



The data quality and performance of FY-3 instruments for NWP

luqf@cma.gov.cn



Qifeng Lu, Ran You, Chunqiang Wu, Chengli Qi, Songyan Gu, Shengli Wu,
Yang Guo, Jun Yang, Peng Zhang, Zhongdong Yang, Naimeng Lu,
Chaohua Dong, and whom from ECMWF, Met Office and Met France

National Satellite Meteorological Center ,CMA

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Outline

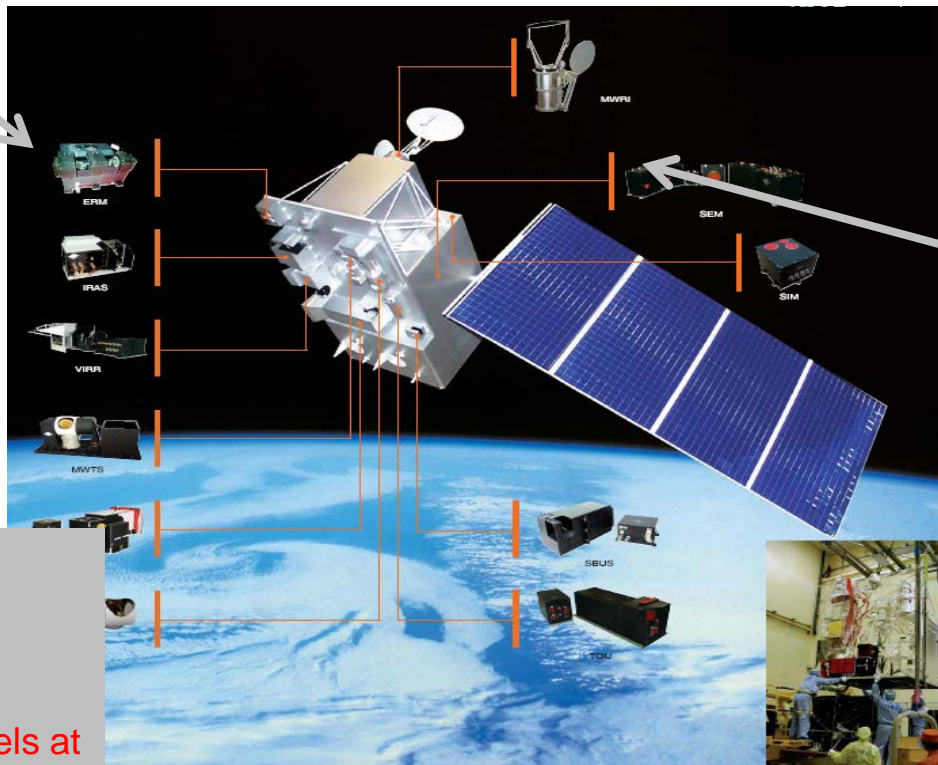
- **Quick review of FY3A/B**
- **Monitoring FY-3 sounders**
- **Initial evaluation of FY-3C**

The FY-3A/B/C Instrument Suite

Infrared
Atmospheric Sounder
(IRAS)
20 channels
(~HIRS/3)

Microwave
Temperature
Sounder (MWTS)
4 channel (~MSU)
13 channels

Microwave
Humidity
Sounder (MWS)
5 channel (~MHS)
**15 channels with channels at
118 GHz**



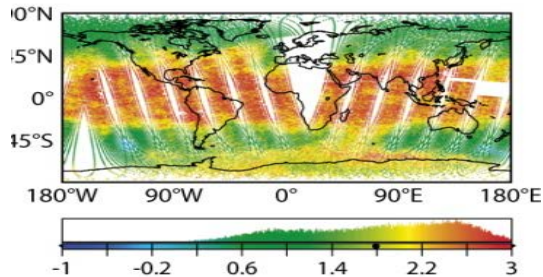
Microwave
Radiation Imager
10 channels
(~AMSR-E)



