Global Statistical Jason-2 assessment and cross-calibration with Jason-1
Parameter Analysis

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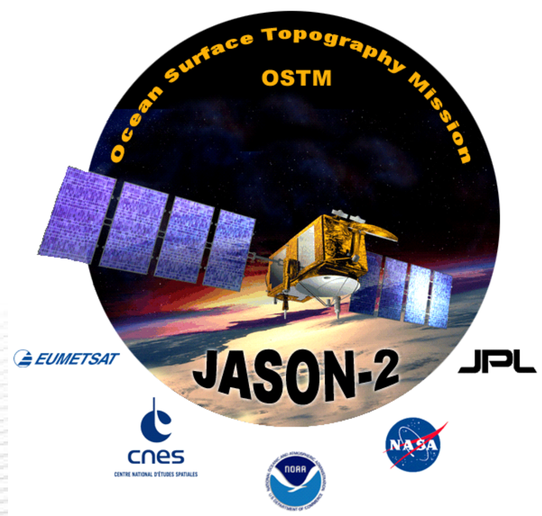
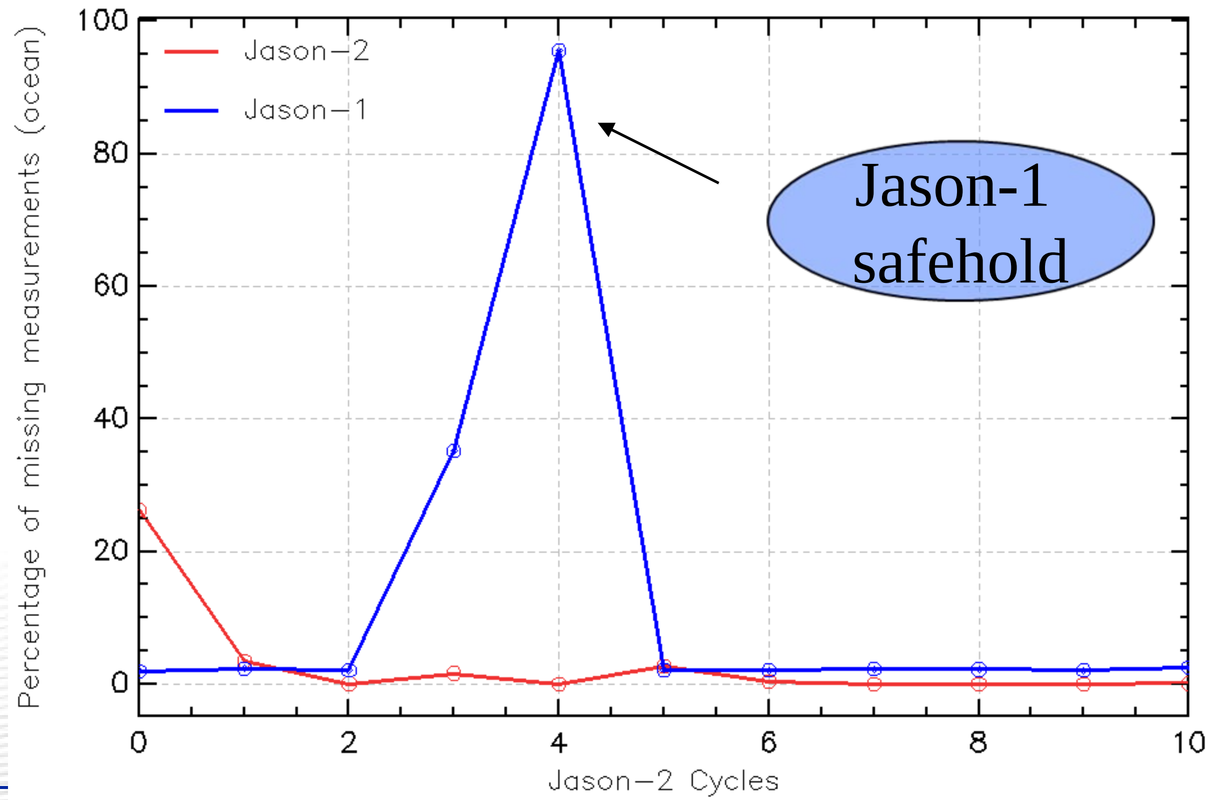


