FY-3 data usage at the Met Office

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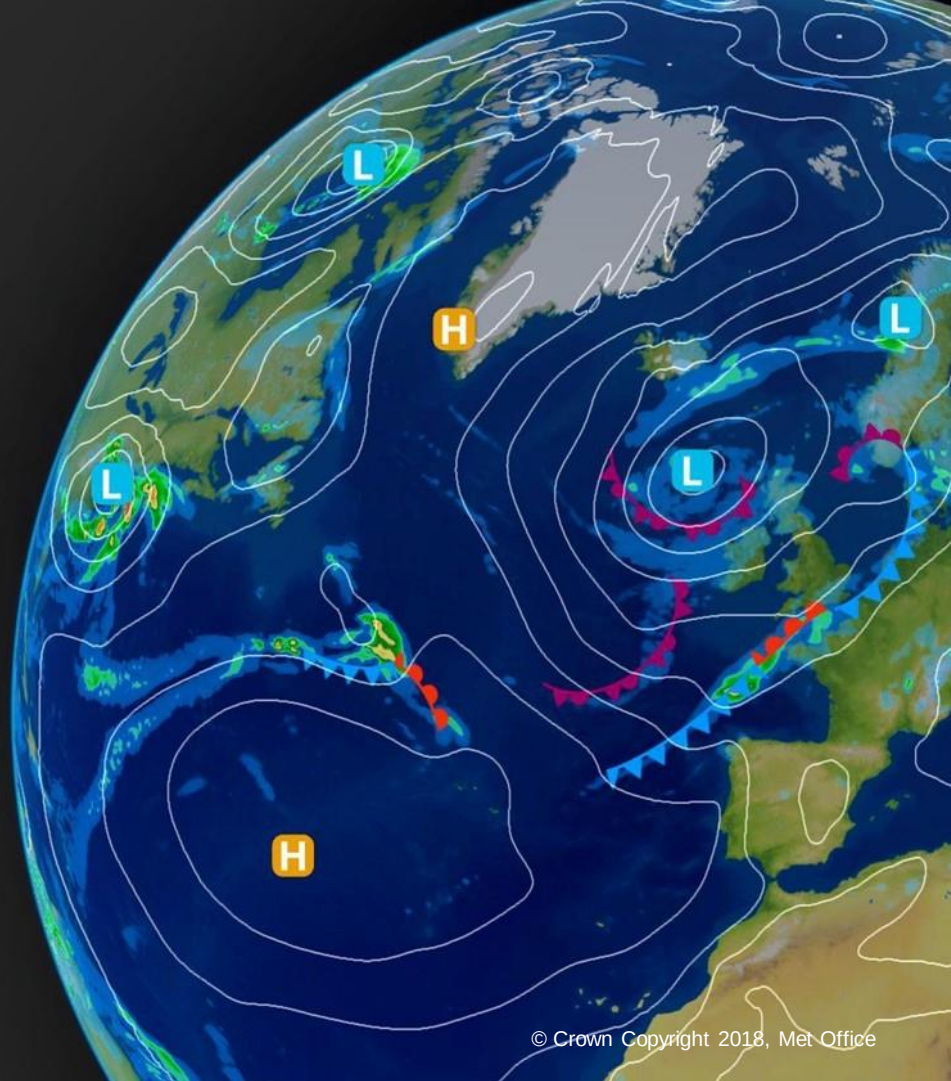