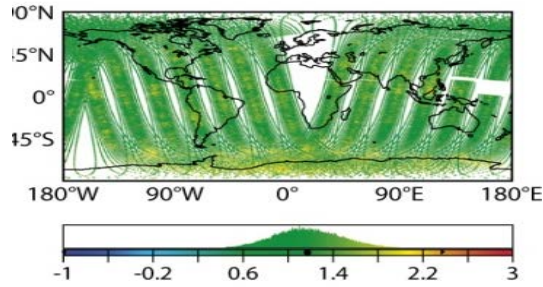
Characterize the MWTS

The OMB comparison between FY-3A/MWT and MetOp/AMSU-A

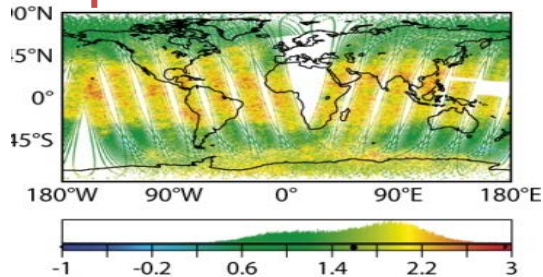
MWTS Channel 4



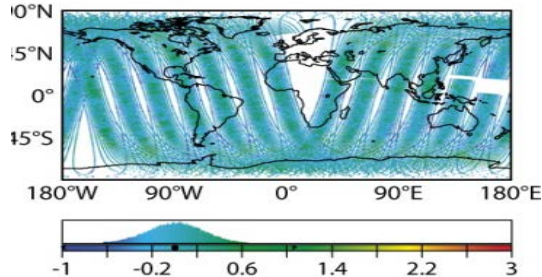
Specification



Optimized Passband

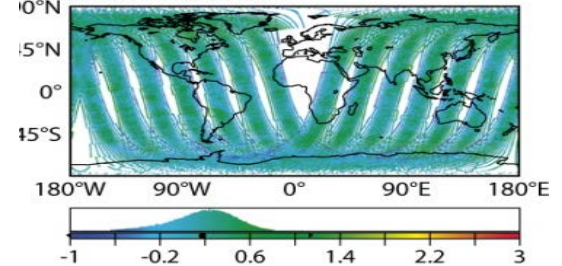


PreLaunch Measurement



Optimization+NonLinearity Correction

AMSU-A Channel 9

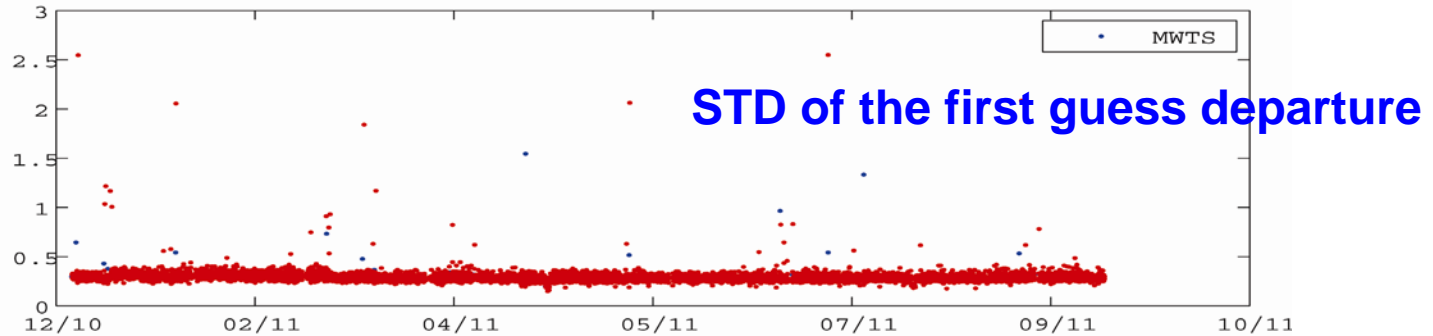
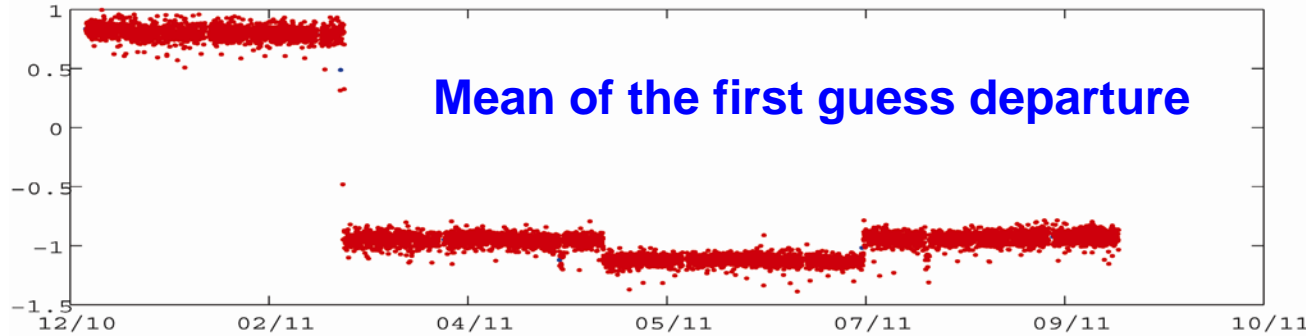


MetOp AMSU-A

Optimizer of Satellite Instrumental Parameters On-orbit (OSIPOn)

Monitoring FY-3 sounders

Statistics time series of first guess departure from FY-3B MWTS-CH3

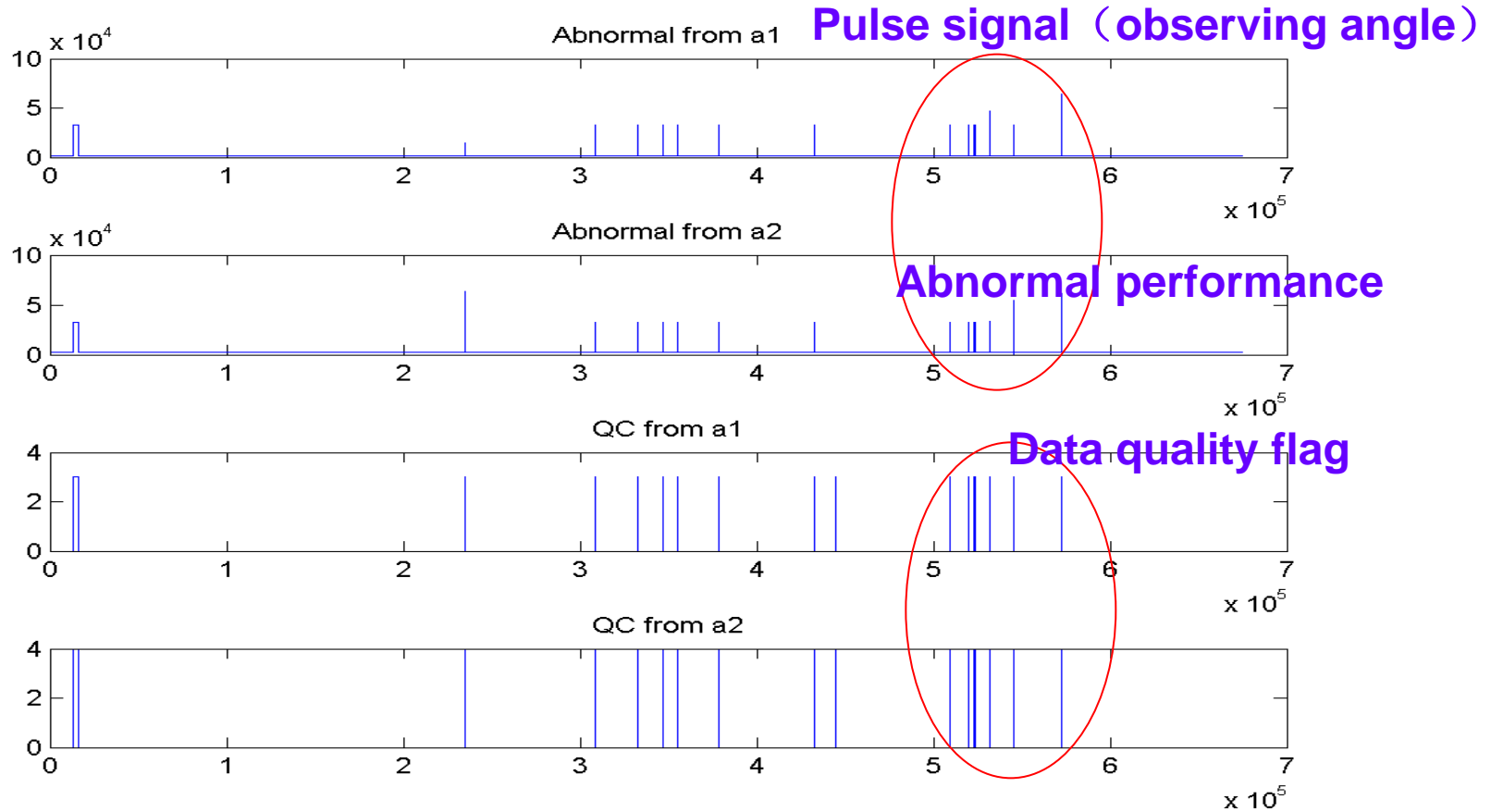


We don't expect the spike for operation!