Introduction

- General
  - OSTM/Jason-2 successfully launched on 20th of June 2008
  - In tandem configuration with Jason-1 (55 seconds apart) since 4th of July 2008
- Objective:
  - Assess Jason-2 data quality
- Method:
  - Analysis of missing and edited measurements
  - Parameter analysis using cross-calibration of Jason-2 with Jason-1
- Used Data:
  - 1 Hz Igdr Jason-2 and Jason-1 data
  - From 4th of July to 19th of october 2008 : Jason-2 cycles 0 to 10 (Jason-1 cycles 239 to 249)

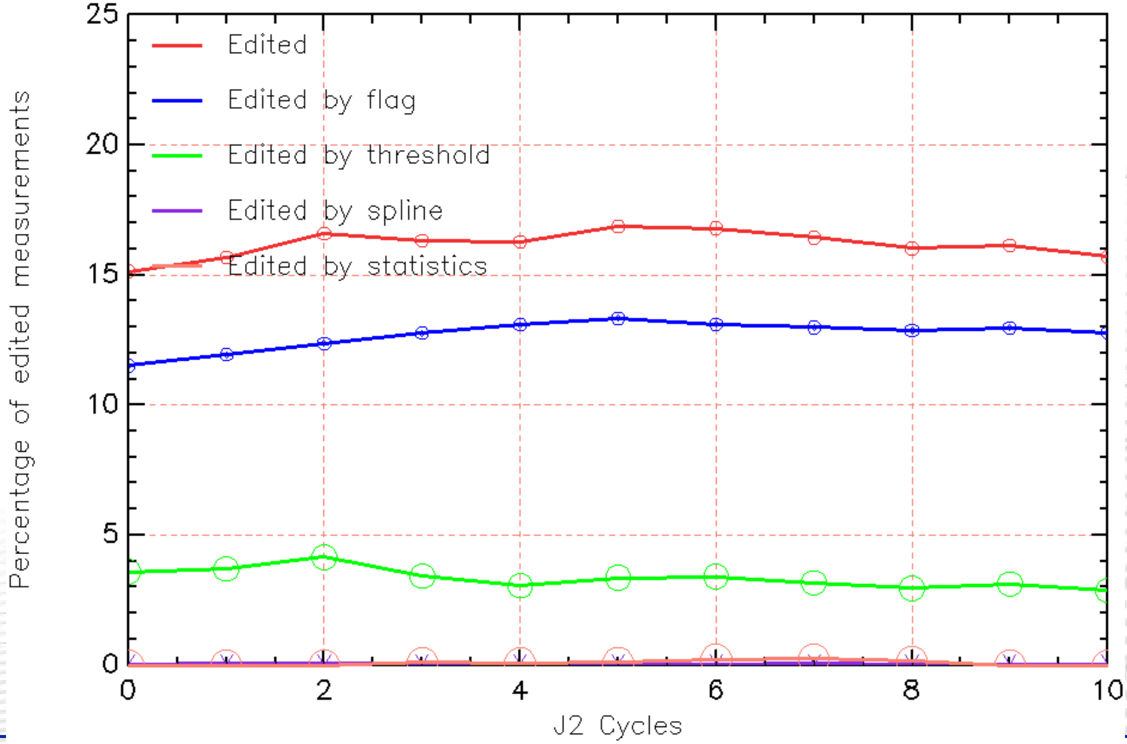
Missing and edited data

- Missing measurements
  - Only few missing measurements over ocean, mostly due to:
    - Acquisition station problems
    - Ground processing anomalies
  - Over coastal and hydrological zones, Jason-2 better than Jason-1, thanks to new tracker algorithms



Missing and edited data

- Edited measurements
  - Over open ocean: same editing criteria used for Jason-1 and Jason-2
  - Percentage of edited measurements similar for both satellites (approx. 16% of edited measurements over ocean)
  - In Median mode, small portions might be edited due to AGC, mispointing, SWH out of threshold



Introduction

Missing and edited data

Parameter Analysis:

- Sigma0
- Number and Rms of 20 Hz range measurements
- SWH
- Mispointing
- Altimeter ionospheric correction
- Wet tropospheric correction