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Overview

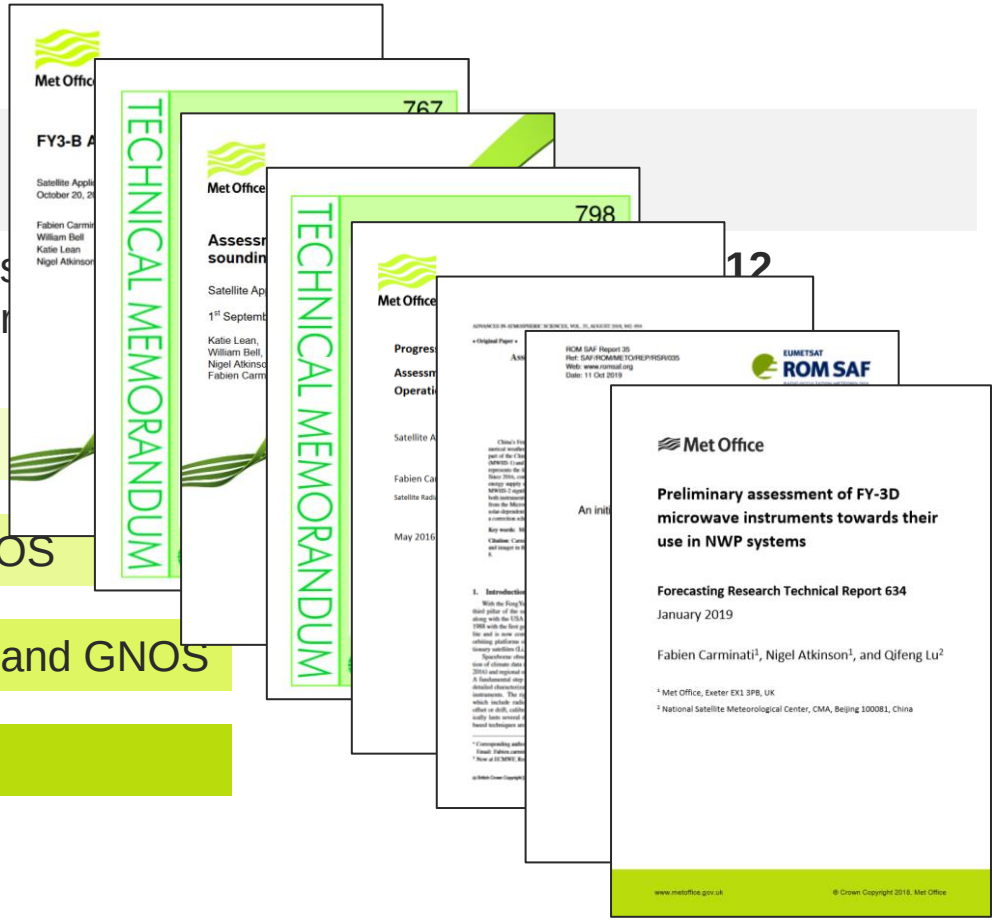
Over the past 5 years, Met Office scientists
instruments from the Feng Yun 3 and 4 ser

FY-3B MWTS-1 and MWHS-1

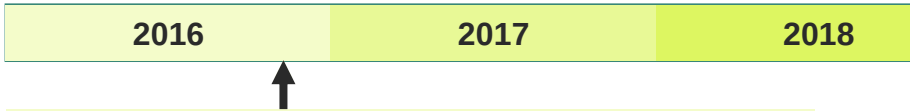
FY-3C MWTS-2, MWHS-2, MWRI, and GNOS

FY-3D MWTS-2, MWHS-2, MWRI, HIRAS, and GNOS

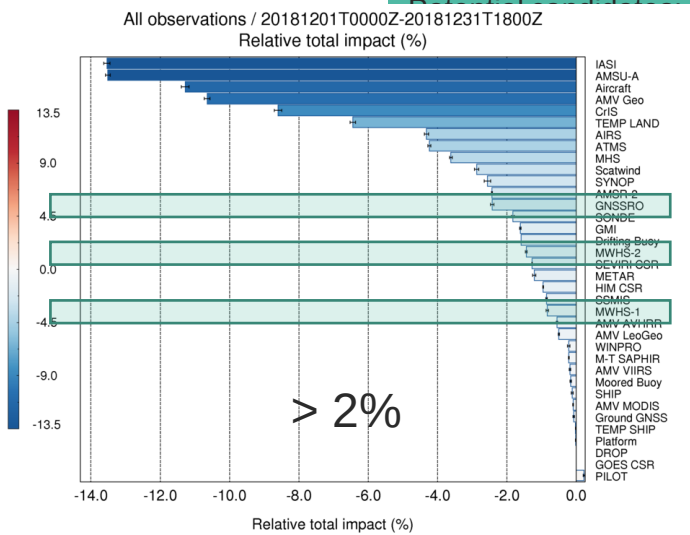
FY-4A GIIRS



Data Usage



Operational assimilation of:
FY-3B MWHS-1 (183 GHz, ocean, low-scattering, global)
FY-3C and MWHS-2 (183 GHz, ocean, low-scattering, global)
FY-3C GNOS (global)



-2, MWHS-2,

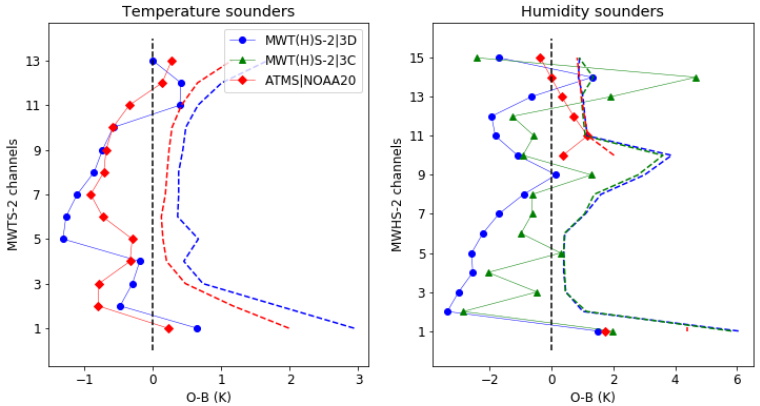
Time

Addition of:
FY-3C MWRI (18
Extended use of:
FY-3C MWHS-2 to **land** and **regional model**

