

风云三号H星 微波温度计-III型仪器 与一级产品介绍

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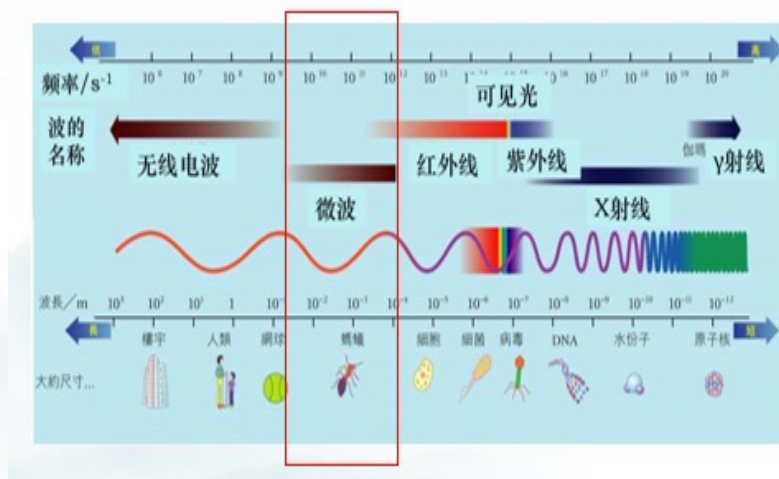
典型应用场景介绍



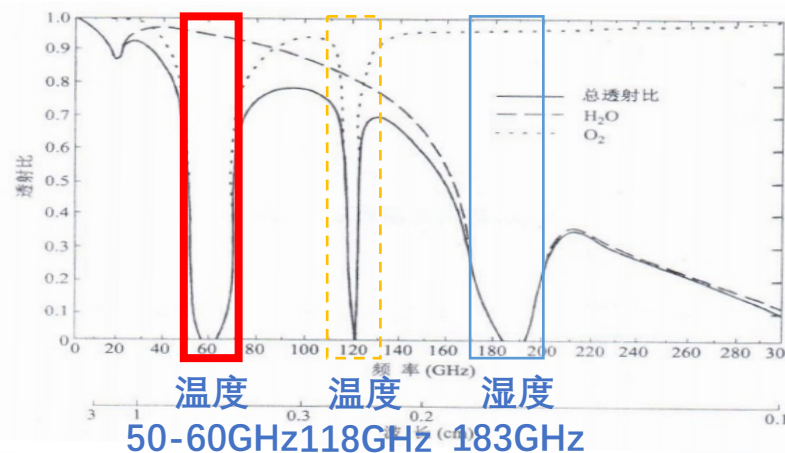
1. 仪器简介

CT+体温计

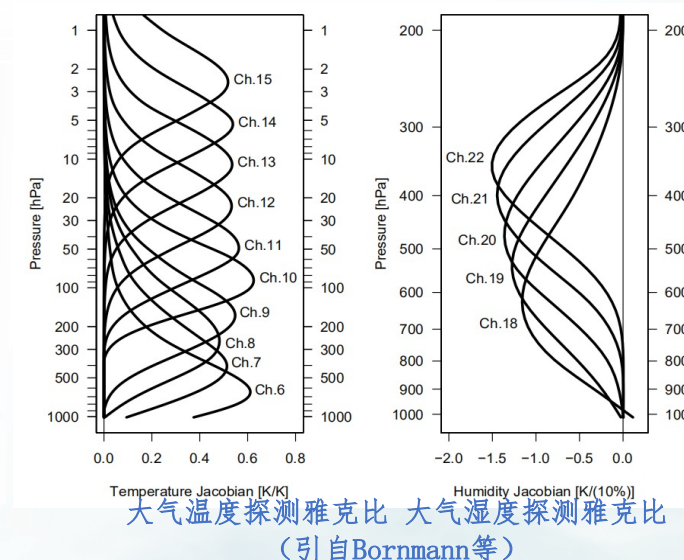
- 微波温度计 (MWTS : MicroWave Temperature Sounder)
 - 微波谱段 (广义) : 300MHz ~300 GHz (1m ~1mm) 。全天时、全天候探测。
 - 微波温度探测仪: 探测50-60GHz氧气吸收带地球微波辐射, 实现对大气垂直温度场的全天时、全天候观测, 为数值天气预报、气候变化分析等应用提供全球观测数据。



电磁波谱



微波气体 (氧气和水汽) 吸收谱



微波温度和湿度通道权重函数
(美国ATMS仪器)



1. 仪器简介

• 风云三号微波温度计

- 国际第一台微波温度探测仪：1972年12月11日发射的雨云5号美国极轨卫星上搭载的4通道NEMS。
- 我国第一台微波温度探测仪：2008年5月27日发射的FY-3A卫星上搭载的4通道MWTS-I。
- 欧洲最新微波温度探测仪：2025年8月12日发射的Metop-SG-A1上搭载的微波探测仪MWS（14个50+GHz通道）
- 我国最新微波温度探测仪：2025年10月2日发射的FY-3H卫星上搭载的17通道MWTS-III（15个50+GHz通道）。

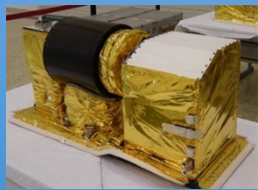
FY-3A MWTS-I
(2008-2013)



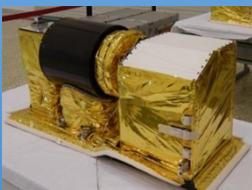
FY-3B MWTS-I
(2010-2014)



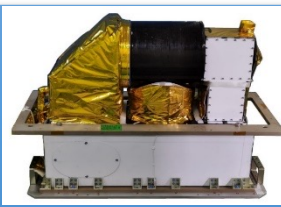
FY-3C MWTS-II
(2013-2015)



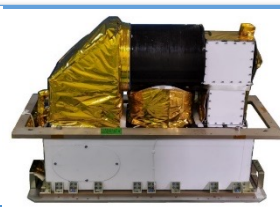
FY-3D MWTS-II
(2017.11-)



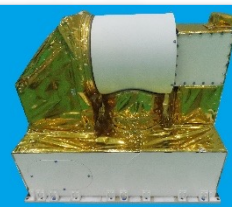
FY-3E MWTS-III
(2021.07-)



FY-3F MWTS-III
(2023.09-)



FY-3H MWTS-III
(2025.10.2-)



FY-3H MWTS-III相较前序仪器改进点

- 添加通道滤波器，提升通道频率响应特性，更趋于标准矩形响应；
- 提升通道独立性，海陆偏差明显改进，通道间相关性显著降低。



1. 仪器简介

- 风云三号微波温度计仪器参数

MWTS-I、MWTS-II到MWTS-III，仪器各项指标逐步提高

指标	MWTS-I	MWTS-II	MWTS-III
对地观测角度	±48.3°	±49.5°	±53.35°
对地观测点数	15	90	98
步进角	6.9°	2.2°	1.1°
星下点空间分辨率	50~75 km	33 km	33 km
扫描周期	16s	5245 ms	5236 ms
积分时间	0.78s	16 ms	16 ms
通道数	4	13	17

CH	Center frequency (GHz)	Band width (MHz)	NEDT (K)	MWT S-II NEDT	ATMS	AMSU-A	Metop-SG-A1 MWS
1	23.8	270	0.3		1	1	1
2	31.4	180	0.35		2	2	2
3	50.3	180	0.35	1.2	3	3	3
4	51.76	400	0.3	0.75	4		
5	52.8	400	0.3	0.75	5	4	4
6	53.246±0.08	140	0.35				5
7	53.596±0.115	170	0.3	0.75	6	5	6
8	53.948±0.081	142	0.35				7
9	54.40	400	0.3	0.75	7	6	8
10	54.94	400	0.3	0.75	8	7	9
11	55.50	330	0.3	0.75	9	8	10
12	57.290344(fo)	330	0.6	0.75	10	9	11
13	fo±0.217	78	0.7	1.2	11	10	12
14	fo±0.3222±0.048	36	0.8	1.2	12	11	13
15	fo±0.3222±0.022	16	1.0	1.7	13	12	14
16	fo±0.3222±0.010	8	1.2	2.4	14	13	15
17	fo±0.3222±0.0045	3	2.1	3.6	15	14	16

