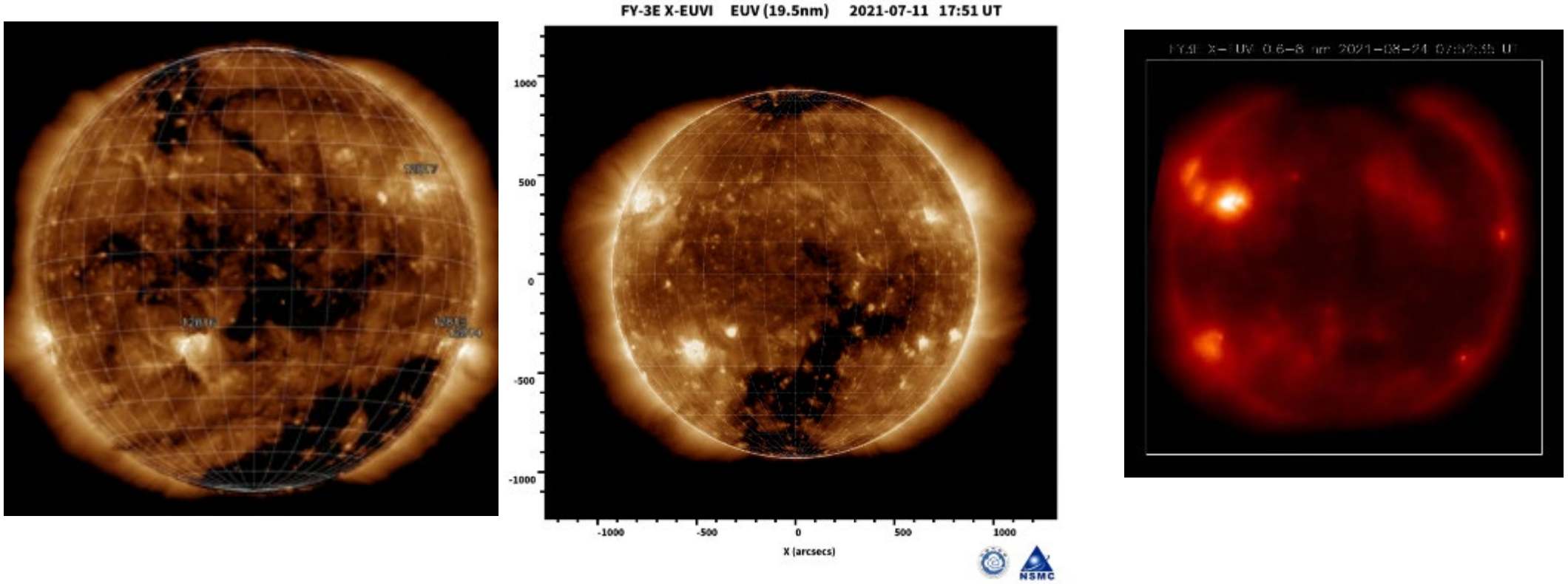
FY-3E sea surface wind speed (September, 2021)



FY-3E MERSI-LL image and city light map



X-EUVI images



FY-3E X-EUVI coronal solar activity product example (the left is an example product, which identifies the number and location of the solar active region, the right picture is an example product made with on-orbit test data, the active region number and location have not been identified yet)

