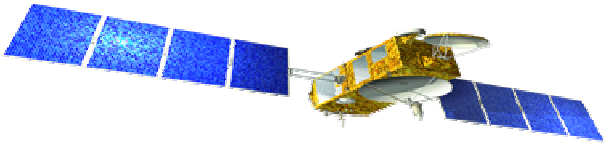


JMR in-flight calibration

E. Obligis, N. Tran and L. Eymard

1. New JMR calibration
2. Yaw state dependence

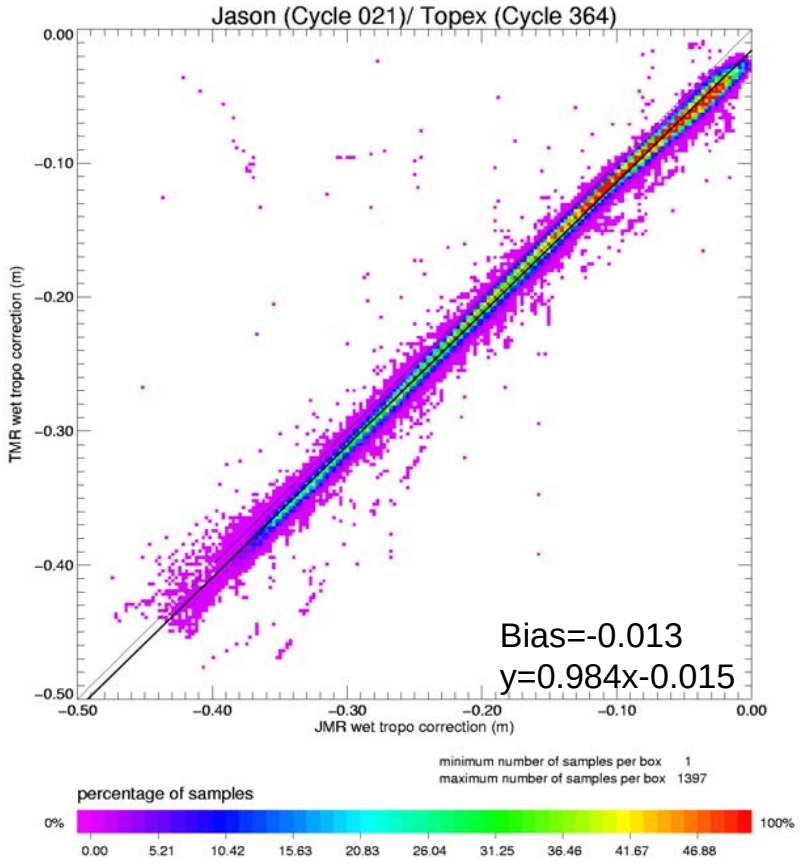
New-calibrated JMR TBs for cycles 17 to 22

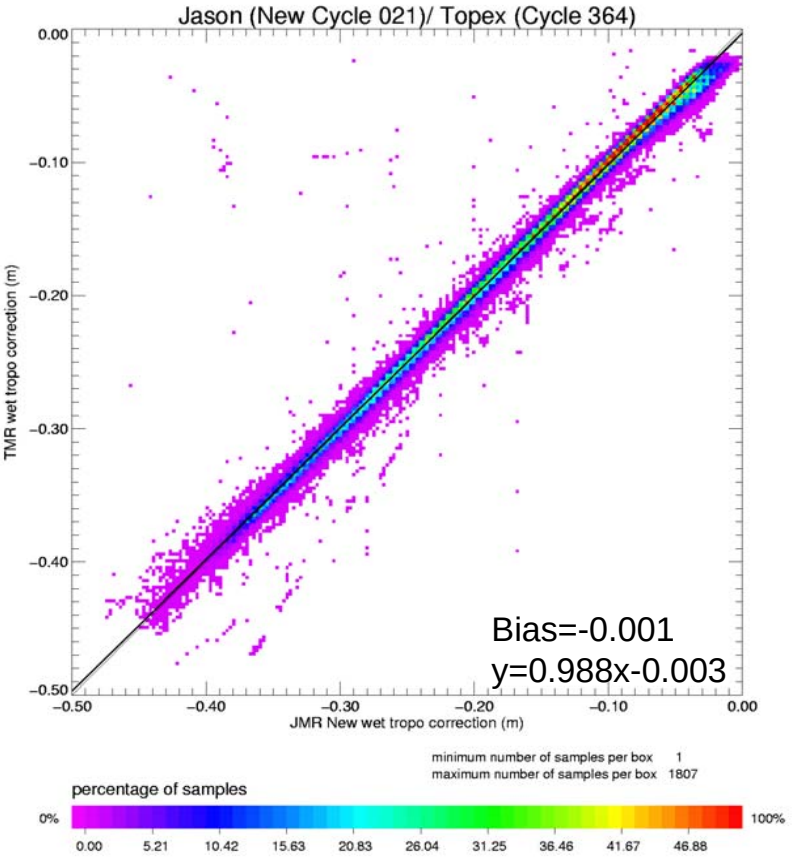
- Comparison with « old » JMR TBs and products
- Comparison with TMR TBs and products