Green: MWTS-I channels. Red: The channel addition from MWTS-II to MWTS-III



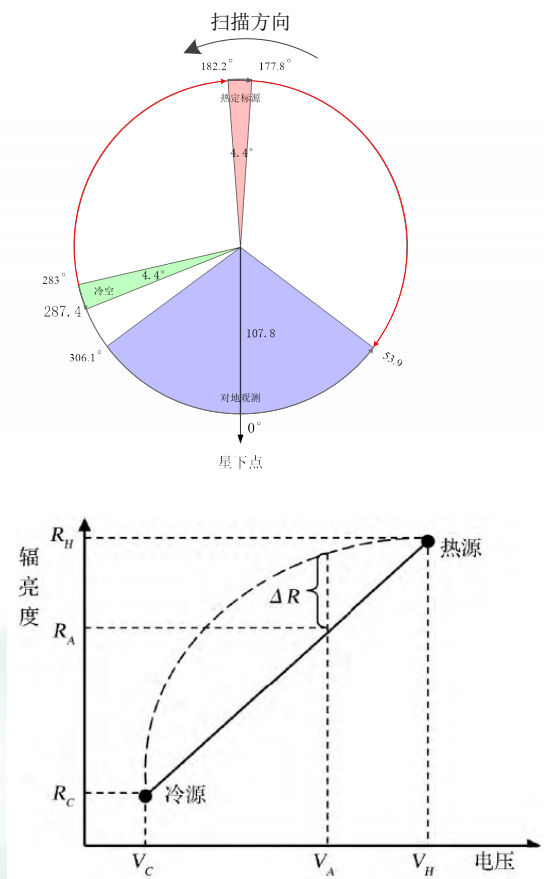
微波温度计数据处理流程





2、预处理技术及数据质量

辐射定标算法



微波温度计 在轨辐射定标过程

发射前测量
试验

在轨定标

模型优化

参数优化

真空定标试验：获取环境温度5C°、15C°、25C°下各通道非线性系数u
天线方向图测试：测量各频段天线方向图，获取天线方向图校正系数
 $cof(\beta)$

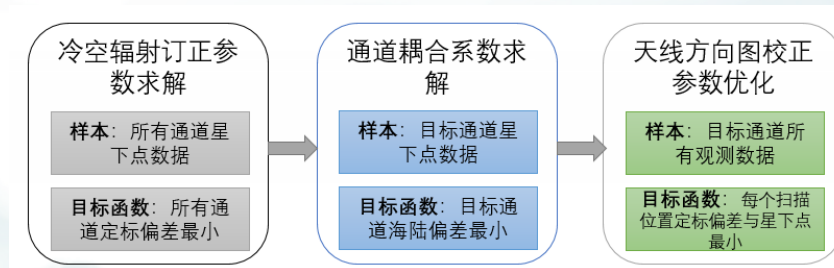
频率响应函数测量：测量各通道SRF响应曲线

接收机定标： $R_{TDR} = \left(R_w - \frac{C_w}{g} + \frac{u C_w C_c}{g^2} \right) + \left(\frac{1}{g} - \frac{u(T)(C_w + C_c)}{g^2} \right) * C_s + \frac{u}{g^2} C_s^2$
天线定标： $R_{SDR}(\beta) = \frac{1}{cof(\beta)} [R_{TDR} cof(\beta) - (1 - cof(\beta)) * R_c]$

基于物理机理的在轨定标模型优化

- (1) 冷空辐射订正 $\Delta R_c = \Delta R_c^{cosmic} + \Delta R_c^{earth} + \Delta R_c^{sat} + \Delta R_c^{refl} = \Delta R_c^{adjust} + \Delta R_c^{refl}$
- (2) 天线方向图系数在轨优化 $R_A(\beta) = \frac{1}{N_\eta} [f_e(\beta) R_E + f_c(\beta) R_c + \eta f_{sat}(\beta) R_{sat}]$
 $R_{SDR} = \frac{1}{cof(\beta)} [R_{TDR} - (1 - cof(\beta)) * R_c]$
- (3) 通道耦合校正 $R_{TDR_correct, ch=i} = a_i * R_{TDR, ch=i} + b_i * (R_{TDR, ch=i} - R_{TDR, ch=3})$
- (4) 条纹噪声滤除 $R_{SDR_strip}(\beta) = R_{SDR}(\beta) - strip(\beta)$

基于观测敏感性的分级系数优化



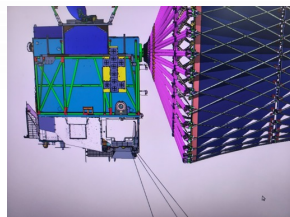
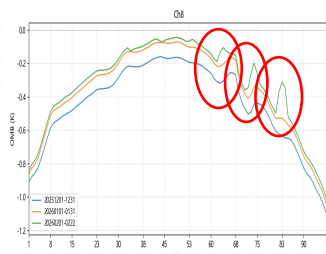


2、预处理技术及数据质量

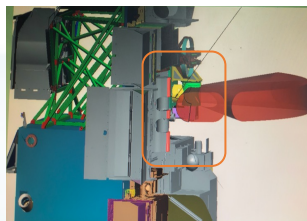
• 辐射定标算法在轨优化

(1) 天线旁瓣辐射响应

- 在局部对地观测位置、冷空观测时，天线旁瓣会探测到平台辐射；
- 导致局部位位置定标偏大、所有通道定标偏低。
- 通过在轨测试数据和变分方法实现优化。



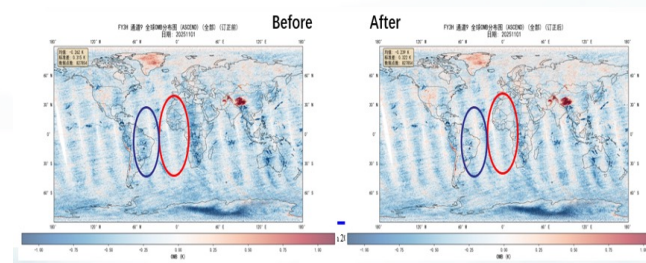
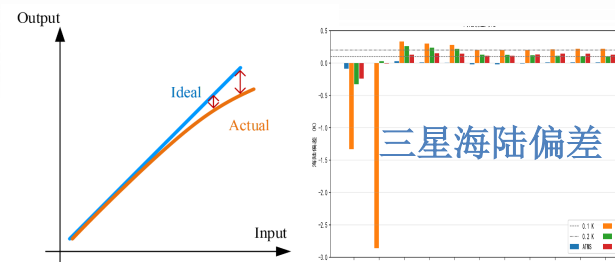
三个对地观测位置旁瓣分析