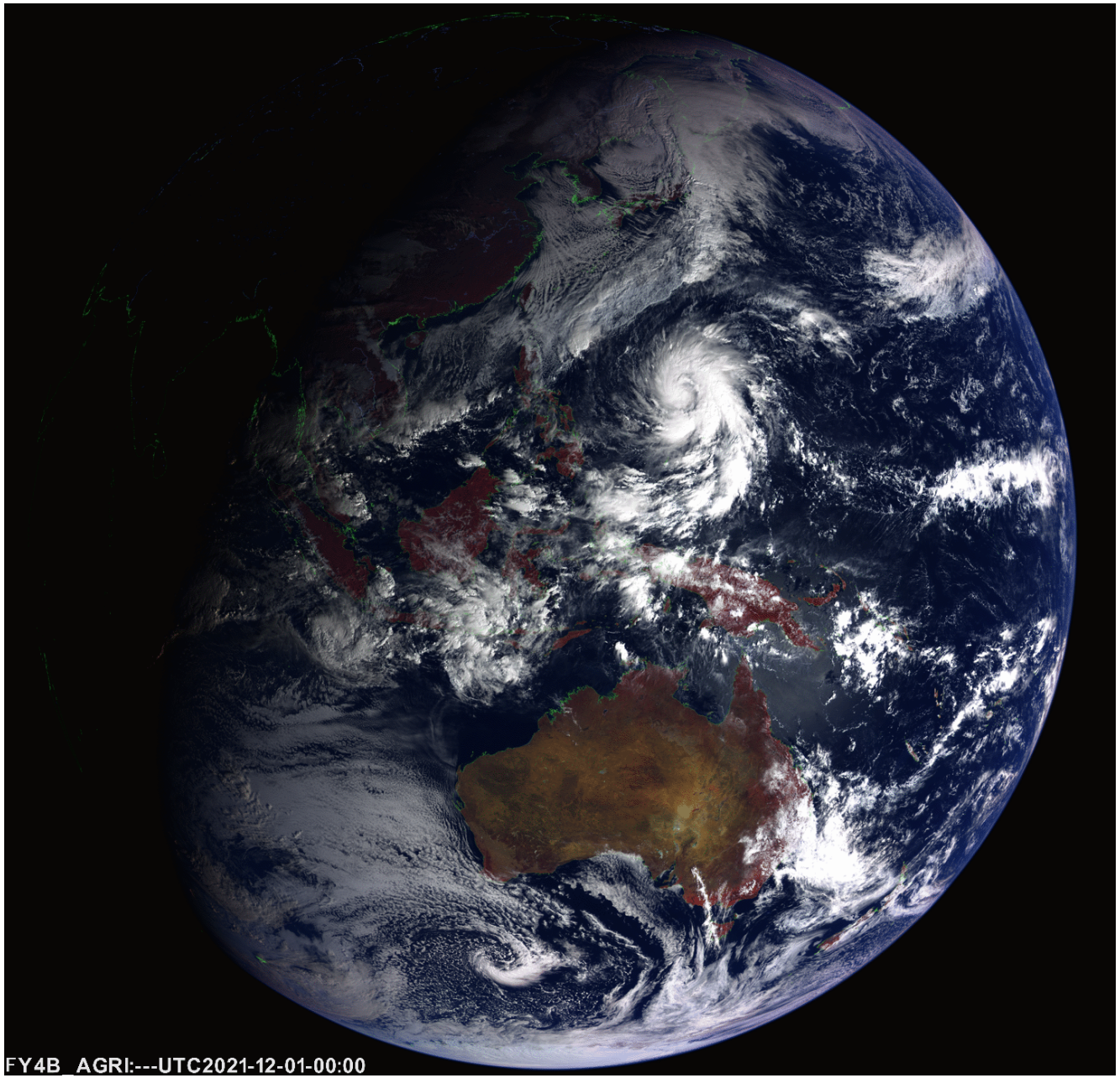
2. FY-4B Brief introduction of FY-4B

FY-4B, which is the **first operational** geostationary satellite in FY-4 series, was successfully launched from the Xichang Satellite Launch Center at 0:17 on June 3, 2021, and was successfully positioned over the equator at 123.5 degrees east longitude at 17:07 on June 10,2021.

Commissioning began on June 17,2021.

There are 4 instruments on the FY-4B.
The main observation capabilities are similar to those of FY-4A, with some significant performance improvements.