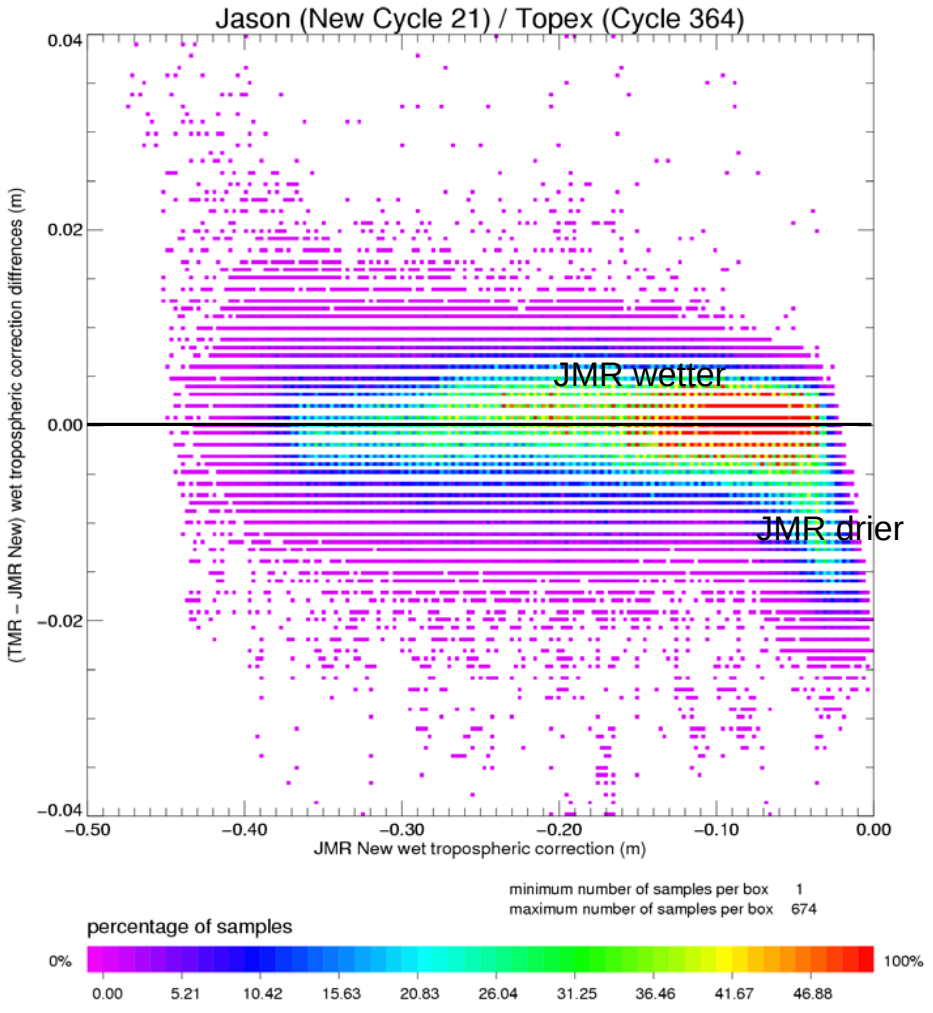
  dh corrected from the 18GHz drift

➨ Results obtained for cycles 21/364 - Sin/Sin – Representative

dh TMR/JMR (m)


Jason (Cycle 021)/ Topex (Cycle 364)
TMR wet tropo correction (m)
JMR wet tropo correction (m)
0.00
−0.10
−0.20
−0.30
−0.40
−0.50
−0.50
−0.40
−0.30
−0.20
−0.10
0.00
Bias=-0.013
y=0.984x-0.015
minimum number of samples per box 1
maximum number of samples per box 1397
percentage of samples
0%
100%
0.00
5.21
10.42
15.63
20.83
26.04
31.25
36.46
41.67
46.88