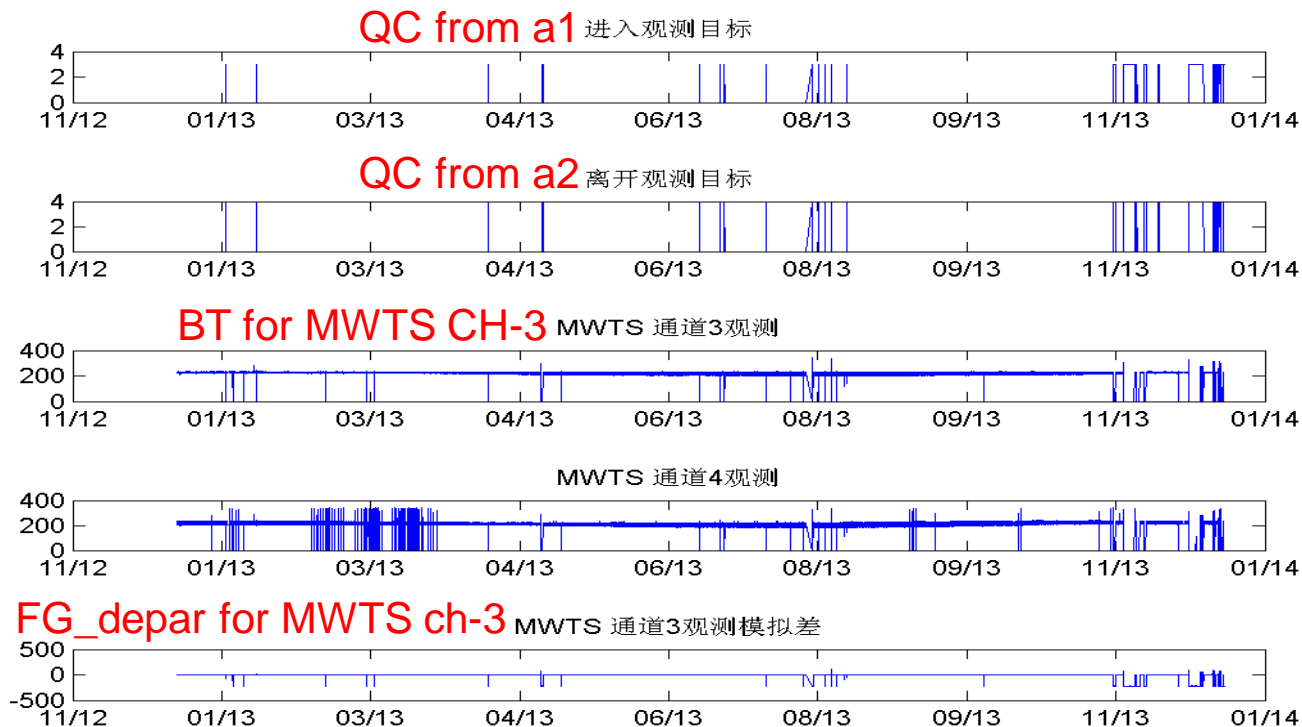
Parameters indicating the data quality

- **Observing system:** such as, frequency locker, Receiver;
- **Temperature:** such as, PRT, instrument temperature;
- **Antenna:** such as, cold space starting/end angle, warm load starting/end angle, earth scene starting/end angle;
- **Auxiliary information:** time, volt, gain