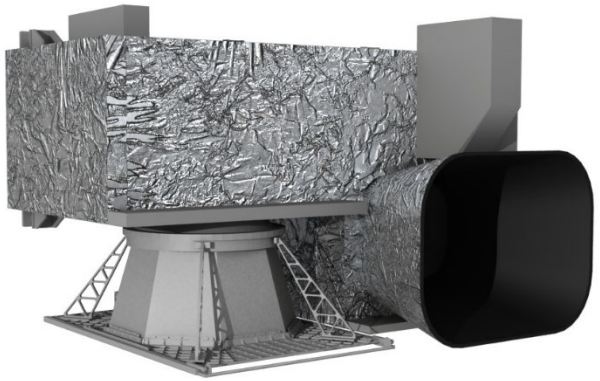
	Instruments
1	Advanced Geostationary Radiation Imager(AGRI)
2	Geostationary Interferometric Infrared Sounder(GIIRS)
3	Geostationary High Speed Imager(GHI)
4	Space Environment Package(SEP)


FY4B_AGRI:---UTC2021-12-01-00:00

Advanced Geostationary Radiation Imager (AGRI)

Channel Characteristics

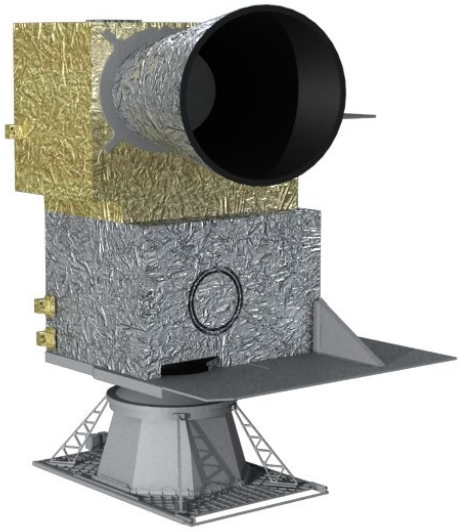
	Central wavelength	Spectral interval	SNR or NEΔT @ specified input	IFOV at s.s.p.
1	0.47 μm	0.45-0.49 μm	≥90 @ 100% albedo	1 km
2	0.65 μm	0.55-0.75 μm	≥150 @ 100% albedo	0.5 km
3	0.825 μm	0.75-0.90 μm	≥200 @ 100% albedo or ≥3 @ 1% albedo	1 km
4	1.378 μm	1.371~1.386 μm	≥120 @ 100% albedo or ≥2 @ 1% albedo	2 km
5	1.61 μm	1.58-1.64 μm	≥200 @ 100% albedo or ≥3 @ 1% albedo	2 km
6	2.25 μm	2.10-2.35 μm	≥200 @ 100% albedo or ≥2 @ 1% albedo	2 km
7	3.75 μm (high)	3.50-4.00 μm	≤ 0.7 K @ 315 K	2 km
8	3.75 μm (low)	3.50-4.00 μm	0.2 K @ 300 K or 2.0 K @ 240 K	4 km
9	6.25 μm	5.80-6.70 μm	0.2 K @ 300 K or 0.9 K @ 240 K	4 km
10	6.95 μm	6.75-7.15 μm	0.25 K @ 300 K or 0.9 K @ 240 K	4 km
11	7.92 μm	7.24-7.60 μm	0.25 K @ 300 K or 0.9 K @ 240 K	4 km
12	8.55 μm	8.30-8.80 μm	0.2 K @ 300 K or 0.4 K @ 240 K	4 km
13	10.80 μm	10.30-11.30 μm	0.2 K @ 300 K or 0.4 K @ 240 K	4 km
14	12.00 μm	11.50-12.50 μm	0.2 K @ 300 K or 0.4 K @ 240 K	4 km
15	13.30 μm	13.00-13.60 μm	0.5 K @ 300 K or 0.9 K @ 240 K	4 km



- Compared with FY-4A, 1 new water vapor channel is added, 4 channel band settings are optimized, and the resolution of short wave and medium wave is improved to 2km;
- Each working mode of the instrument works normally, and the scanning control accuracy, inter-line registration accuracy, MTF, non-uniformity and other indicators meet the requirements.
- The dynamic range of the instrument is set reasonably;
- All 16 channel sensitivities meet the requirements.
- The SNR of the reflection channel and the sensitivity of the very long-wave channel are doubled compared to the FY-4A.