Assessment of FY-3D MWT/HS

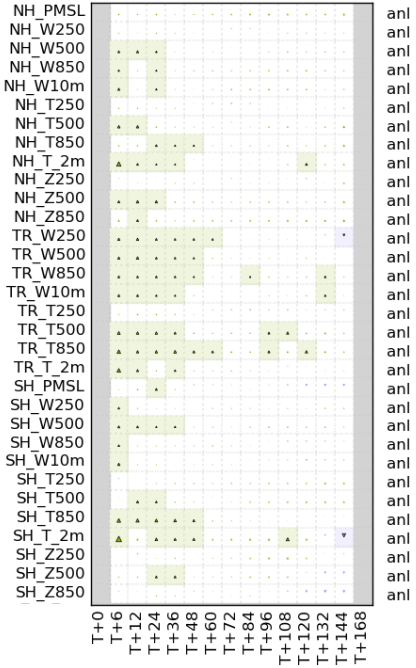
MWTS
- Problem with the average of the instrument raw digital counts
- O-B within ±1 K to ATMS but noisier
- Scan-dependent bias
- Striping noise

MWHS
- Different calibration compare to FY-3C
- O-B at 183 GHz within ±2.6 K to ATMS
- Striping noise

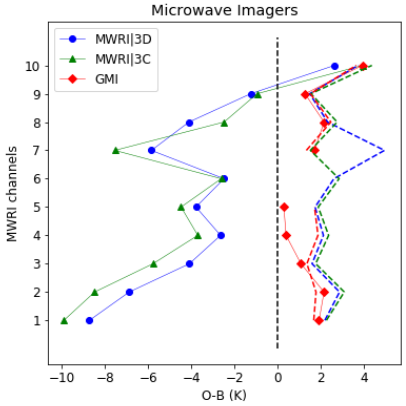


Combined assimilation of MWTS-2 and MWHS-2 channels yields a 0.1% reduction in RMSE (against MO analyses).

RMSE difference against control



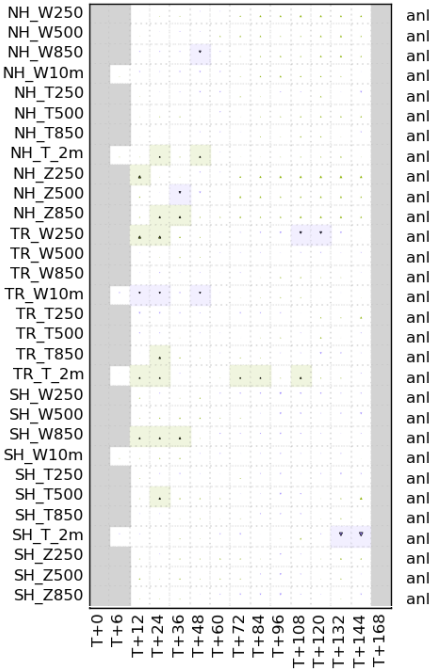
Assessment of FY-3D MWRI



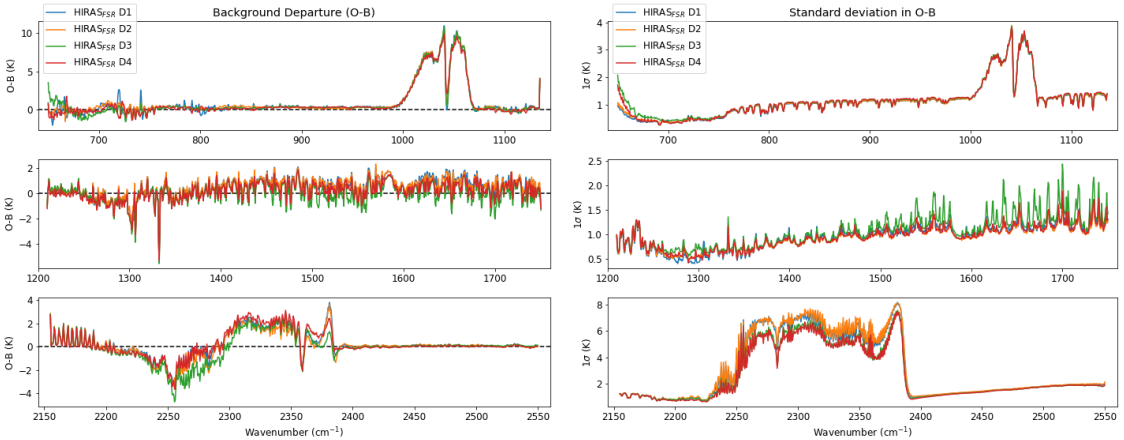
The assimilation of MWRI (FY-3D) along with the instrument on FY-3C yields a neutral change in RMSE (against EC analyses).