Abnormal instrument performance on-orbit can identify the data quality



Abnormal instrument performance on-orbit can identify the data quality





Satellite

FY3C

Instrument

MWTS

Type

Global

Channel

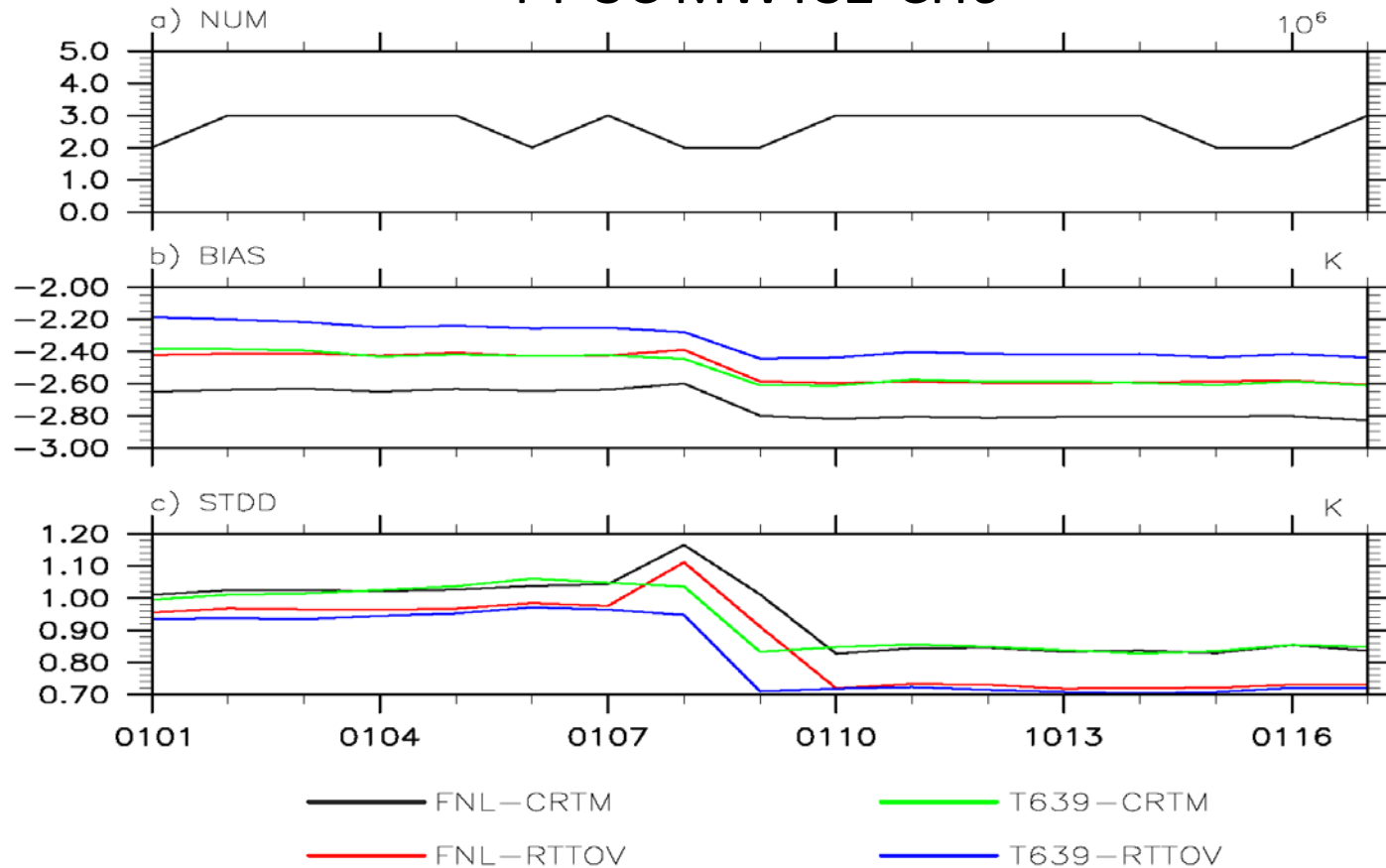
Channel 1

Time

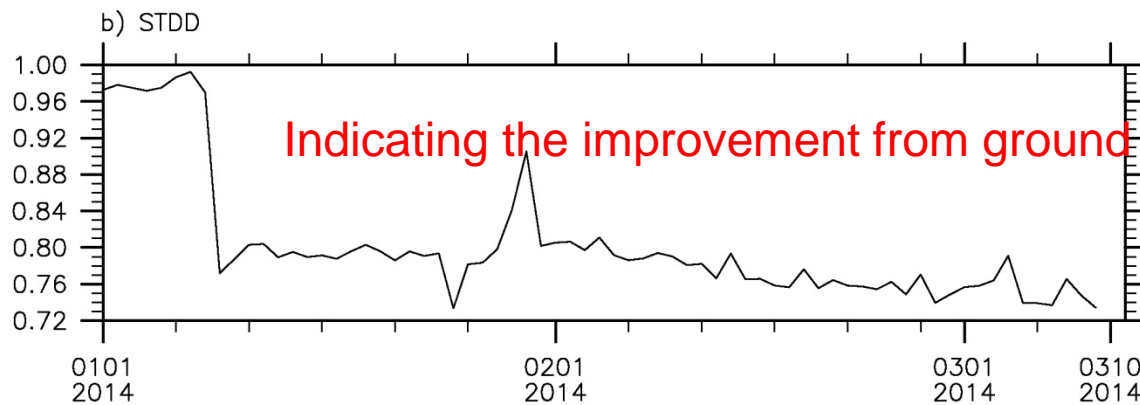
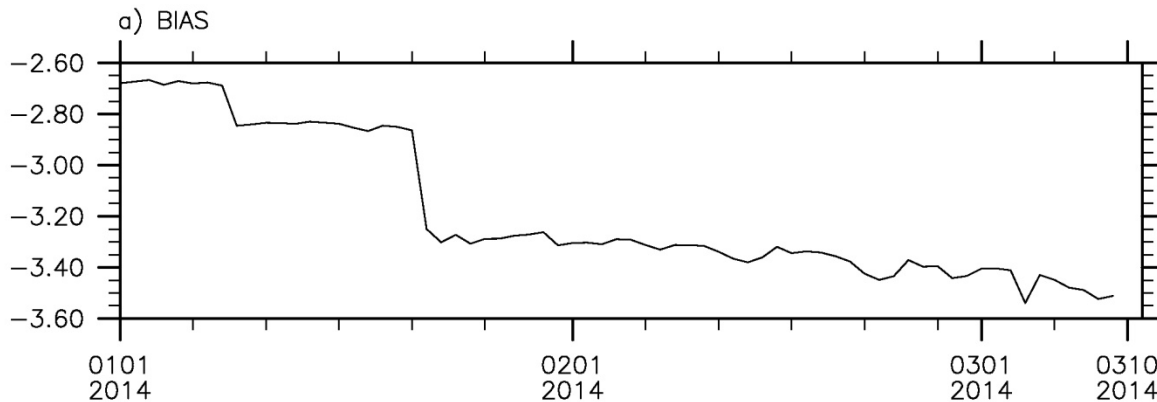
Latest