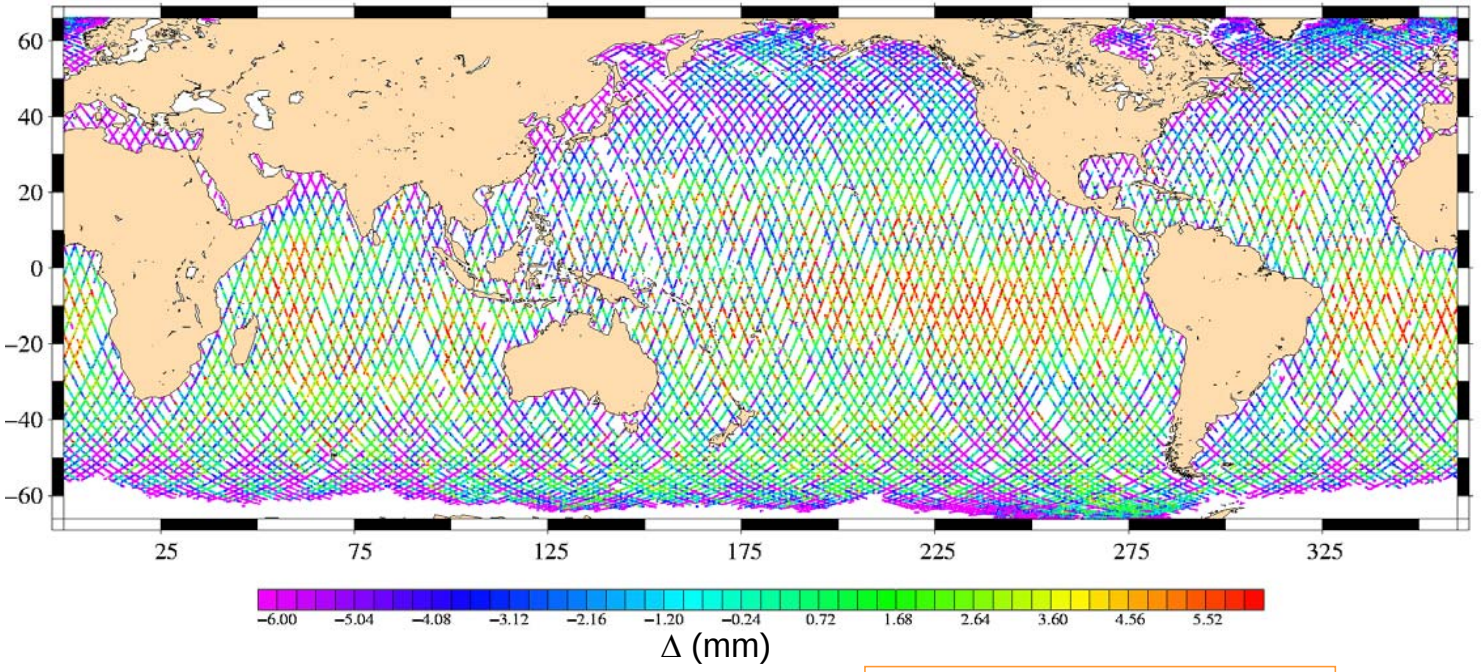

Jason (New Cycle 021)/ Topex (Cycle 364)
TMR wet tropo correction (m)
JMR New wet tropo correction (m)
0.00
−0.10
−0.20
−0.30
−0.40
−0.50
−0.50
−0.40
−0.30
−0.20
−0.10
0.00
Bias=-0.001
y=0.988x-0.003
minimum number of samples per box 1
maximum number of samples per box 1807
percentage of samples
0%
100%
0.00
5.21
10.42
15.63
20.83
26.04
31.25
36.46
41.67
46.88