Conclusion

Parameter Analysis

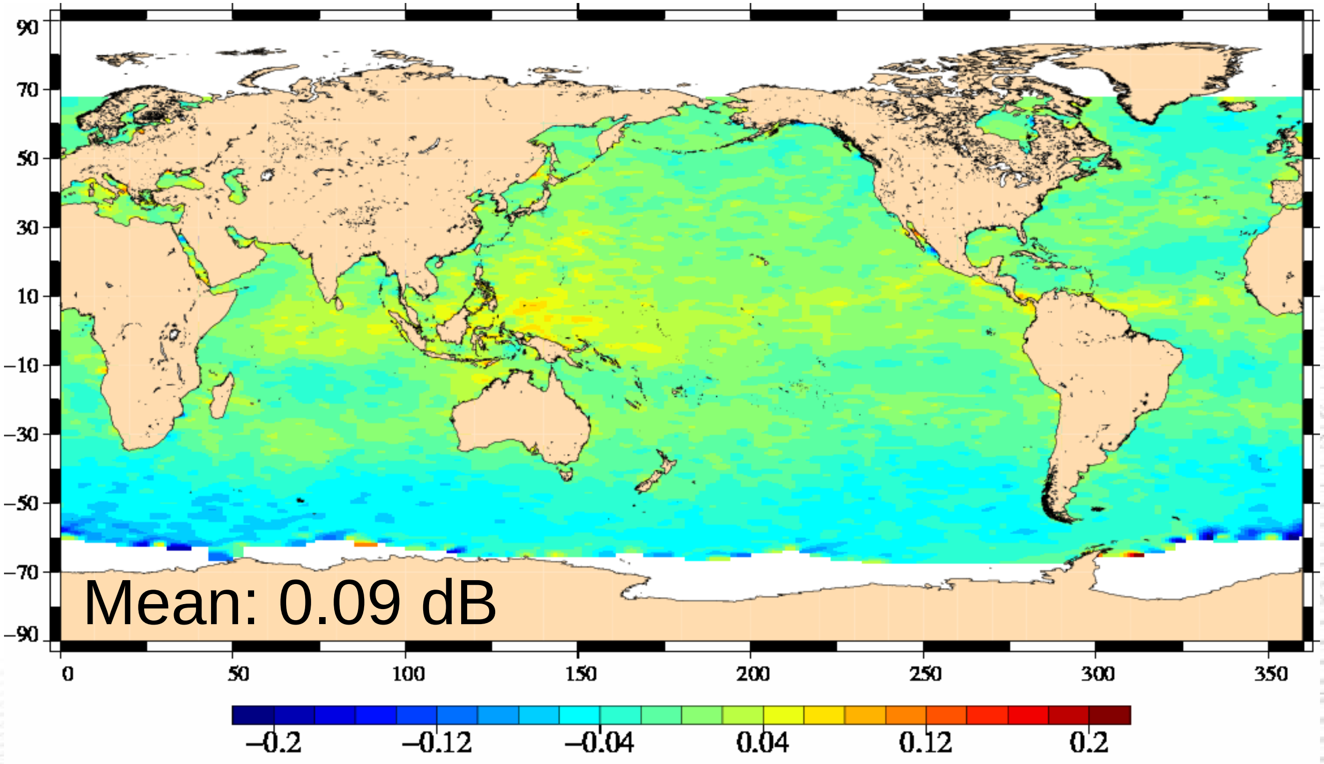
- Monitoring of altimetric parameters is very important to verify stability of measurements

- Tools:
  - Maps of Jason-1 – Jason-2 differences to observe possible geographically correlated bias
  - Daily monitoring of global Jason-1 – Jason-2 differences to observe possible drifts or jumps

- Analyzed parameters:
  - Backscattering coefficient
  - Number and Rms of 20 Hz range measurements
  - Significant wave height
  - Mispointing from waveforms
  - Altimeter ionospheric correction
  - Radiometer wet troposphere correction

Backscattering coefficient

- Jason-2 backscattering coefficient shows good agreement with Jason-1



Map of JA1 – JA2 Sigma0 difference (Ku-band), cycles 0 to 10 [dB]