Submit

FY-3C MWTS2-CH6

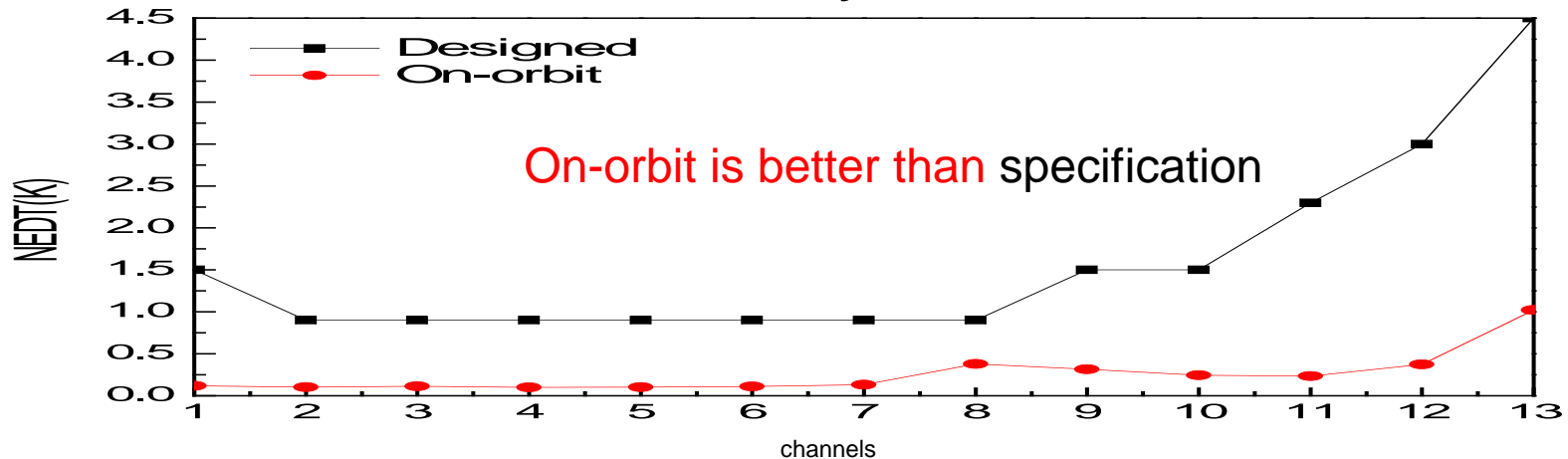
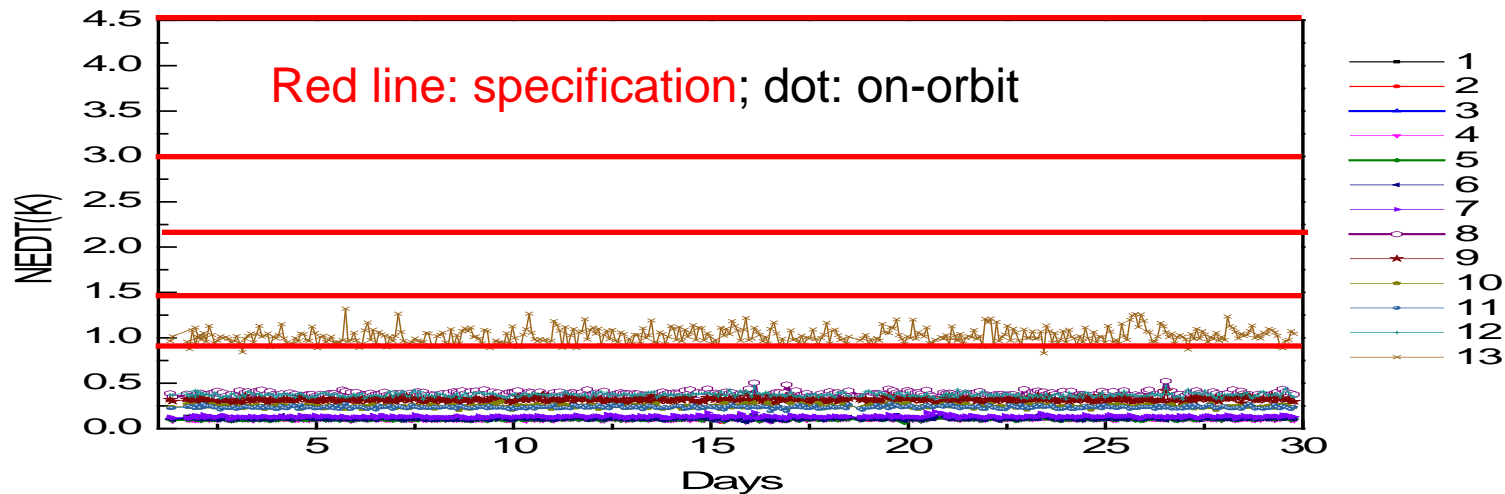