-> global agreement between corrected TMR dh and new JMR dh

-> but still remain a climatological signal

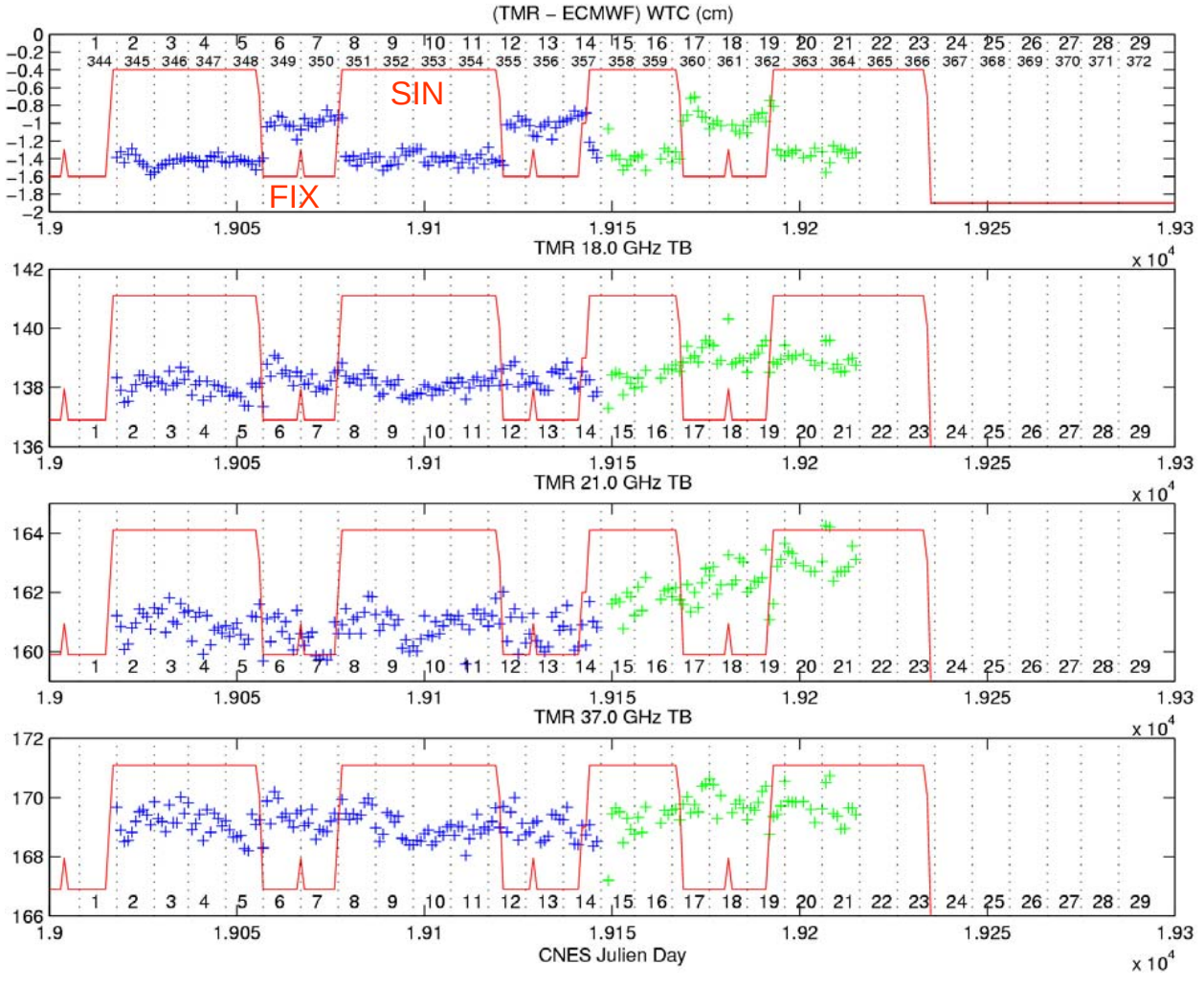
Difference between JMR dh and TMR dh

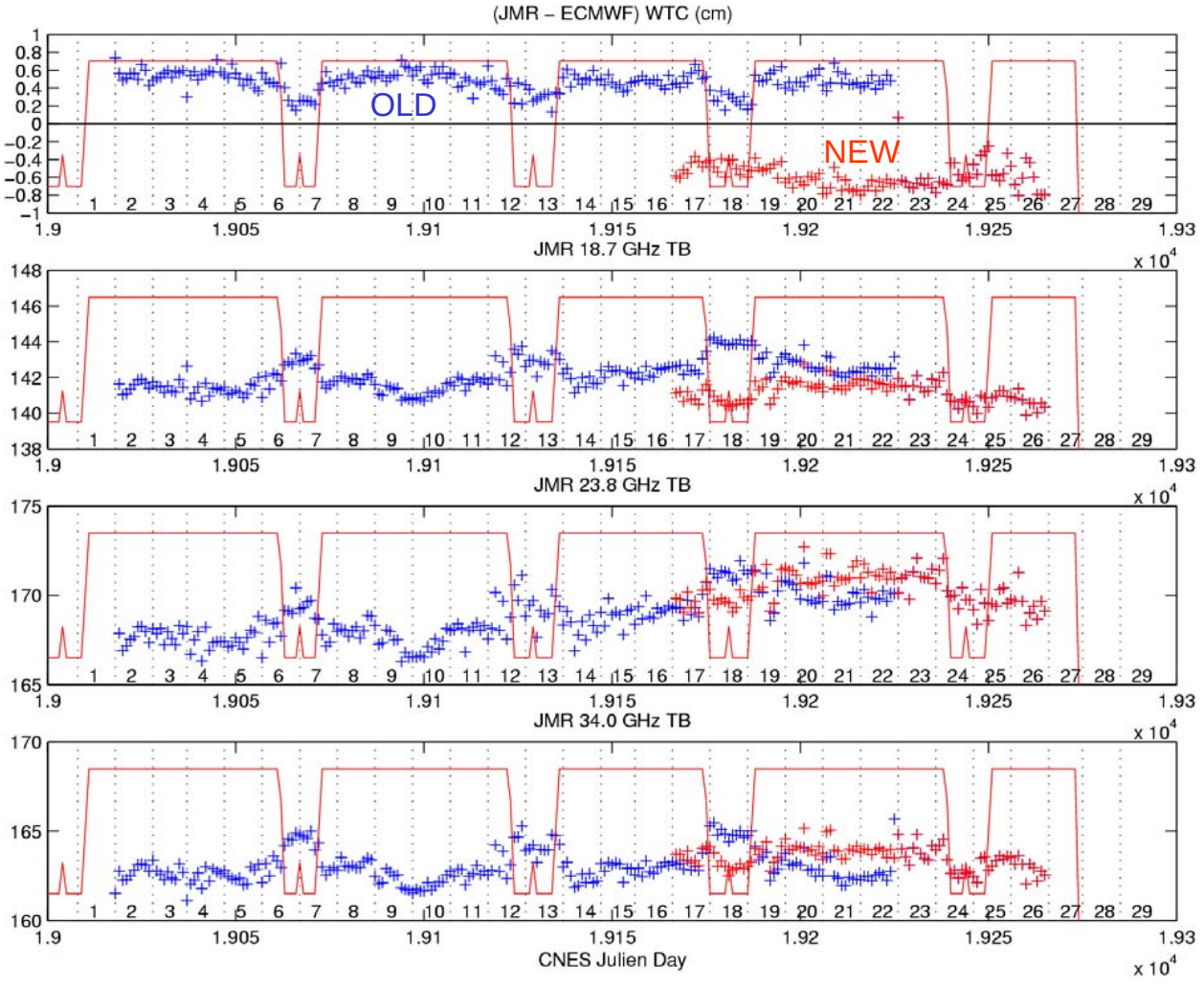


|dh_JMR| :
- higher for high latitudes
- lower in tropical/wet regions

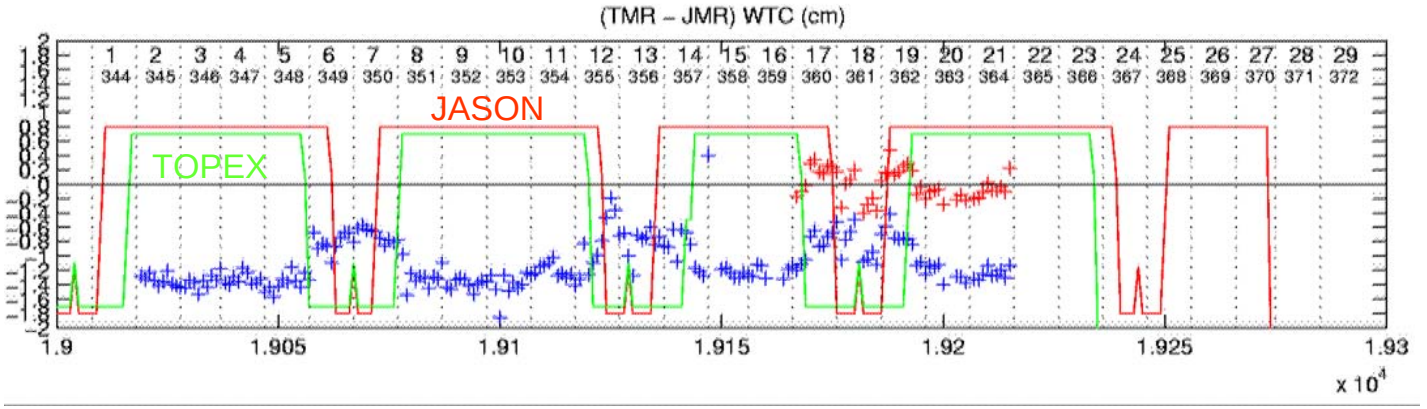
Yaw State Dependence

- Survey of the daily averages
- Impact over TMR TBs and dh (corrected from the drift)
- Impact over JMR TBs and dh


(TMR – ECMWF) WTC (cm)
SIN
FIX
TMR 18.0 GHz TB
TMR 21.0 GHz TB
TMR 37.0 GHz TB
CNES Julien Day
x 10^4



Still remains an *opposite* JMR yaw state dependence



The JMR new calibration :