Backscattering coefficient

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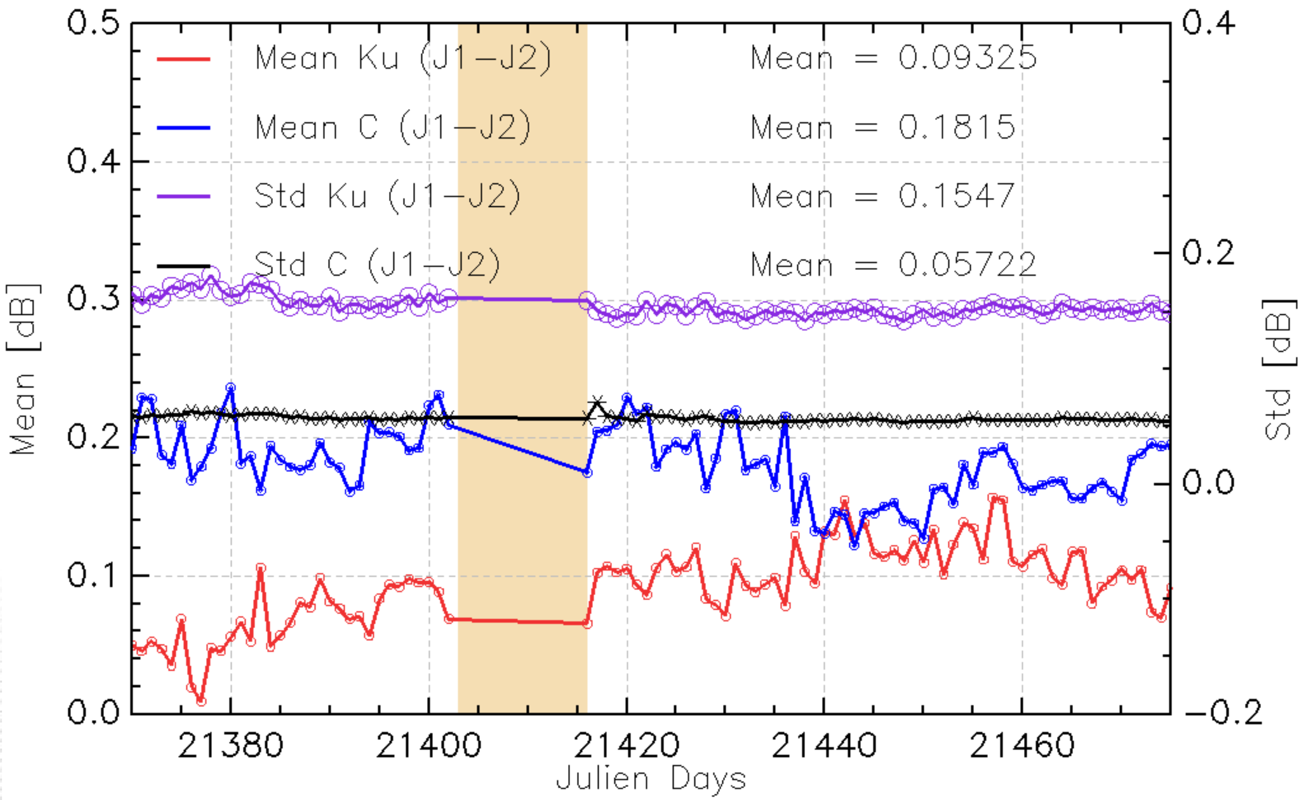
- Jason-2 backscattering coefficient shows good agreement with Jason-1
- Global bias of 0.1 dB in Ku-band and 0.2 dB in C-band
- Bias between T/P and JA1 was 2.4 dB