MWTS2-ch6

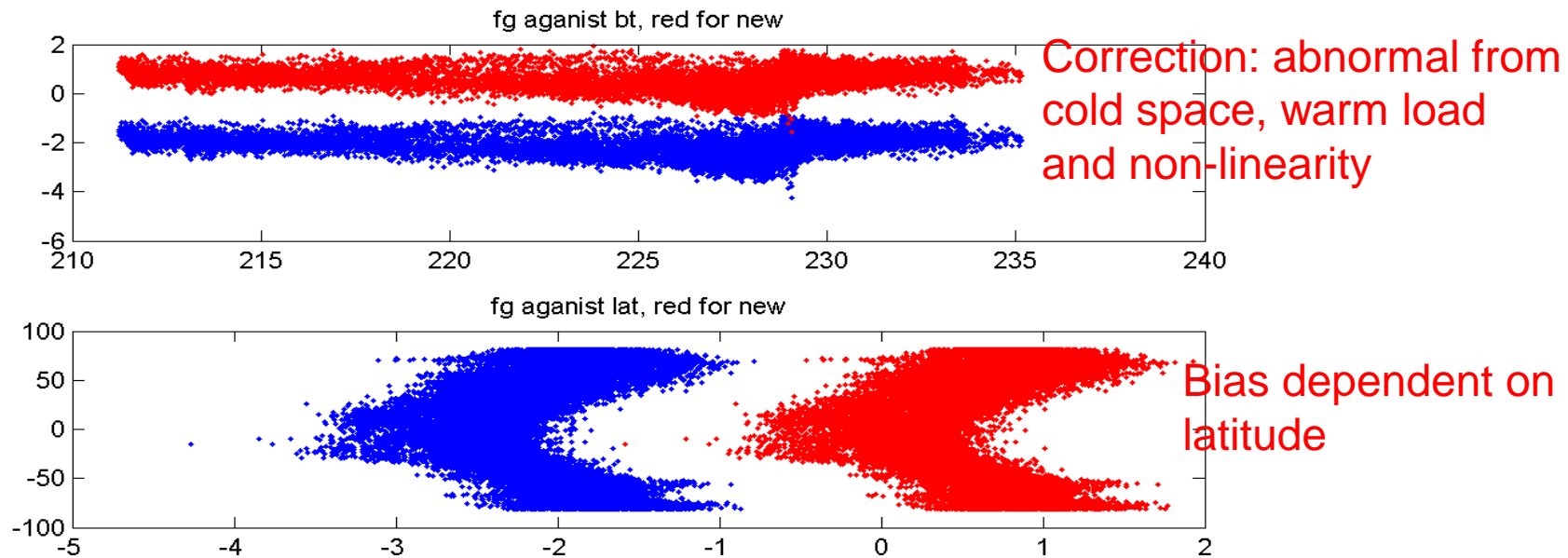


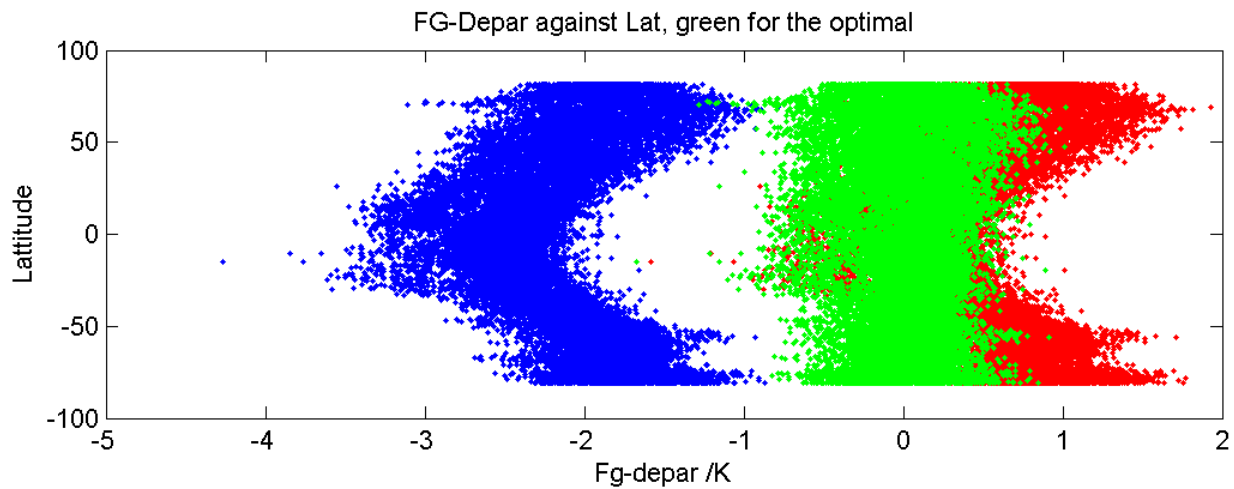
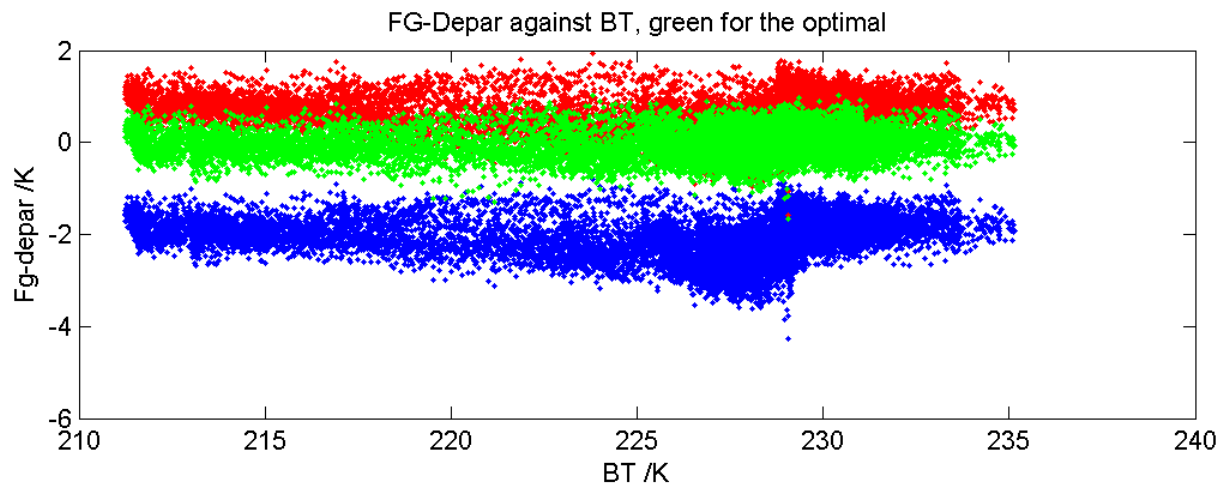
Initial evaluation of FY-3C

Stability of NEdT: 2013.12.1-30



Initial analysis and correction for the bias

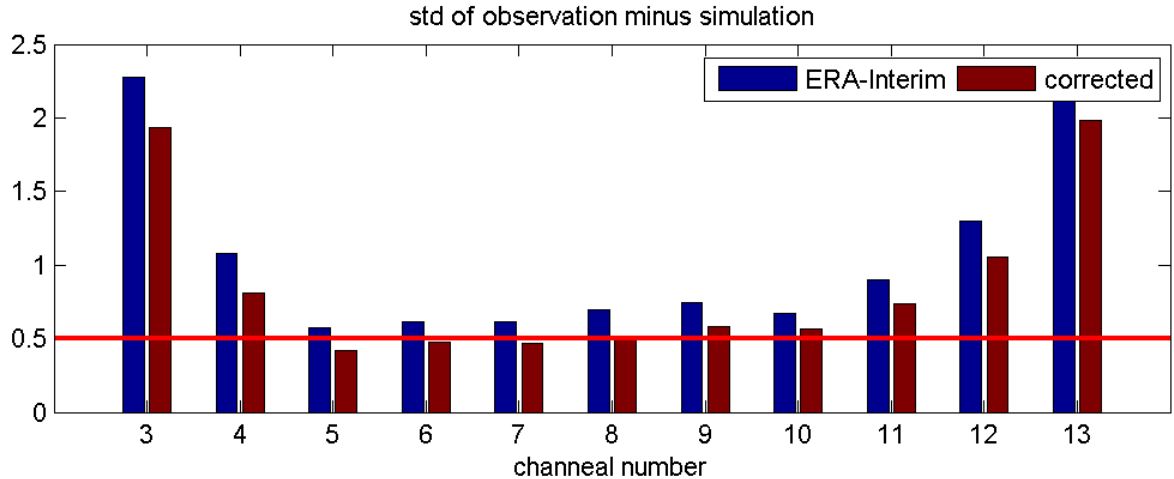
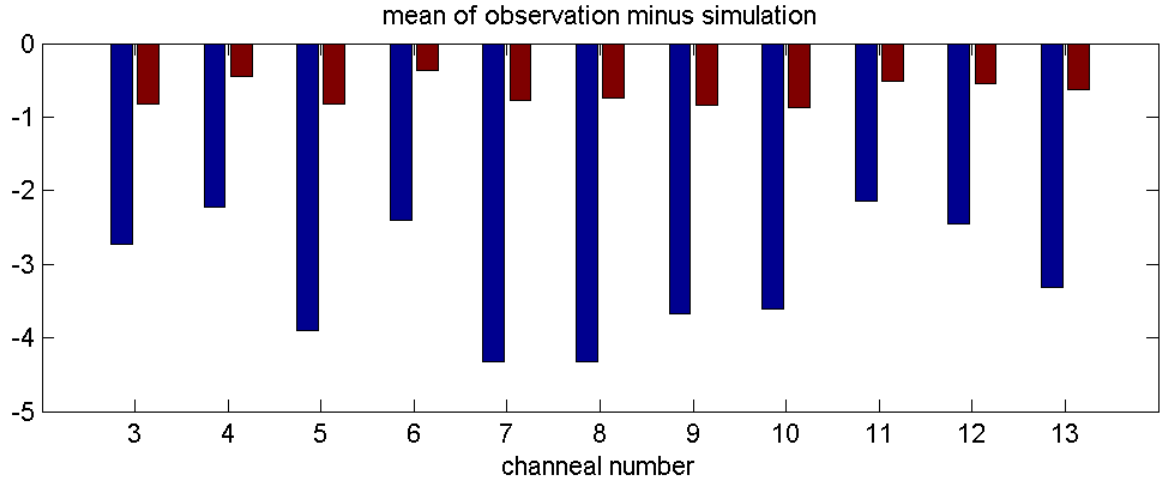