对冷空观测位置旁瓣分析

(2) 通道间响应耦合

- 通道间响应耦合，自FY-3C有之。
- 仪器不断改进，数据特征越来越不明显。
- 针对0.15K的海陆偏差建立了订正模型，偏差<0.1K。



通道解耦前后定标偏差分布图

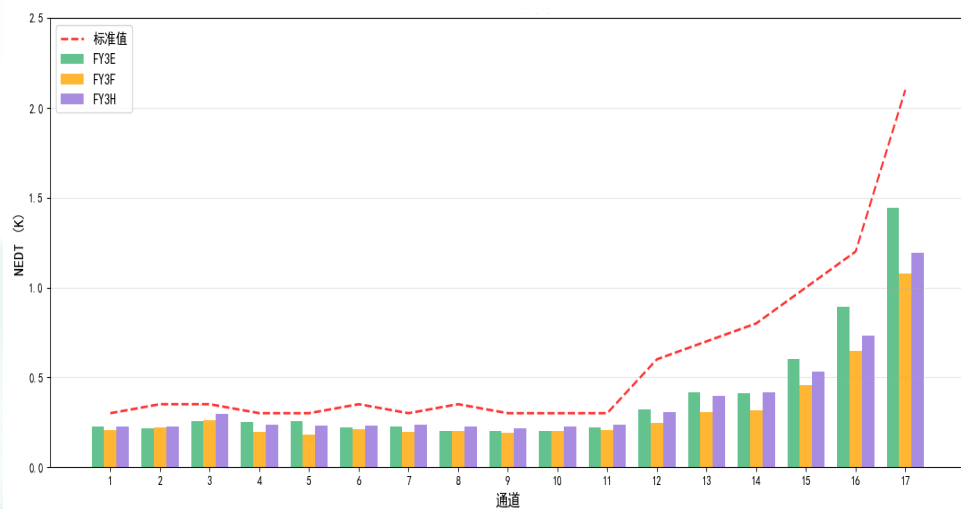


2、预处理技术及数据质量

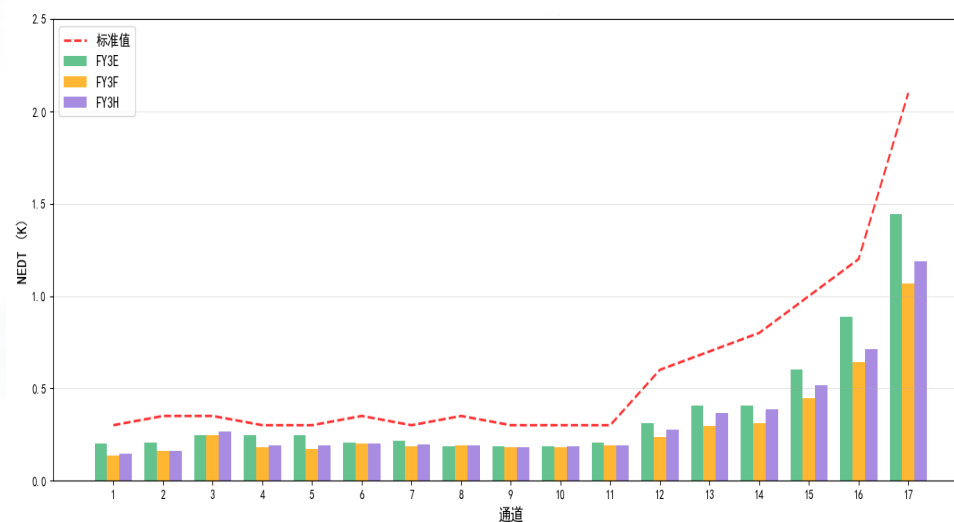
• 灵敏度（等效噪声温度NEDT）

- 所有通道，两种NEDT计算方法，计算结果均符合指标要求；
- 窄带通道（12-17）NEDT优于FY-3E，宽带通道（1-11）与前序两个仪器相当。

标准差法



阿伦方差法





2、预处理技术及数据质量

• 与国际同类观测数据交叉比对(SNO)

1) 检验源数据：

- NOAA-21 ATMS数据
- FY-3E/3F MWTS-III数据
- 2025年12月18日至2026年1月4日

2) 检验算法：

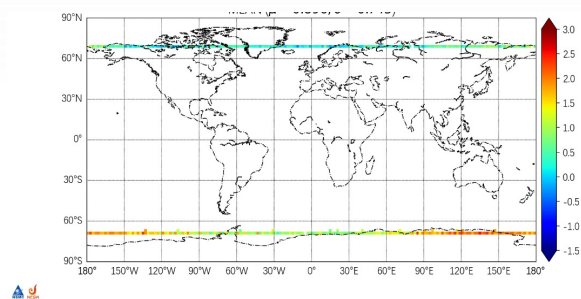
- 过境时间差异<30分钟；
- 空间像元距离<15公里（1/2 像元）；
- 观测天顶角差异小于1°；
- 像元均一性筛选：3*3像元内标准差<1K
- 观测像元位置：通道1-5 星下点左右各2个，通道7-17 星下点左右各20个；
- 下垫面筛选：通道1-5 陆地像元，通道7-17 海洋像元。

	ch1-11	ch12-16	ch17
指标 (期望/最低)	0.8/1.2K	1.2/1.5K	1.5/2.5K

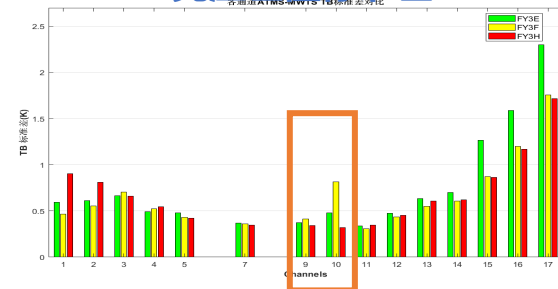
3) 评估结果：

- 平均偏差：所有通道均<1K，偏差水平优于FY-3E和FY-3F。
- 标准差：FY-3H与FY-3F相当；**通道9和10改进SRF，标准差优于FY-3F。**
- 均方根误差：通道1-4,17满足最低定标精度指标值（1.2K和2.5K）；通道5-11，通道12-16满足期望指标值（0.8K和1.2K）。

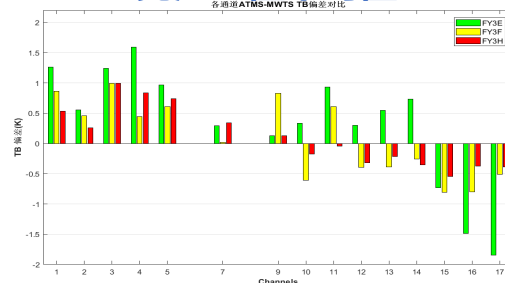
匹配像元空间分布



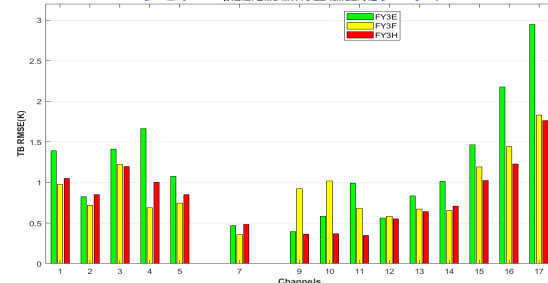
亮温差值标准差



亮温差值平均值



亮温差值均方根误差





2、预处理技术及数据质量

与高精度同步模拟亮温比对

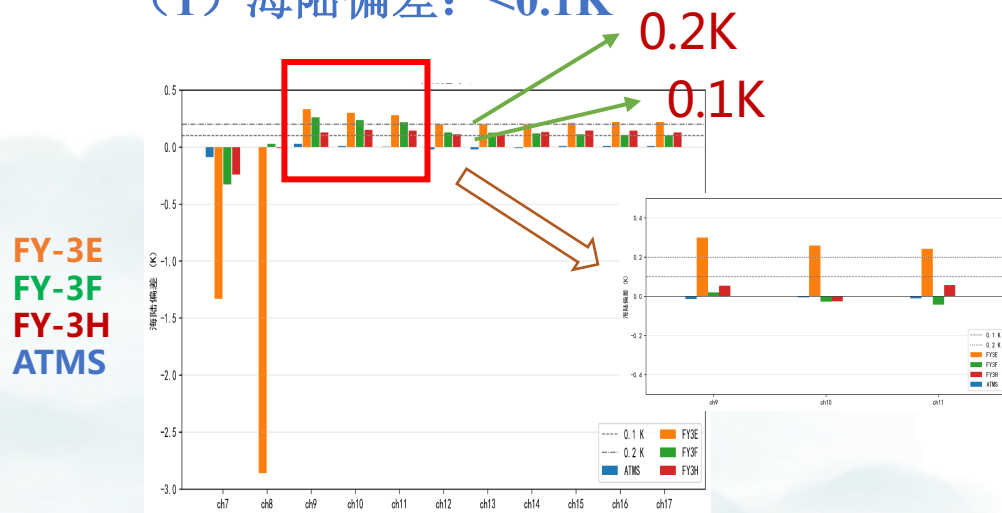
检验源数据：

- 1) 辐射传输模型: RTTOV
- 2) NWP 数据: ERA5 3小时间隔数据
- 3) 数据时间：2025年10月3日-2026年3月10日
- 4) 参照数据：FY-3E\3F, NOAA-21 ATMS观测和模拟数据

评估质量维度：

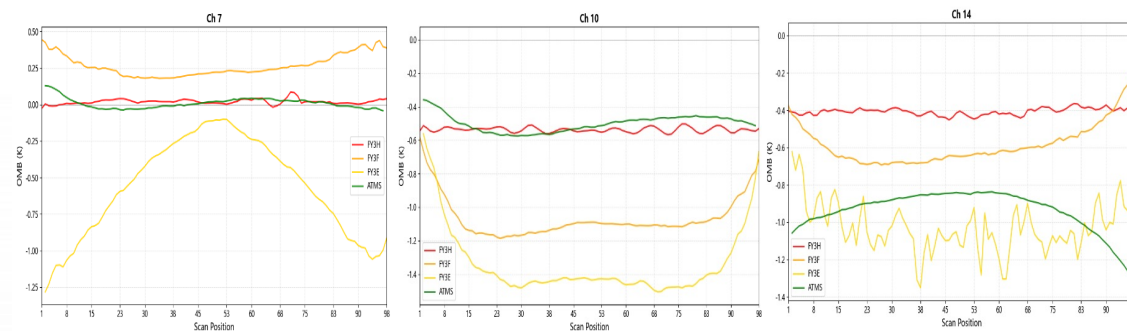
- 1) 海陆偏差
- 2) 扫描偏差
- 3) 时间稳定度

(1) 海陆偏差: <0.1K



(2) 扫描偏差:

观测模拟亮温差无明显随扫描位置分布特征



(FY-3E FY-3F FY-3H ATMS)

(3) 时间稳定度:

观测模拟亮温差半年内变化在0.2K以内。2026年1月卫星平台状态稳定后，定标质量更为稳定。

Diagram of FY3H MWTS ERA5 O-B.LAT45.Sea 12_57.290344(fo)GHz

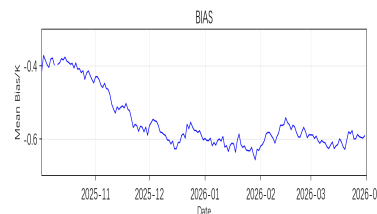


Diagram of FY3H MWTS ERA5 O-B.LAT45.Sea 09_54.40GHz

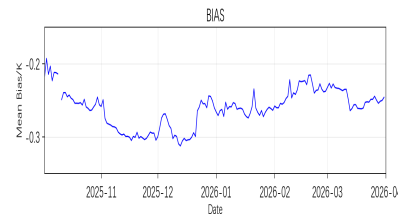
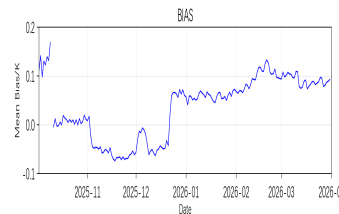


Diagram of FY3H MWTS ERA5 O-B.LAT45.Sea 07_53.596GHz





3. L1产品及使用指南

全球轨道L1产品简介

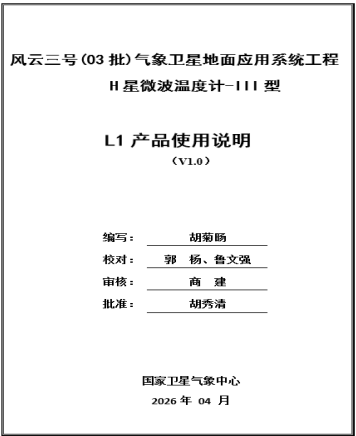
- MWTS-III L1数据分升轨和降轨分别存储，一天28个文件。
- 每个文件包含1个定标信息数据集，11个定位信息数据集，3个质量码数据集。
- 更新：（1）细化LandSeaMask分类；（2）质量码数据集调整

MWTSdata (J:) > FY3H > L1 > ASCEND > 2026 > 20260101

- 名称
- FY3H_MWTS-ORBA_L1_20260101_0026_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_0207_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_0349_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_0530_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_0712_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_0853_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1035_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1216_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1358_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1539_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1721_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_1902_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_2044_033KM_V0.HDF
 - FY3H_MWTS-ORBA_L1_20260101_2225_033KM_V0.HDF

MWTSdata (J:) > FY3H > L1 > DESCEND > 2026 > 20260101

- 名称
- FY3H_MWTS-ORBD_L1_20260101_0117_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_0258_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_0440_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_0621_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_0803_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_0944_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1126_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1307_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1449_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1630_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1811_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_1953_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_2134_033KM_V0.HDF
 - FY3H_MWTS-ORBD_L1_20260101_2316_033KM_V0.HDF



LandSeaMask (FY-3F)

SDS4.	SDS 名称	数据类型	维数	数据量(字节)
	LandSeaMask	uchar8	[nscan,98]	nscan*98*1
逐像元海陆掩码数据				
注释: 1=陆地, 2=陆地水, 3=海, 5=分界线。				

LandSeaMask (FY-3H)

SDS4.	SDS 名称	数据类型	维数	数据量(字节)
	LandSeaMask	uchar8	[nscan,98]	nscan*98*1
逐像元海陆掩码数据				
注释: 0 = Shallow Ocean (Ocean < 5km from coast or < 50m deep). 1 = Land (not anything else). 2 = Ocean Coastlines and Lake Shorelines. 3 = Shallow Inland Water (Inland Water < 5km from shore or < 50m deep). 4 = Ephemeral (intermittent) Water. 5 = Deep Inland Water (Inland water > 5km from shoreline and > 50m deep). 6 = Moderate or Continental Ocean (Ocean > 5km from coast and > 50m deep and < 500m deep). 7 = Deep Ocean (Ocean > 500m deep)."				



3. L1产品及使用指南

L1数据简介

➤ 更新：（1）细化LandSeaMask分类；（2）质量码数据集调整

QA_Flag_Process – 仪器观测是否正常

位	参数	阈值范围
Bit1	冷空计数值线内一致性	阈值：冷空计数值范围 (1,65534)
	冷空计数值线间一致性	阈值：当前线与前一个好线的差值范围 (150)
Bit2	黑体计数值线内一致性	阈值：黑体计数值范围 (1,65534)
	黑体计数值线间一致性	阈值：当前线与前一个好线的差值范围 (150)
Bit3	对地扫描角度是否有异常	阈值：当扫描点与标准角度的偏差（对地观测角度偏差0.5°）
Bit4	黑体观测起始角度	阈值：起始角度与参考角度的偏差[0.2]
	黑体观测结束角度	阈值：结束角度与参考角度的偏差[0.2]
Bit5	冷空观测起始角	阈值：起始角度与参考角度的偏差[0.2]
	冷空观测结束角	阈值：起始角度与参考角度的偏差[0.2]
Bit6	黑体温度线内	阈值：黑体温度范围【0, 400】
	黑体温度线间	阈值：当前线温度与前一条线温度偏差范围0.2
Bit7	仪器温度线内	阈值：前端主份温度与中频温度差值15
Bit8	仪器温度线间	阈值：（当前线与均值阈值0.05）

Quality_Flag_Scnlin – 定标定位处理是否正常

位	参数
A	预处理是否正常
B	定标是否成功
C	是否有月亮污染
DE	00:successful geolocation use GPS
	01:successful geolocation use IOE
	02:successful geolocation use TLE
	11:geolocation failed result from time error
	12:Three geolocation methods failed
	13:geolocation failed result from other error