Introduction

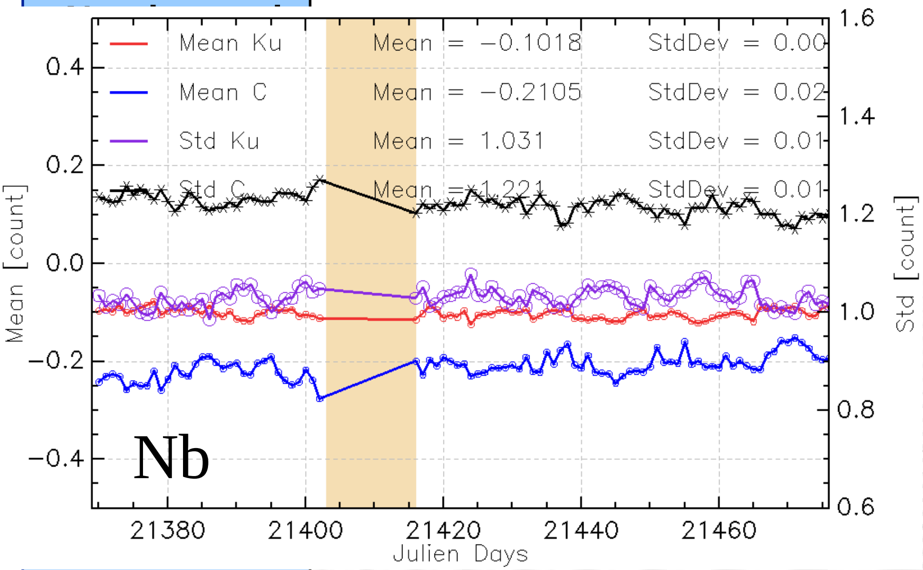
Missing and edited data

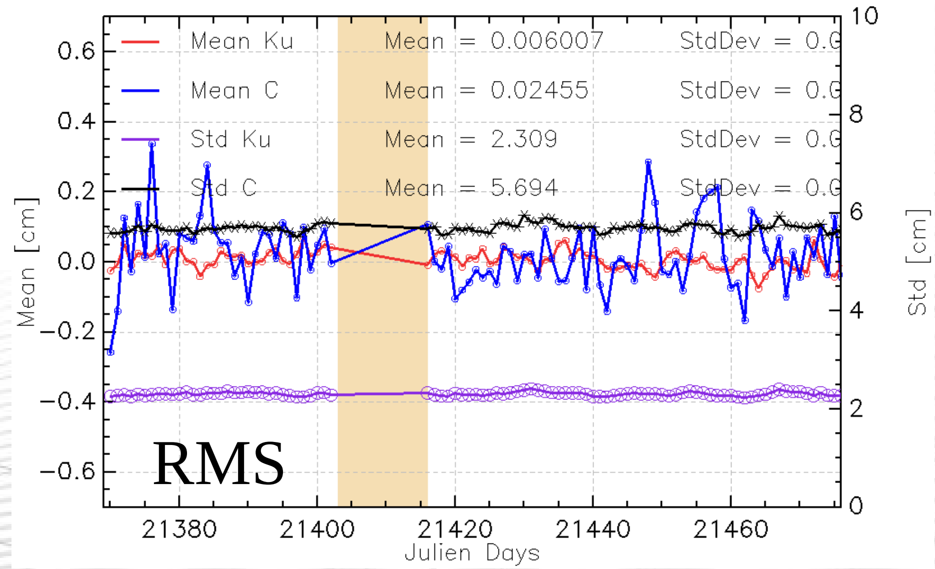
Parameter Analysis:

- Sigma0

Number and Rms of 20 Hz range

- JA1-JA2 difference of number of 20 Hz range measurements is stable
- RMS of 20 Hz range measurements equivalent for both satellites