The Bias statistics for MWTS2

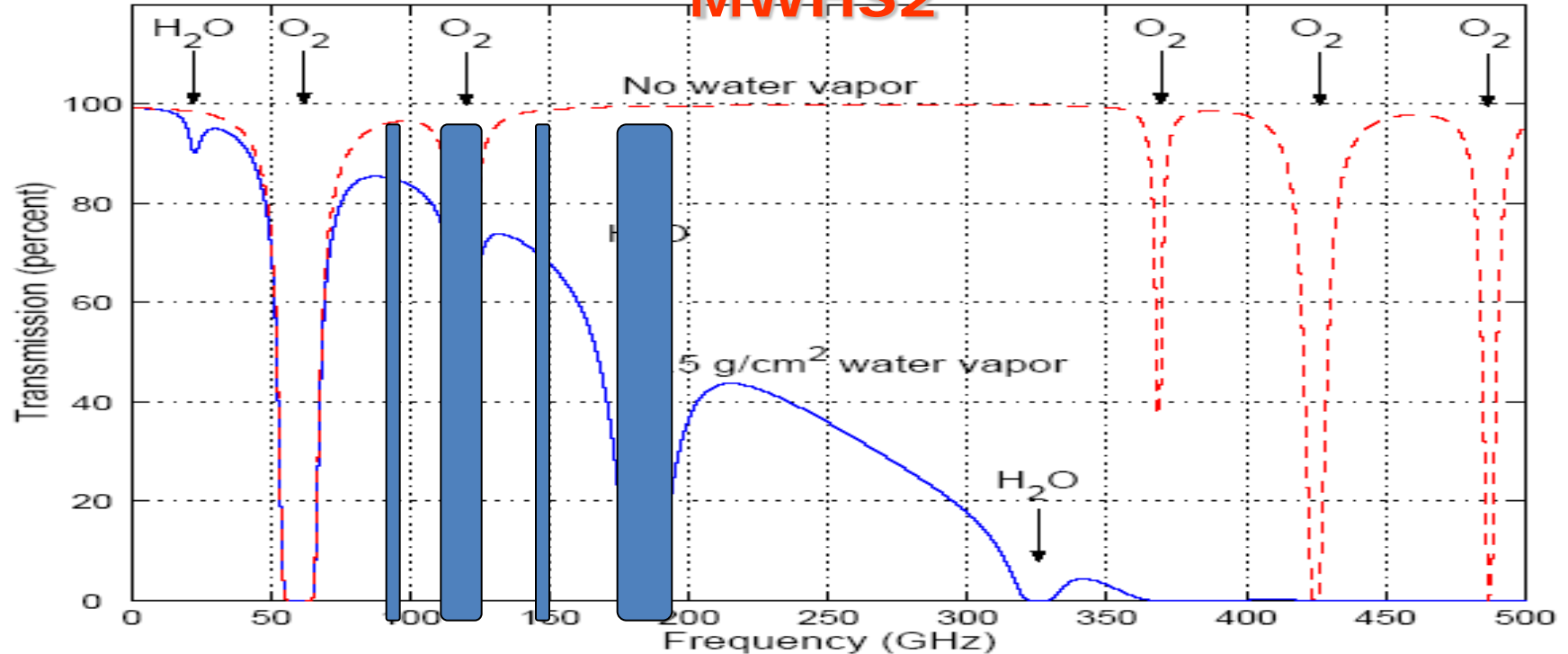
It will be again much improved after remapping and correction in DA.