QA_score – 总体评价

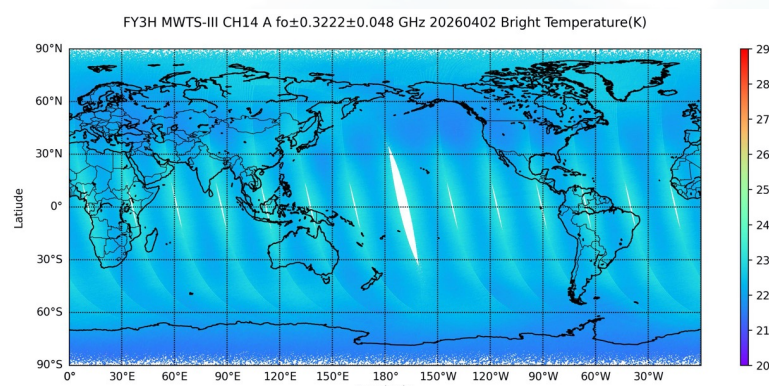
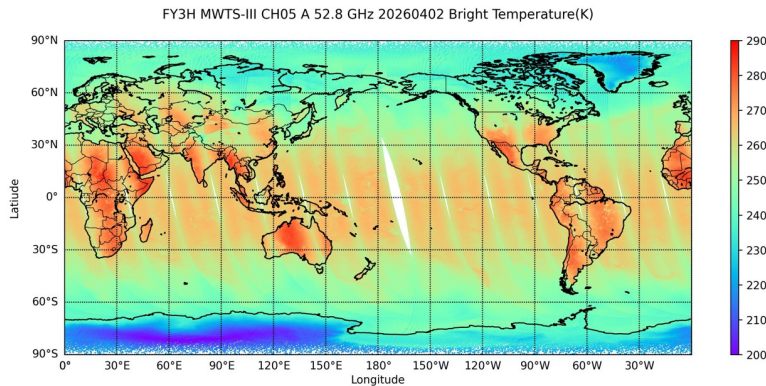
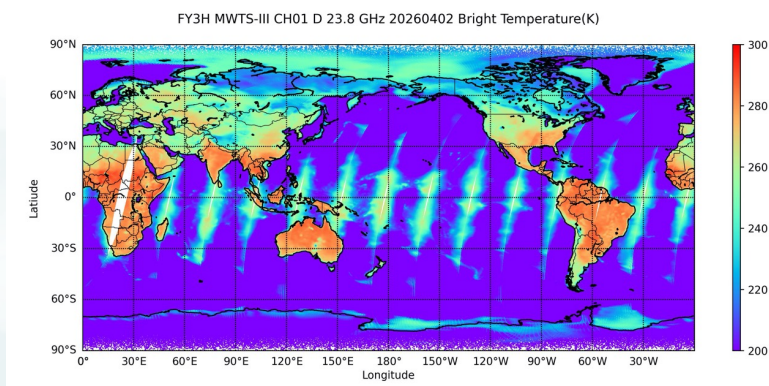
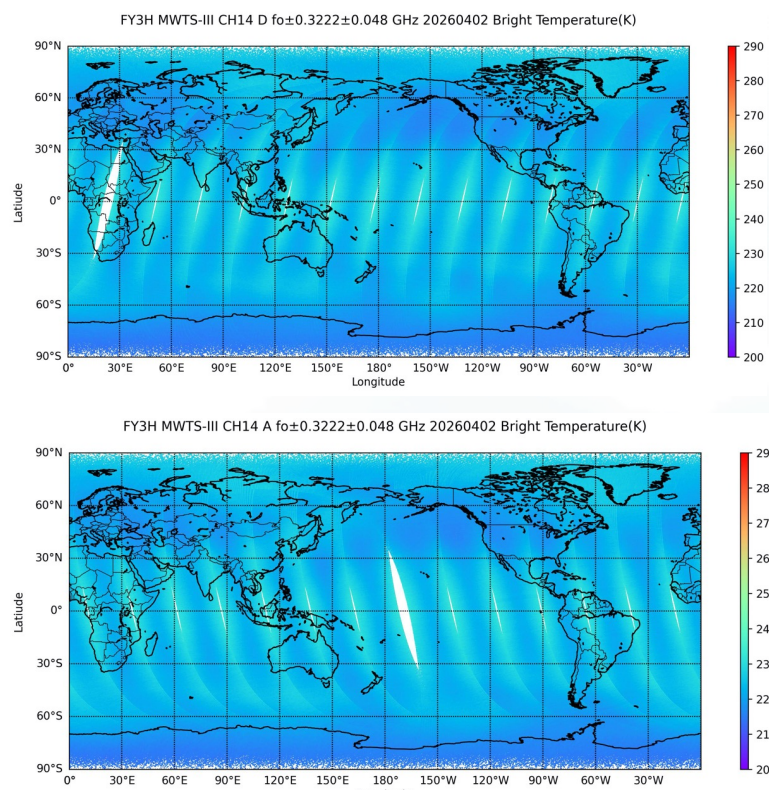
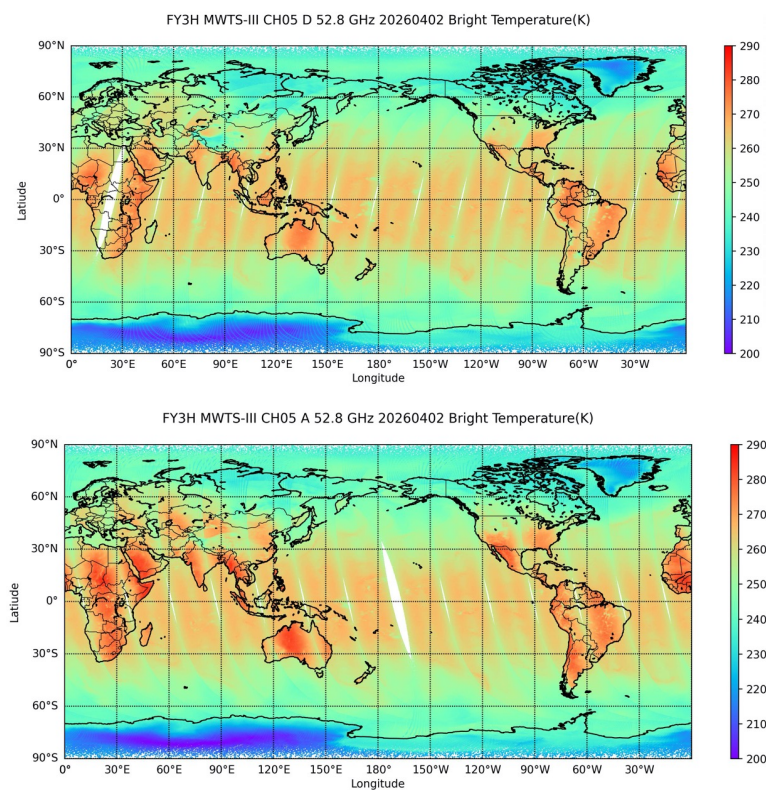
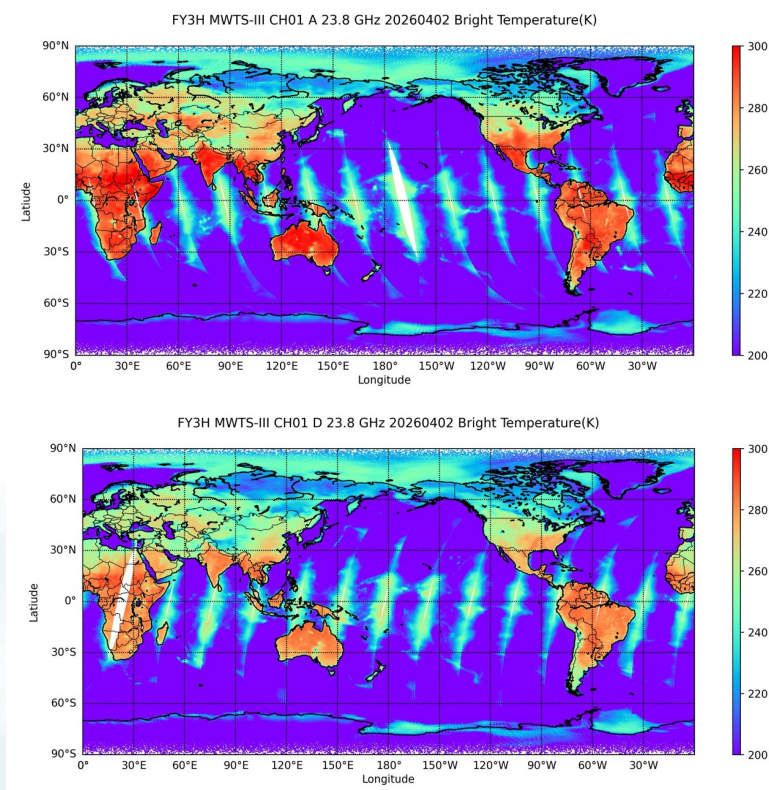
100 :
QA_Flag_Process 每一位都正常
Quality_Flag_Scnlin 第一位正常
否则为0