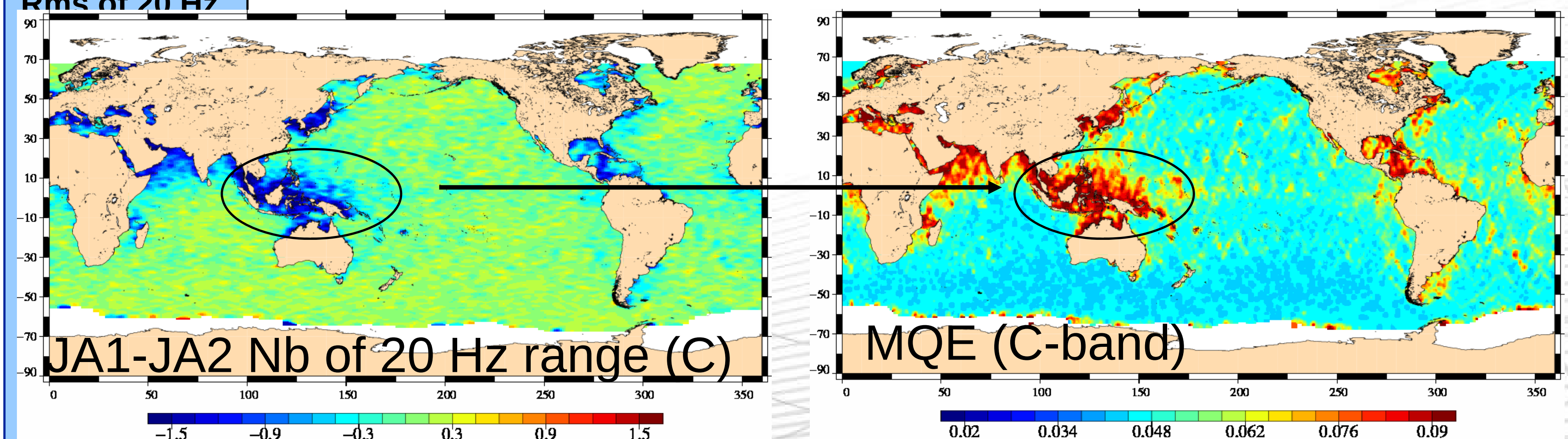


Conclusion

Number and Rms of 20 Hz range

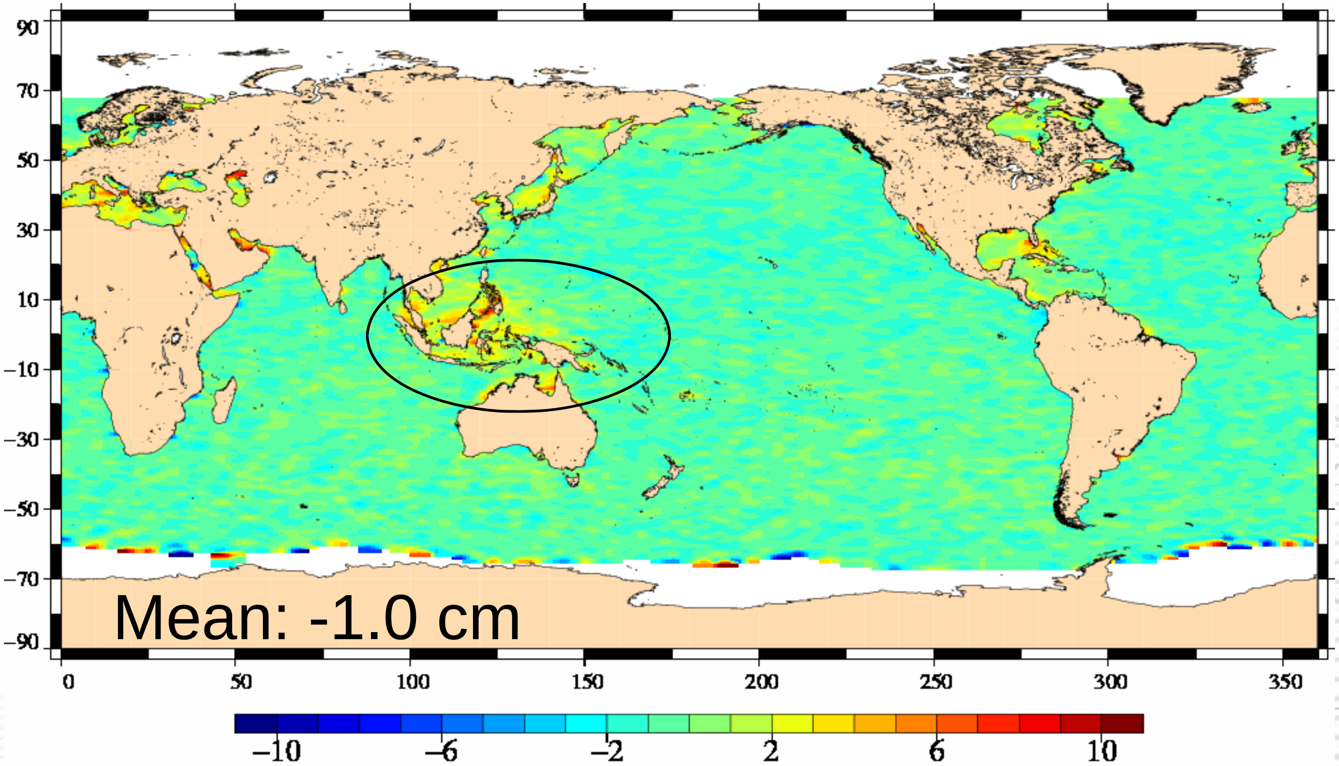
- MQE (Mean Quadratic Error between measured waveform and best fitted Brown model) not yet used during 20 Hz to 1 Hz compression

- Number of elementary valid 20 Hz measurements (per second) higher for JA2 than for JA1 ➡ especially visible for high MQE