Geostationary Interferometric Infrared Sounder (GIIRS)

- The spatial resolution of the infrared channel is increased from 16km to 12km.
- The sensitivity is slightly higher than that of FY-4A.
- The resolution of the visible channel has been increased from 2km to 1km, and the star sensitive identification ability and on-orbit positioning accuracy have been further improved.
- Improve instrument temperature field and reduce instrument background radiation.
- The instrument detection band range, spectral resolution, spatial resolution, working mode, scanning control accuracy, temperature control, visible light dynamic range and other indicators meet the requirements.
- The instrument works normally and has stable performance.



Channel Characteristics

Spectral range (μm)	Spectral range (cm^{-1})	Spectral resolution	NEΔR or SNR
14.7-8.85 μm	680-1130 cm^{-1}	0.625 cm^{-1}	0.5 mW m^{-2} sr^{-1} cm
6.06-4.44 μm	1650-2250 cm^{-1}	0.625 cm^{-1}	0.1 mW m^{-2} sr^{-1} cm
0.55-0.90 μm	N/A	N/A	200 @ 100 % albedo

Geostationary High-speed Imager (GHI)

- GHI, which is a new instrument on FY-4B, is the first long-line array in geosynchronous orbit to achieve 1-minute continuous imaging and observation capability in a 2000km×2000km area with a resolution of 250m.
- The visible and near-infrared spatial resolutions are doubled compared to ABI.
- Each working mode of the instrument works normally, and the scanning control accuracy, inter-channel registration accuracy, MTF, non-uniformity and other indicators meet the requirements.
- The dynamic range of the instrument, the sensitivity of each channel, and the SNR are significantly better than the specifications. The NEDT of the infrared channel is better than 0.1K, and more than 70% of the pixels are better than 0.05K.

Channel Characteristics

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

Space Environment Package (SEP)

- The flux intensity, energy spectrum distribution, and direction distribution of high-energy particle sensor, medium-energy particle sensor, and low-energy particle sensor all meet the requirements.
- The performance such as dynamic range, resolution, noise and accuracy of the magnetometer all meet the requirements.

Data services of FY-3E

Till March 10, 2022, the archived FY-3E data files accumulated 307 categories, 4.281 million, and a total of 482.1TB.

Data level	number of files (thousand)	Amount of data stored online (TB)
L0	420	163
1A	740	246
L1	2530	239
L2	2170	3

Instrument	number of files	Amount of data stored online (TB)
GNOS	3,771,160	7.28
HIRAS	595,818	352.80
MERSI	1,130,214	241.30
MWHS	25,736	0.39
MWTS	24,422	0.23
SEM	137,964	1.92
SIM	21,320	0.00
SSIM	1,438	0.00
TRIPM	21,972	0.03
WRAD	116,152	40.51
XEUVI	6,428	7.10