3. L1产品及使用指南

• L1数据示例图

通道1、5、14 全球拼图（上-- 升轨，下 -- 降轨）



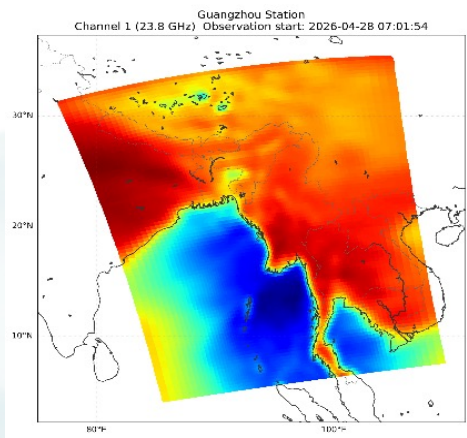


3. L1产品及使用指南

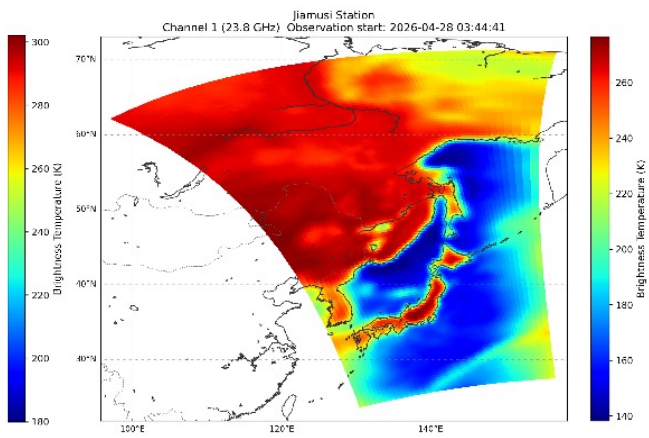
• 中国区高时效产品简介

- 中国区四站（佳木斯、乌鲁木齐、广州、喀什）接收的中国区数据，通过高速专用光纤汇聚至国家卫星气象中心，实现统一的高效预处理。
- MPT产品时效性极高，对于短期天气预报，特别是监测和追踪强对流云团等剧烈天气的短时临近预报，是非常核心的数据来源之一。

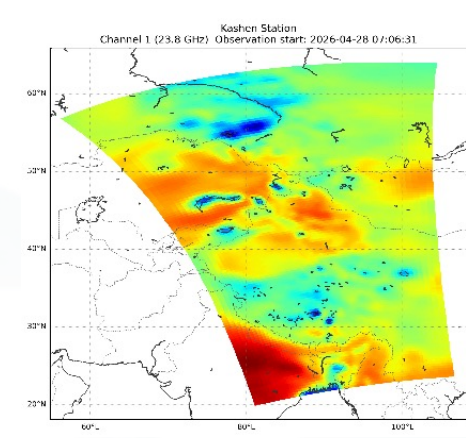
接收站名	文件名	数据观测 时长(分 钟)	处理时 效(分 钟)	覆盖范围
佳木斯 站	FY3H_MWTS- _SGJM_L1_YYYYMMDD_HHmm_033KM_V0.HDF	5.9 ~ 12.8	13.7 ~ 36.7	21.32°N ~ 72.11°N 77.9°E-179.9°E
新疆站	FY3H_MWTS- _SGXJ_L1_YYYYMMDD_HHmm_033KM_V0.HDF	5.5 ~ 12.8	16.8 ~ 91.4	18.47°N ~ 68.96°N 38.11°E ~ 137.13°E
广州站	FY3H_MWTS- _SGGZ_L1_YYYYMMDD_HHmm_033KM_V0.HDF	5.6 ~ 12.8	22.7 ~ 40.8	1.61°S ~ 47.75°N 76.07°E ~ 150.64°E
喀什站	FY3H_MWTS- _SGKS_L1_YYYYMMDD_HHmm_033KM_V0.HDF	5.9 ~ 12.8	12.7 ~ 39.5	14.40°N ~ 64.39°N 30.04°E ~ 121.57°E



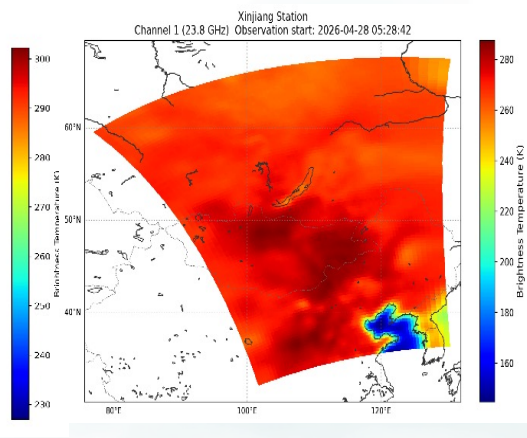
广州



佳木斯



喀什



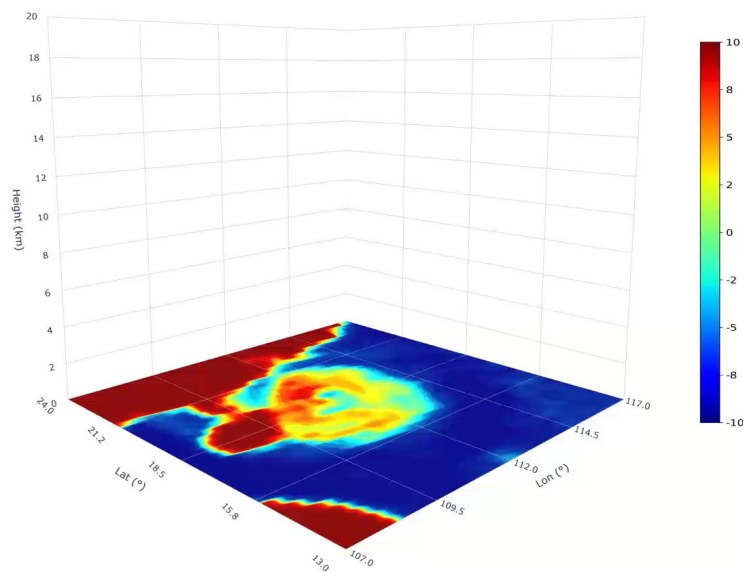
乌鲁木齐



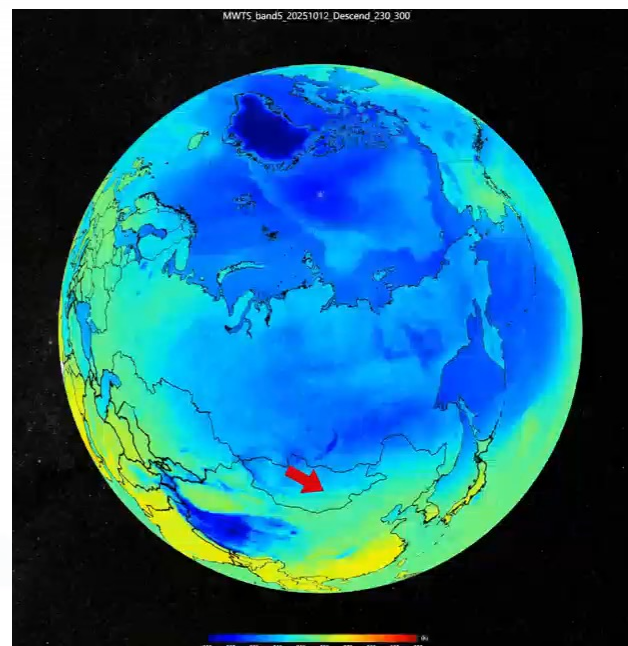
4. 典型应用场景

- FY-3H MWTS-III与FY-3E、FY-3F协同，实现晨昏、上午、下午三星组网

台风麦德姆， 20251004



寒潮过程， 20251009-1019





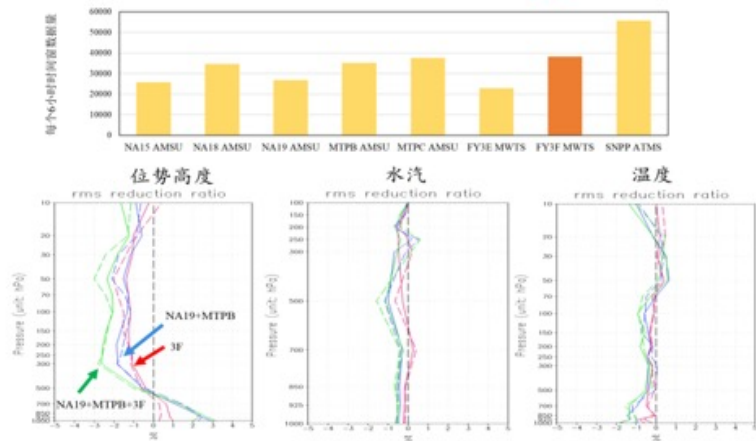
4. 典型应用场景

数值预报同化

FY-3F MWTS-III业务同化

- FY-3F MWTS质量显著优于前序仪器；
- **FY-3F MWTS可用资料量与AMSU相当；**
- 在METOP-B和NOAA-19资料下，同化FY-3F资料预报结果仍有改进。

• FY3F MWTS可用资料量与AMSU相当



• 同化FY3F对模式温度和位势高度有改进

(胡皓等，数值预报模式中心)

同化FY-3E MWTS-3资料显著改善了模型的初始动力场与热力场，从而提升了降水强度的预报精度。

Earth and Space Science

Improving "23.07" Heavy Rainstorm Simulation Through Assimilating FY-3E MWTS-3 Radiance Data

Shengjie Zhu^{1,2}, Dapin Li², Shihui Guo¹, Qian Xu¹, and Xian Fan¹

Key Points:

- The clear-sky radiance data from the Microwave Temperature Sounder (MTS-3) is assimilated into the Weather Research and Forecasting (WRF) model.
- Assimilating MTS-3 data can effectively improve the model's initial temperature and humidity fields.
- The assimilation of MTS-3 data can improve precipitation simulation, particularly improving the accuracy of extreme precipitation events.