Significant Wave Height

- Good agreement between JA2 and JA1
- Weak regional differences

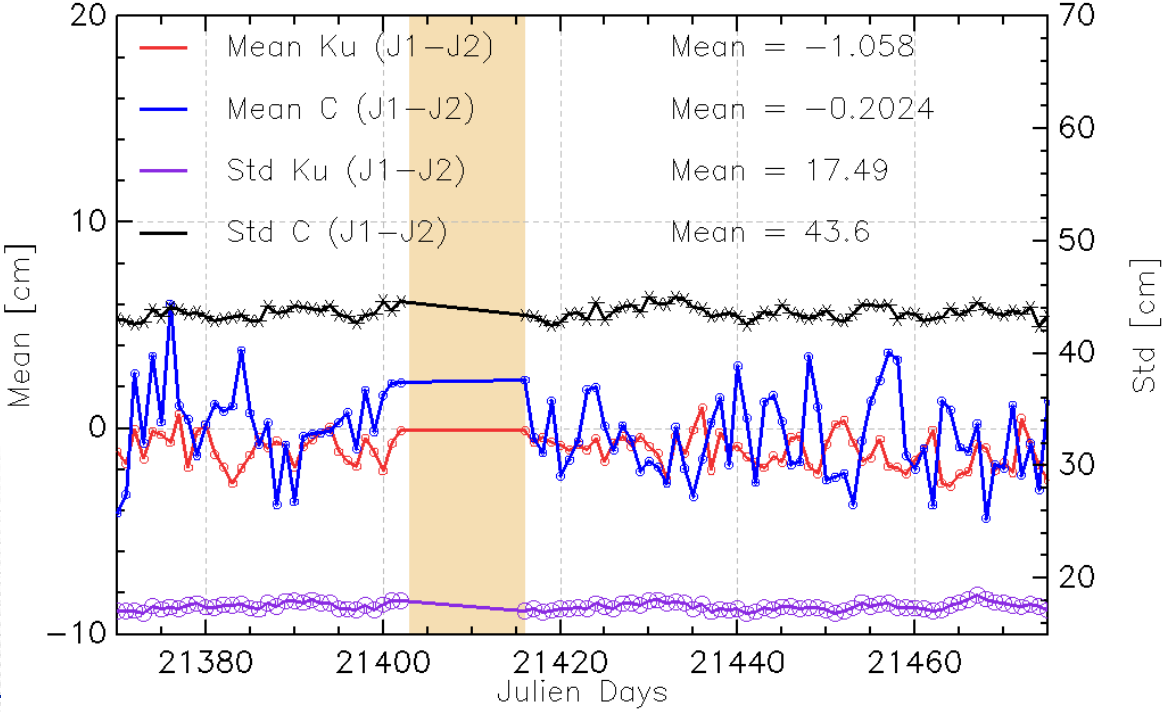


Map of JA1 – JA2 SWH difference (Ku-band), cycles 0 to 10 [cm]

Significant Wave Height

- Daily monitoring: no drift between JA2 and JA1, neither in Ku- nor in C-band
- Global bias between T/P and Jason-1 was 8.9 cm

	Ku-band	C-band
Mean (JA1-JA2)	-1.0 cm	-0.2 cm
Std (JA1-JA2)	17.5 cm	43.6 cm



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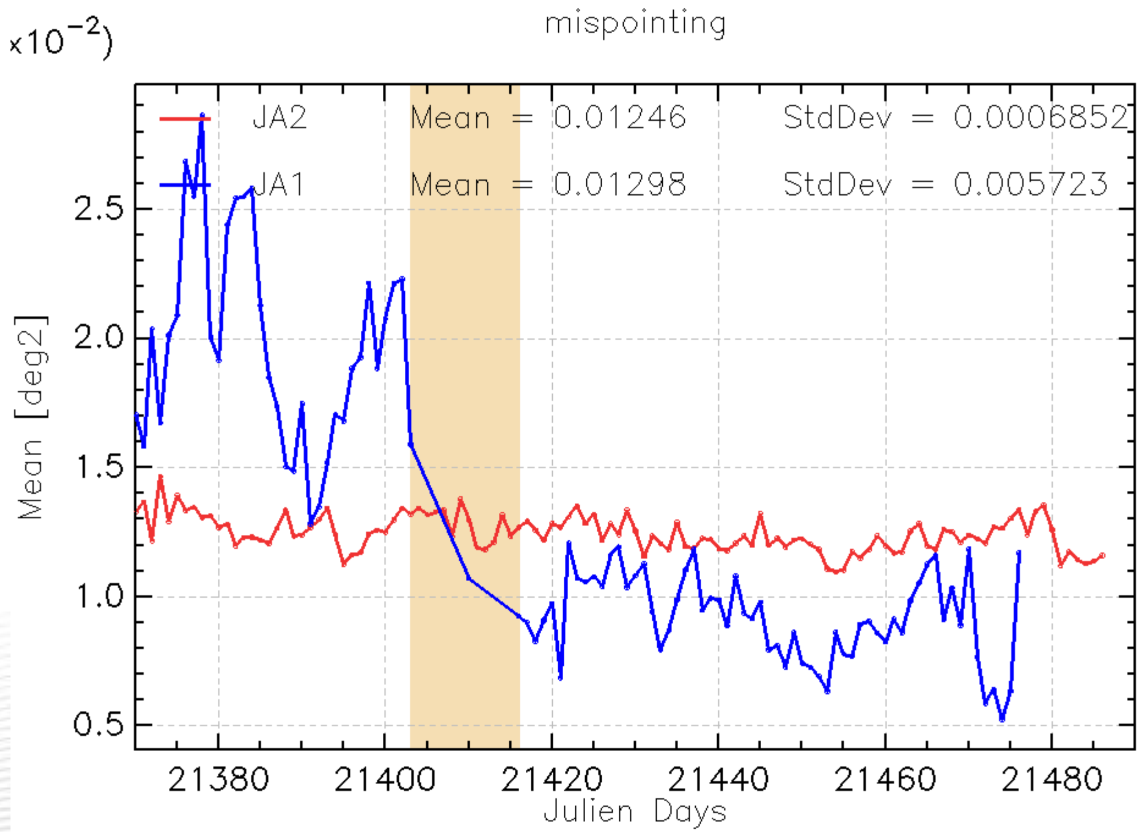
Mispointing from waveforms