it is supposed to be good enough for NWP application



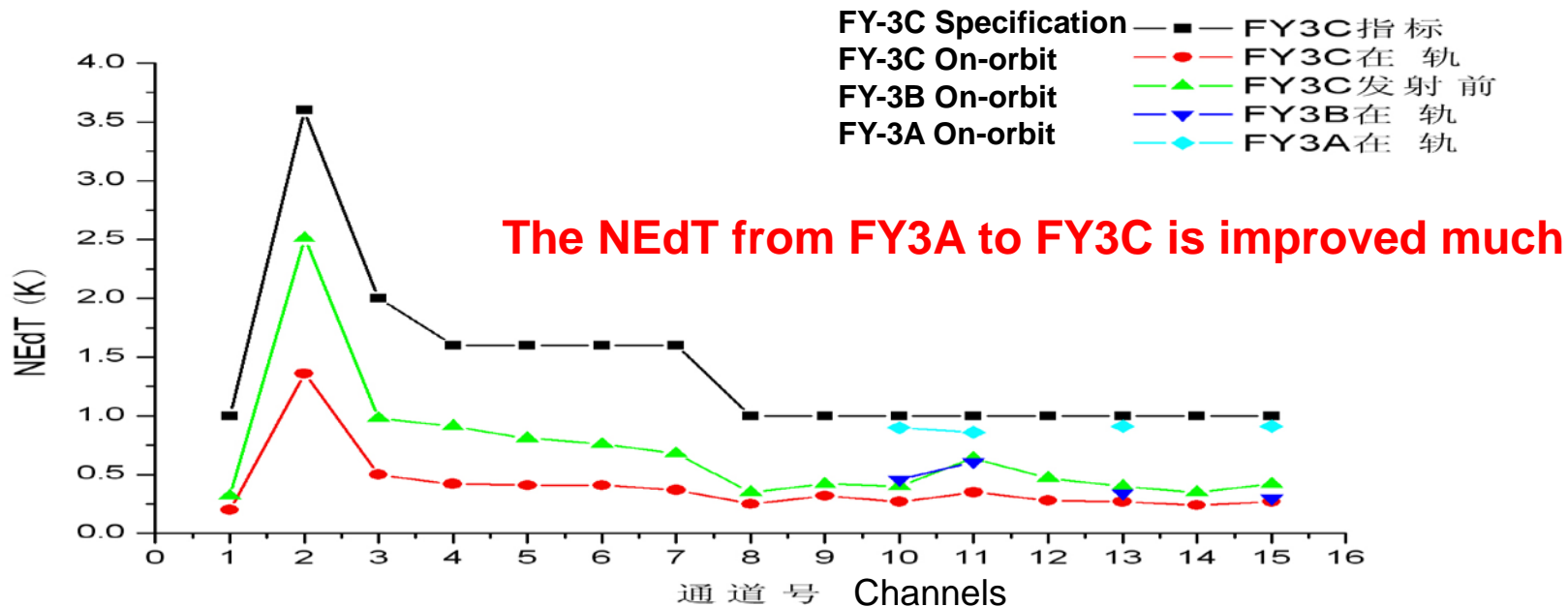
Atmospheric Transmission at Microwave Wavelengths

MWHS2



The frequency dependence of atmospheric absorption allows different altitudes to be sensed by spacing channels along different absorption lines.

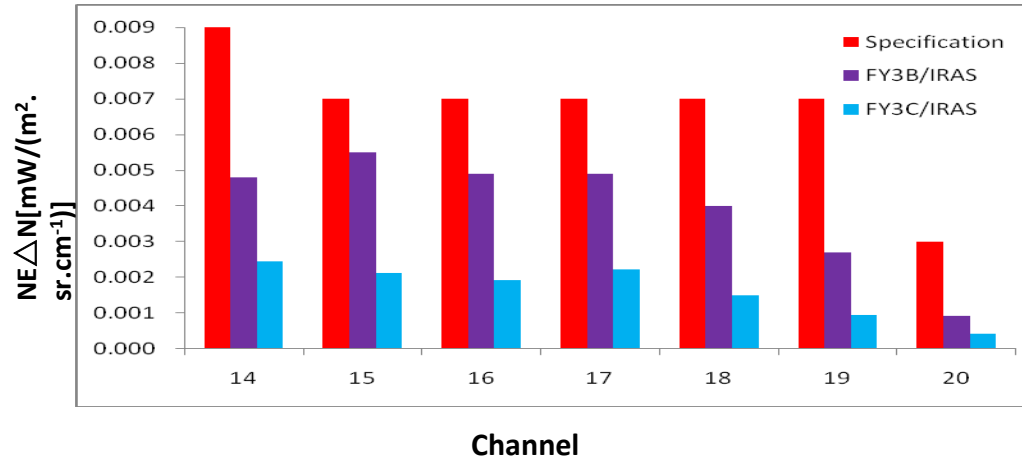
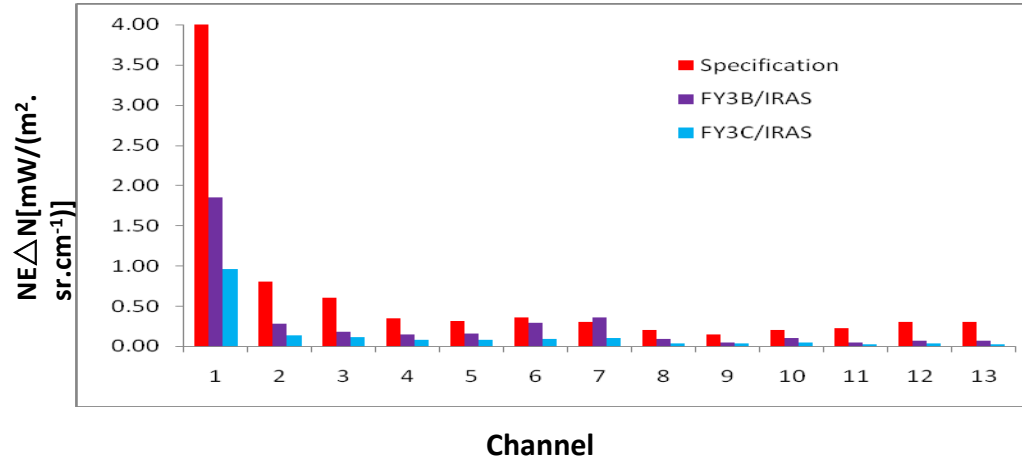
MWHS2 NEdT



NEdT from FY3A/B/C MWRI (K)

Channel	89V	89H	36V	36H	23V	23H	18V	18H	10V	10H
FY3A	0.67	0.58	0.31	0.33	0.38	0.44	0.43	0.43	0.43	0.43
FY3B	0.55	0.64	0.26	0.24	0.36	0.35	0.35	0.37	0.30	0.31
FY3C	0.41	0.41	0.27	0.27	0.33	0.39	0.40	0.42	0.31	0.29

NE Δ N from FY3B/C IRAS



Summary

- FY-3 data has been initially evaluated through a comparison with simulated radiances & full assimilation experiments in which FY-3A/B data is introduced in the ECMWF system.
- Initial assessment of FY-3 suggests the data is comparable with its counterpart.
- The high values of OSIPOn in Cal/Val of new satellite sensors has been clearly demonstrated – the improved FY-3 data would be expecting to contribute more to the NWP community.