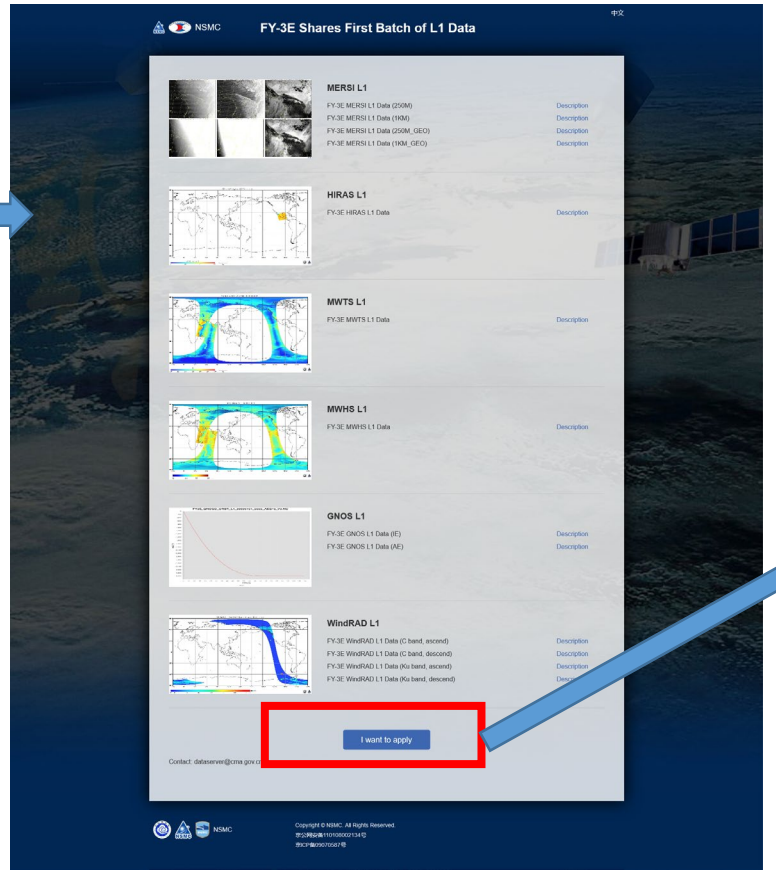
Data services of FY-3E

- The first batch of 13 types of L1 data of FY-3E 6 instruments released.
- Data from January 1-7, 2022, a total of 18,000 files, data volume 3TB.

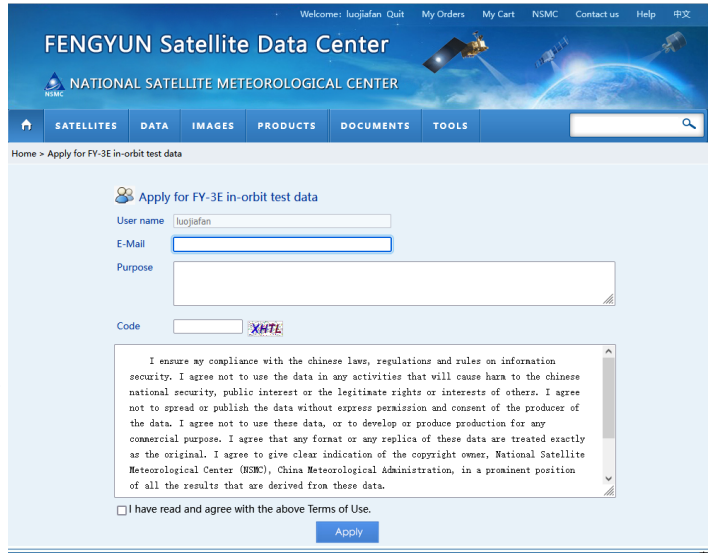
Data released from: Jan 12, 2022

Data services website

https://satellite.nsmc.org.cn/FY3E/html/data.html



Accept the data usage agreement and apply for an account



Data services of FY-3E

- Since February 2022, FY-3E's WinRAD, MERSI-LL spectral response function, MWTS-3 RTTOV band information, and MWHS-II, HIRAS-II commissioning data have been provided to ECMWF, NWPSAF, KNMI (Netherlands Meteorological Institute)), IACP (Institute of Automation and Control Processes, Far Eastern Branch of the Russian Academy of Sciences), and Russian LORETT Engineering Company.

ftp://NWPSAF_FY3E_HIRAS:D8WEjW_A@ftp.nsmc.org.cn
ftp://NWPSAF_FY3E_WRAD:D8WEjW_A@ftp.nsmc.org.cn
ftp://KNMI_FY3E_HIRAS:DrWvi_80@ftp.nsmc.org.cn
ftp://KNMI_FY3E_WRAD:DrWvi_80@ftp.nsmc.org.cn
ftp://ECMWF_FY3E_HIRAS:TYaQ7r_6@ftp.nsmc.org.cn
ftp://ECMWF_FY3E_WRAD:TYaQ7r_6@ftp.nsmc.org.cn

Data services of FY-4B

Till March 10, 2022, the archived FY-4B data files accumulated 253 categories, 24.638 million, and a total of 429.5TB.

Data level	number of files (thousand)	Amount of data stored online (TB)
L0	45,963,864	622.08
L1	2,150,748	204.46
L2	440,558	5.60

仪器		累计文件数	累计在线存储数据量（TB）
AGRI		876,432	198.47
GHI		41,991,162	210.53
GIIRS		5,546,394	362.03
SEP	FGM	12,462	0.04
	LEPD	12,440	0.25
	MEED	12,550	0.02
	MEPD	12,450	0.04
	PLAT	66,412	60.73
	RTU	12,438	0.01

Make the data better and easier to use !