Abstract: FengYun-3E (FY-3E) satellite, launched on 1 July 2021, is equipped with the third-generation Microwave Temperature Sounder (MTS-3). Two window channels of MTS-3 are used to build a cloud detection module, and efficient assimilation of MTS-3 clear-sky radiance data is implemented in the Weather Research and Forecasting Model (WRF). To assess the influence of assimilating MTS-3 radiance on extreme precipitation weather forecasting, a heavy rainstorm event that occurred in North China from 20 July to 2 August 2021 has been selected. After assimilating MTS-3 radiance data, the precipitation field adjusted, leading to a southward shift of the Western Pacific Subtropical High as well as a eastward adjustment of the weather system. The forecast with assimilated MTS-3 data reduced the root mean square error of temperature, wind, and meridional wind, with clear improvements in temperature forecast skill at the 100–400 hPa levels within the first 12 h of the forecast period. The 6-h maximum rainfall center located southeast of Beijing was more accurately reproduced in the model simulation. Additionally, the precipitation forecast skill above the threshold of 15 mm was improved. Moreover, the water vapor transport and vertical motion conditions in Beijing has improved after assimilating MTS-3 data, which are likely to be contributing factors to the enhancements in the precipitation forecasting performance.

Plain Language Summary: Global and regional numerical weather prediction models often exhibit significant uncertainty in forecasting extreme precipitation events. Satellite data is the most effective means of obtaining large-scale, high-frequency observational data in real time on a global scale. The FengYun-3E (FY-3E) satellite, launched by China, operates in an early morning orbit and has significant potential to enhance the forecast accuracy of both global and regional models. This study assimilated data from the Microwave Temperature Sounder (MTS-3) on the FY-3E satellite into the Weather Research and Forecasting (WRF) model.

As a result, it was found that assimilating MTS-3 data effectively improved the initial dynamical and thermal fields of the model, thereby enhancing the forecast for precipitation intensity.

同化FY-3E MWTS-3资料能够显著改善台风强度预报



Atmospheric Research
Volume 120, July 2021, 108025

Evaluating clear-sky assimilation of FengYun-3E microwave radiance data in predicting multiple tropical cyclones over the Western North Pacific

Di Fang^{a,b,c,d}, Guanghua Chen^{a,b,c,d}, Xinguo Xu^a, Yuhui Zhao^{a,b,c}, Ziqiang Wang^{a,b,c}

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<https://doi.org/10.1016/j.atmosres.2021.108025>

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Highlights

- The potential for assimilating MWTS-3 and MWHS-2 radiance is first explored for multiple TCs in the WNP.
- Assimilating MWHS-2 and MWTS-3 reduces the track and intensity forecast errors, respectively.

FY-3E MWTS-3资料是伏羲气象模型的主要输入资料，其成果发表在Nature子刊。

nature communications

Article

<https://doi.org/10.1038/s41467-025-62024-1>

A data-to-forecast machine learning system for global weather

Received: 4 December 2024

Accepted: 6 July 2025

Published online: 19 July 2025

Check for updates

Xinyu Sun^{1,2}, Xiaohui Zhong^{1,2}, Xiaoxu Xu^{1,2,3,4}, Yuanqing Huang¹, Hao Li^{1,2,3,4}, J. David Neelin⁵, Deliang Chen^{1,2,3,4}, Jie Feng^{1,2}, Wei Han^{1,2,3,4}, Libo Wu^{1,2,3,4,5} & Yuan Qiu^{1,2,3,4}

Weather forecasting traditionally relies on numerical weather prediction (NWP) systems that integrate global observations, data assimilation (DA), and physics-based models. However, further advances are increasingly constrained by high computational costs, the underutilization of vast observational datasets, and challenges in obtaining finer resolution. Recent advances in machine learning present a promising alternative, but still depend on the initial conditions generated by NWP systems. Here, we introduce FuXi Weather, a machine learning-based global forecasting system that assimilates multi-satellite data and is capable of cycling DA and forecasting. FuXi Weather generates reliable 10-day forecasts at 0.25° resolution using fewer observations than conventional NWP systems. It demonstrates the value of background forecasts in constraining the analysis during DA. FuXi Weather outperforms the European Centre for Medium-Range Weather Forecasts High-resolution forecasts beyond day one in observation-sparse regions such as central Africa, highlighting its potential to improve forecasts where observational infrastructure is limited.



4. 典型应用场景

地球物理参数反演

云液态水含量

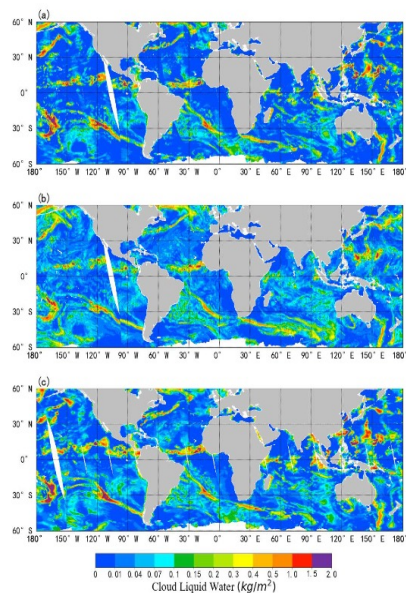


Figure 12. CLW retrieved from MWTS-III and ATMS over global oceans on 1 August 2021. (a,c) The cloud liquid water path retrieved from MWTS-III and ATMS using the physical algorithm; (b) CLW from ERA5 reanalysis at the time of MWTS-III.

(Dong C et al., 2022)

大气可降水

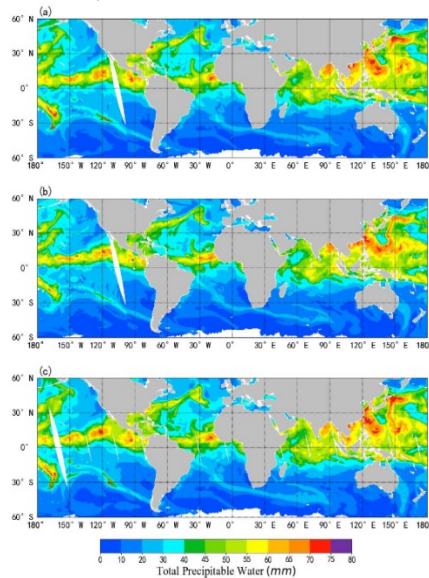
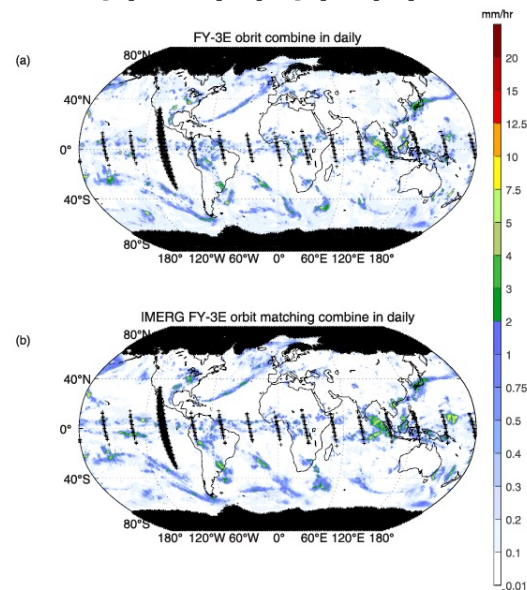


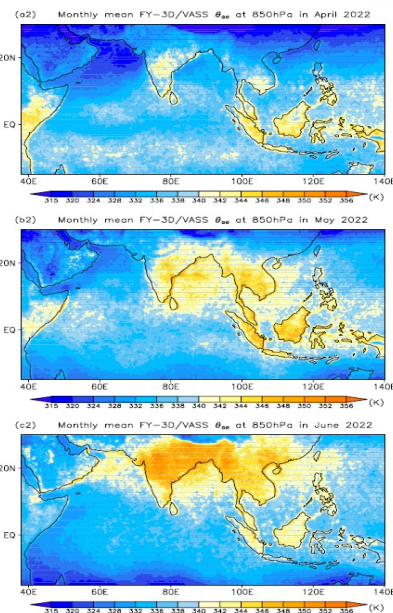
Figure 13. TPW retrieved from MWTS-III and ATMS over global oceans on 1 August 2021. (a,c) The cloud liquid water path retrieved from MWTS-III and ATMS using the physical algorithm; (b) TPW from ERA5 reanalysis at the time of MWTS-III.