- decreases the yaw effect
- decreases the TMR/JMR dh differences

but there is always a dependence with TOPEX and JASON yaw states

Yaw state dependence correction

- **JMR** : « direct » correction in the level1b processing coefficients : OK

- **TMR** : C. Ruf proposed a « step» correction over dh values

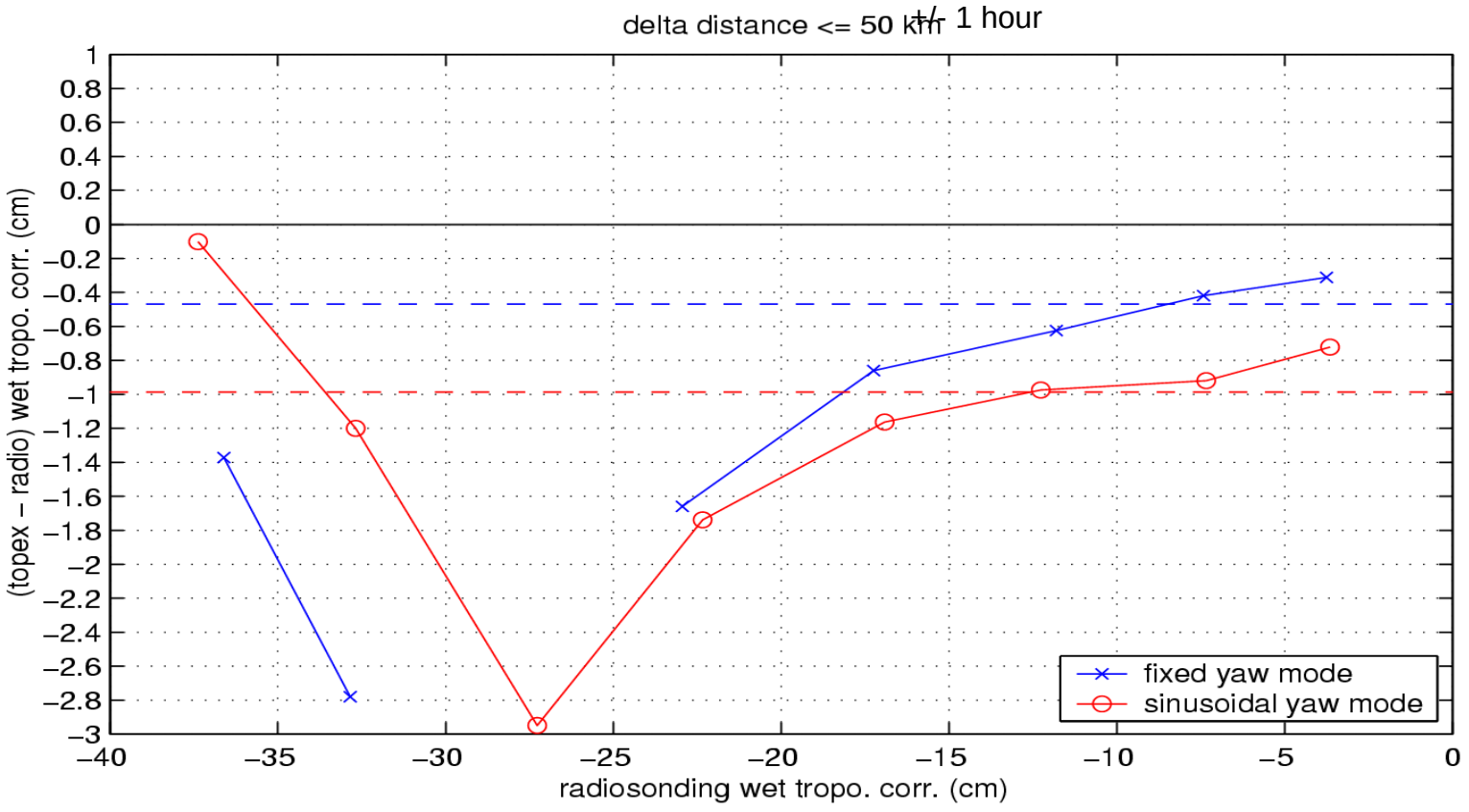
  -2mm in sinusoidal yaw state

  +3mm in fix yaw state

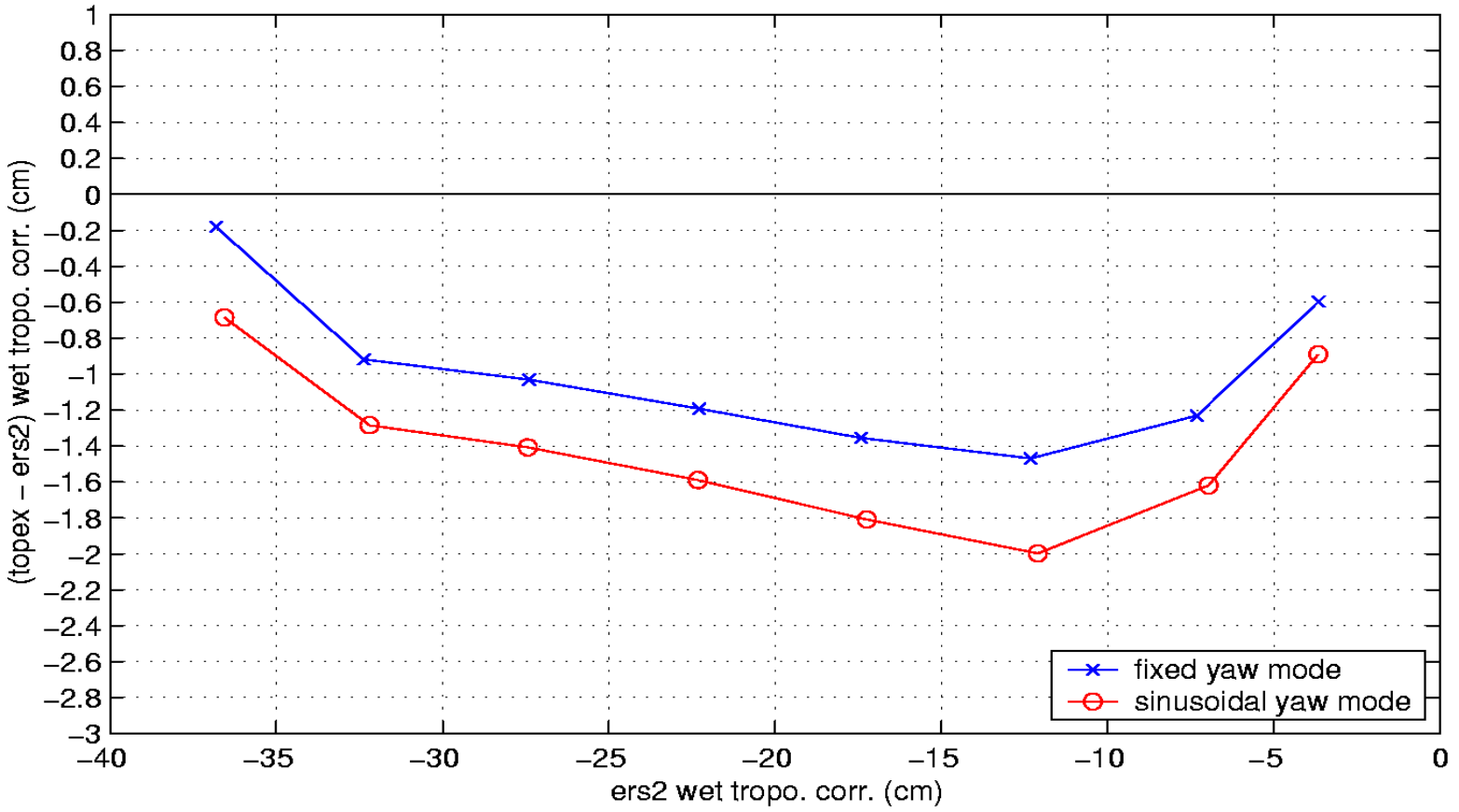
To evaluate this correction

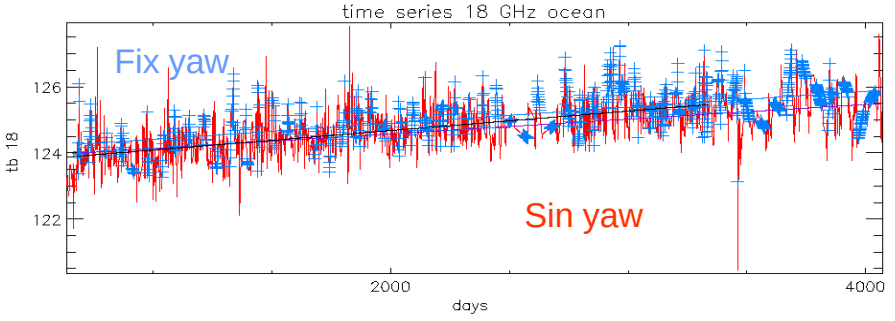
- Comparison with radiosounding dh measurements for a 10 years period
- Comparison with ERS2 dh measurements for the common period
- Long term survey over cold/hot targets