- Reduced global bias (stdv) compared to MWRI FY-3C
- Low biased compared to GMI
- Ascending-descending bias reduced to <0.2K

RMSE difference against control

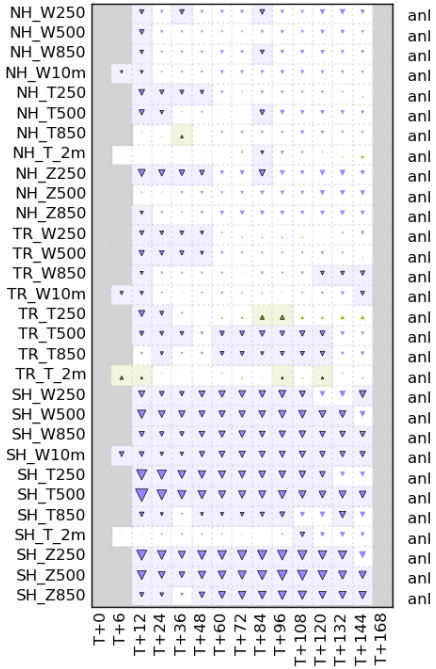


Assessment of FY-3D HIRAS



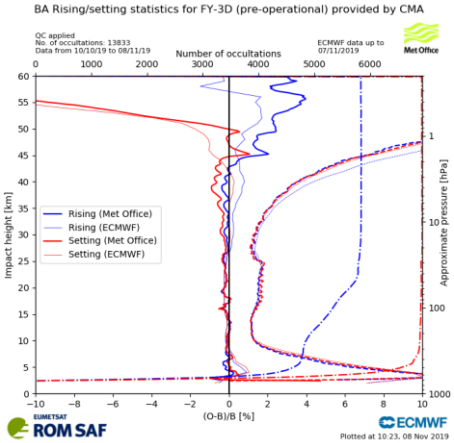
- O-B FSR with ±2.6 K (1σ ≤ 2K) where the confidence in the model is largest.
- O-B NSR within ±0.1 K of those of CrIS but 0.2 K noisier.
- Sunlight contamination of detector 3 calibration towards the end of the descending node.

RMSE difference against control



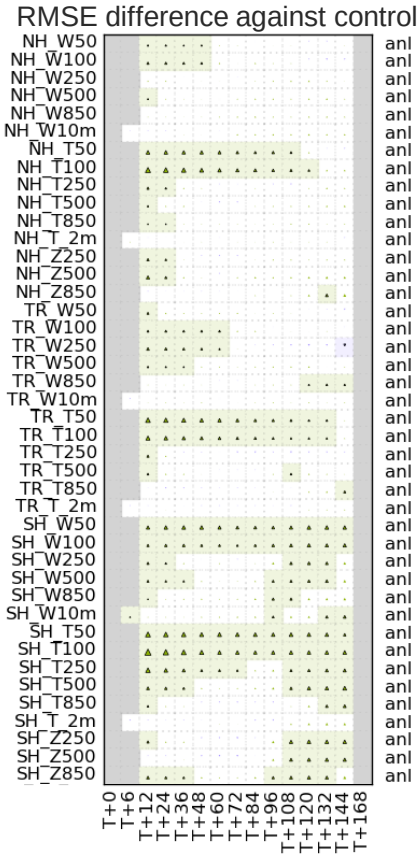
Assimilation of detector 4 over ocean yields negative results but the channel selection is sub-optimal.

Assessment of FY-3D GNOS



- Data generally unbiased and comparable to other satellites.
- Bias in setting occultations above 45km due to local multipath – CMA working on correction.
- Increase in RMS at 25km due to change in smoothing (less correlation, larger RMS).

0.19% reduction in RMSE when assimilating GNOS data from FY-3D (measured against ECMWF analyses), setting data above 40km excluded.



Future Plans

- FY-3D microwave (and GNSS) instruments should be assimilated in operation by summer 2020.
- Channel selection for FY-3D HIRAS (Q4 2019 - Q1 2020) and new assimilation experiments.
- Implement FY-4A GIIRS processing capability (Q4 2019 - Q1 2020) and assimilation experiments.
- MWHS-2 118 GHz in all-sky data assimilation (Q2-Q3 2020).

Questions?

For more information please contact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