降雨率和降雪率



(Zhao, R. et al., 2024)

850hPa等效位温



(Ren, S. et al., 2023)



4. 典型应用场景

台风暖核监测

(Niu et al.,2022)

FY-3E MWTS-3 观测显著提升台风暖核强度日变化（250hPa 暖核呈单峰日变化，午夜最强、正午最弱）的反演精度，减少约 1 小时相位偏差；

再分析资料和模拟数据暖核强度整体弱于观测，且垂直范围略窄。为台风监测与数值预报提供关键支撑。

2022年4月12日20:36UTC 台风“马勒卡”

250 hPa 温度距平及暖核垂直剖面

卫星
观测

ERA5
数据

GFS
全天空
模拟

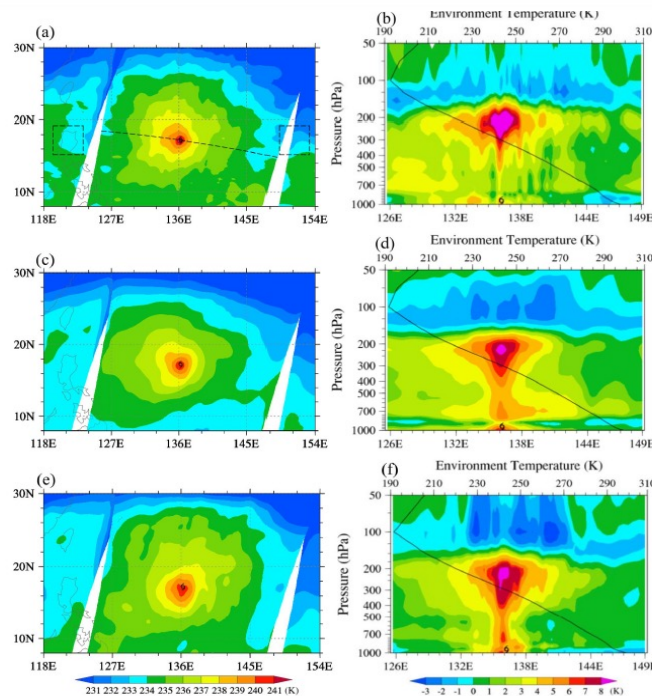


Figure 5. Horizontal distributions of TB retrieved temperature anomaly at 250 hPa (left panels) and cross sections of warm core along the FY-3E MWTS-3 scanline (dashed line in (a) and (b) FY-3E MWTS-3, (c and d) ERA5, and (e and f) GFS all-sky simulations at 20:36 UTC 12 April 2022. Also indicated are Malaka's center (hurricane symbol) and two $5^{\circ} \times 5^{\circ}$ boxes (dashed) within which the environment temperature profiles (solid curve in left panels) are calculated.

暖核垂直范围的时间演变

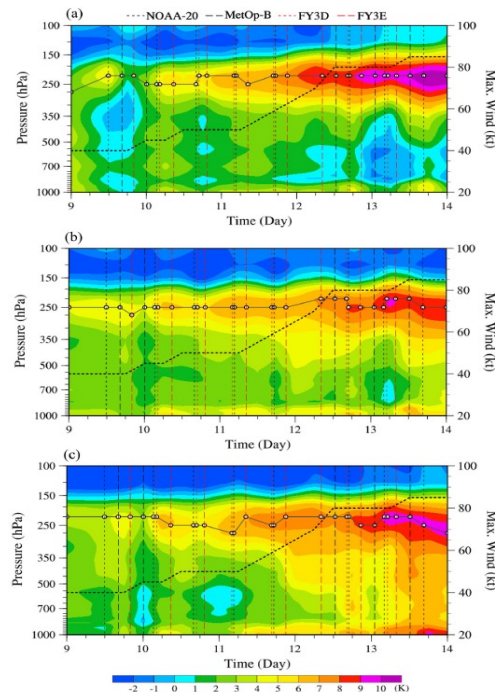


Figure 8. Temporal evolution of the maximum surface wind (thick black dashed curve) and temperature anomalies at Malaka's center retrieved from (a) TB observations, (b) ERA5, and (c) GFS simulations from 9 to 14 April 2022. Also indicated are the maximum temperature anomaly (open circle) and satellite observing times (color bars above (a)).



4. 典型应用场景

天气和气候分析

Climate Dynamics (2024) 62:3431–3450
<https://doi.org/10.1007/s00382-023-07074-1>

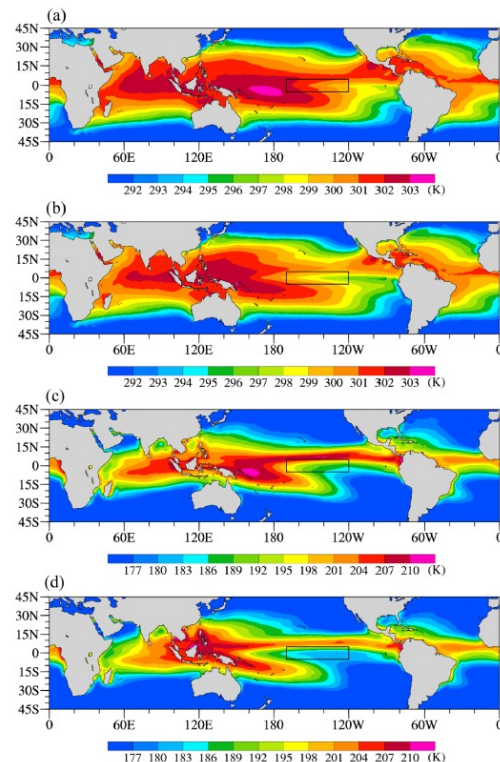
ORIGINAL ARTICLE

El Niño signals revealed by AMSU-A brightness temperature observations

Xinlu Xia¹ · Xiaolei Zou² · Wenjun Zhang³

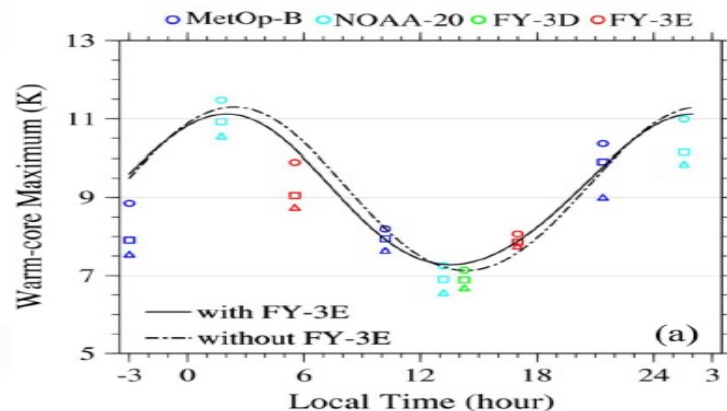
Received: 26 August 2023 / Accepted: 17 December 2023 / Published online: 27 January 2024
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热带海域中AMSU-A窗口通道亮度温度与海表温度存在密切关系，AMSU-A TB观测揭示厄尔尼诺信号的潜力，为厄尔尼诺研究提供了新的卫星数据来源。



多星组网观测数据应用

FY-3H发射后，MWTS-III组网（上午-下午-晨昏）完成，可实现全球一天6次观测覆盖，对天气分析和同化有极大助益。



(Niu et al., 2022)



国家卫星气象中心
国家空间天气监测预警中心

欢迎使用 MWTs数据



hujy@cma.gov.cn