Comparison with radiosounding measurements



Comparison with ERS2 dh at crossover points





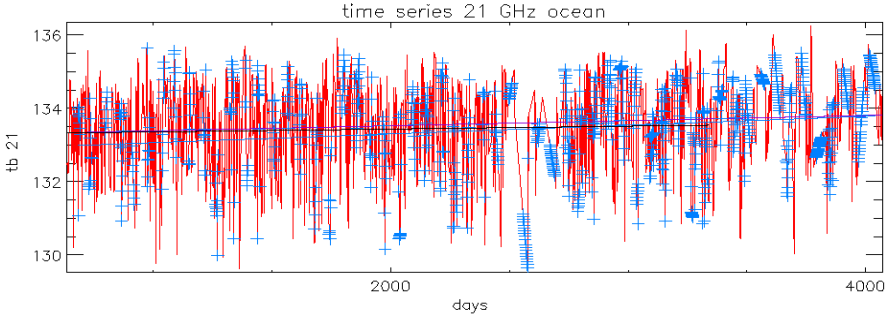
125.203

124.700

COLDEST POINTS OVER OCEAN

18 GHz

⇒Δ(fix-sin)=0.50 K

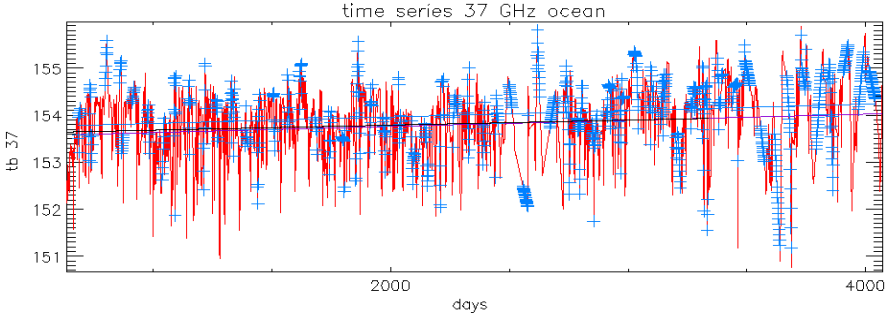


133.452

133.562

21 GHz

=> Δ(fix-sin)=-0.11 K

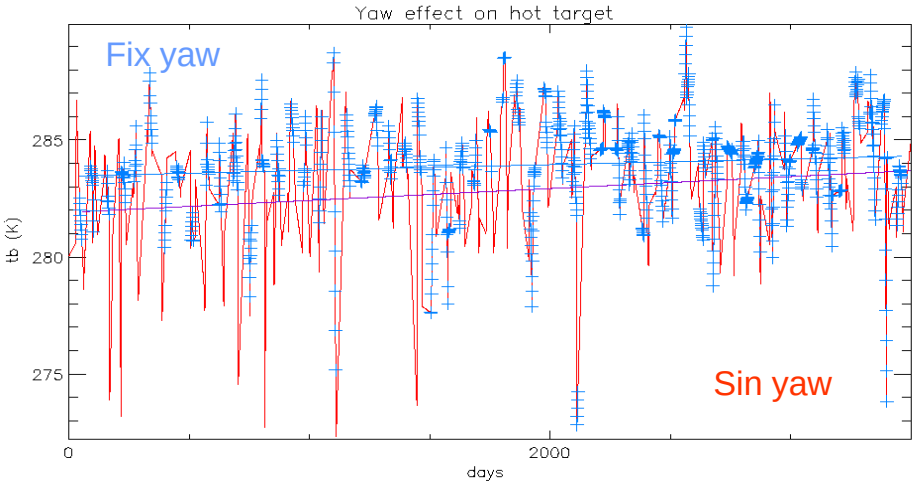


154.048

153.797

37 GHz

=> Δ(fix-sin)=0.25 K



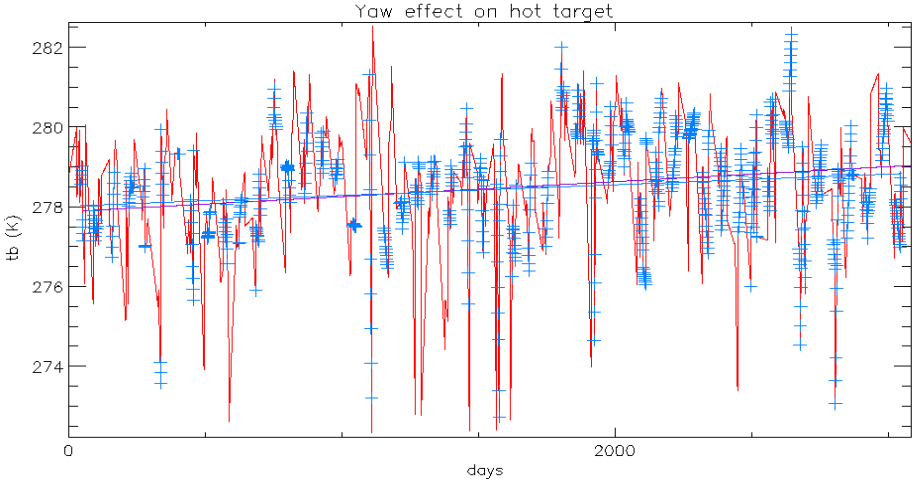
TB 37 GHz over AMAZON FOREST

283.950

282.759

DAY

=> Δ(fix-sin)=1.19 K



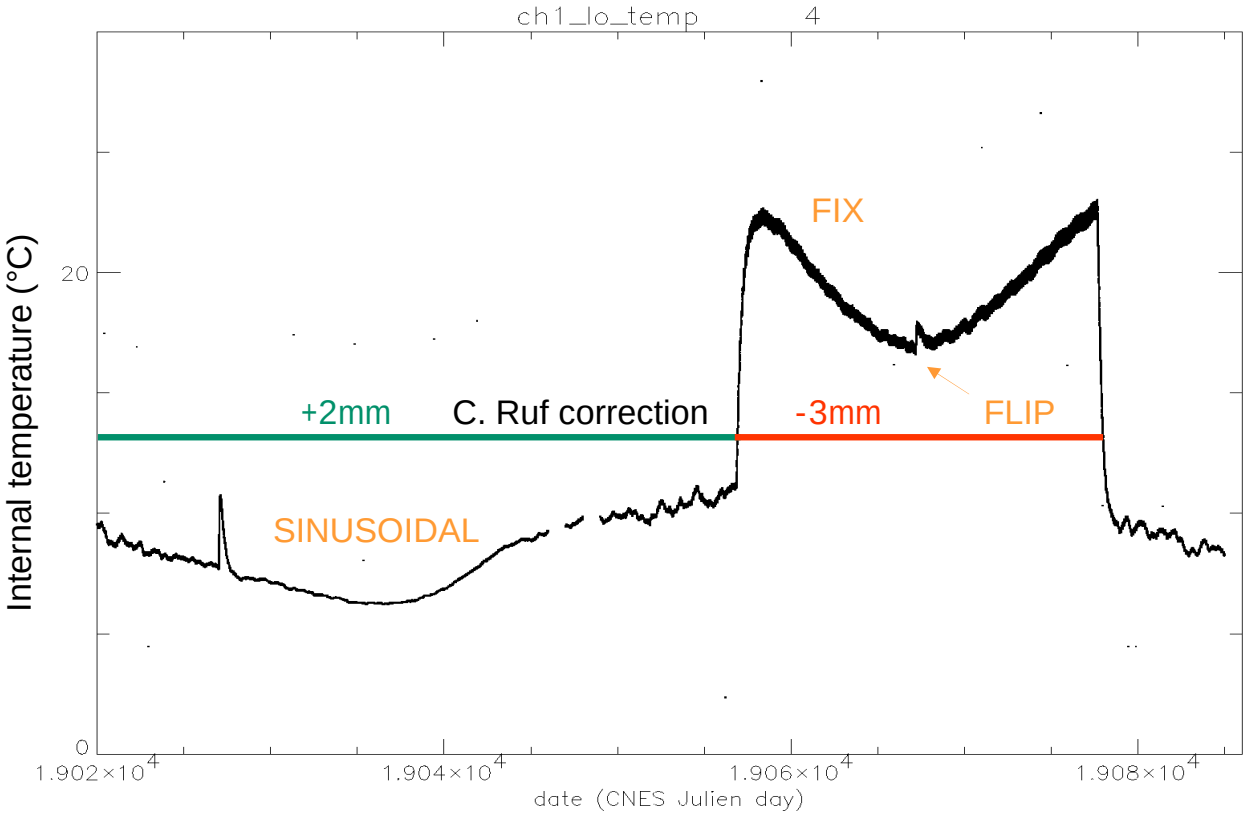
278.493

278.436

NIGHT

=> Δ(fix-sin)=0.06 K

Variations of an internal temperature for a complete yaw cycle



CONCLUSIONS

- **JMR calibration**
  - global agreement with TMR wet tropospheric correction
    -> still remain a geographical difference between the two
  - decreases the yaw state dependence
    -> TOPEX and JASON signals always visible on TBs and dh
- **TOPEX yaw signals**
  - dh in fix yaw mode is closer to in-situ measurements and ERS2
  - the TOPEX yaw state affects differently day and night measurements
    -> modifies the diurnal cycle
    -> same results for other channels and over Greenland Glacier
    -> need to do similar study over ocean for JMR and TMR
    -> impact on dh (1K ⇔ 4 mm)
  - TMR internal temperature variation is not a step function

How to better account for
TMR temperature variations in the L1B processing chain ?