- Daily monitoring of JA2 mispointing from waveforms much more stable than JA1
- JA1: reduced star tracker availability ⇨ poorer pointing
- JA2: no real mispointing, but mean of 0.012 deg2



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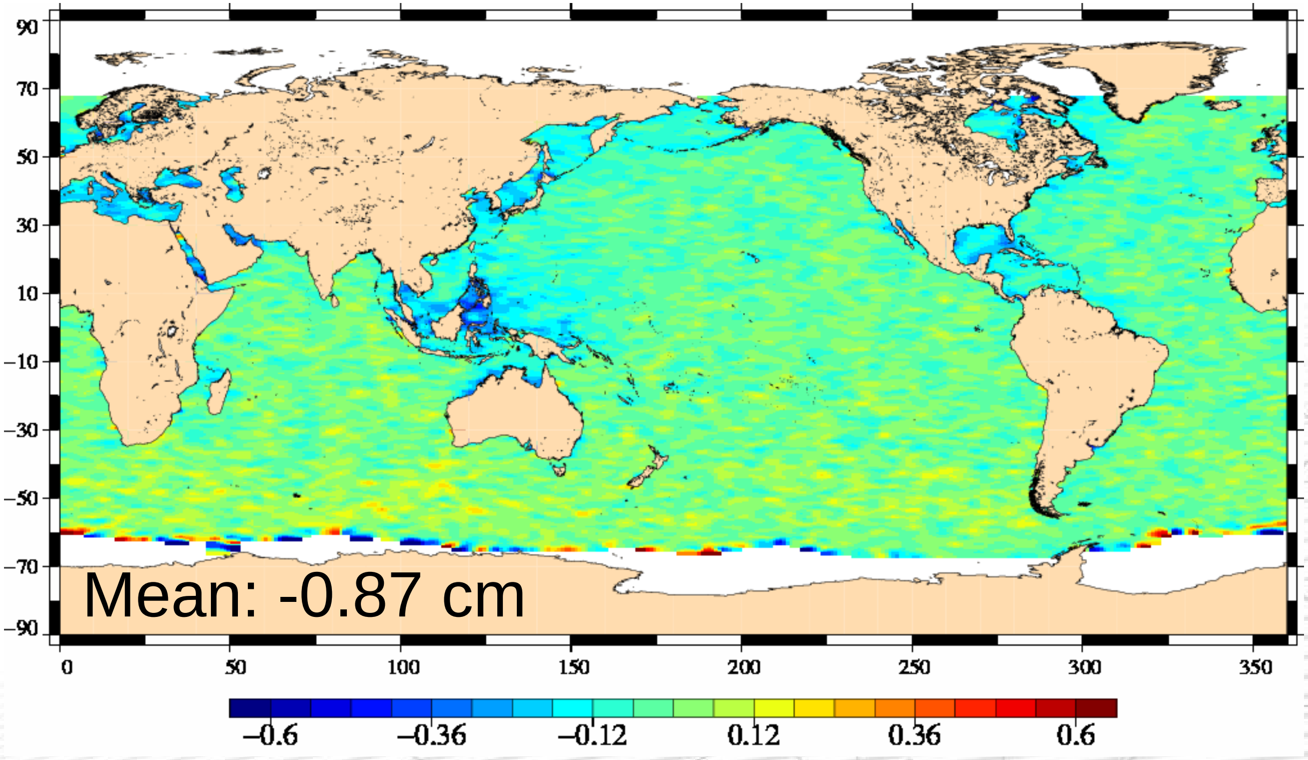
Dual-frequency Ionospheric Correction

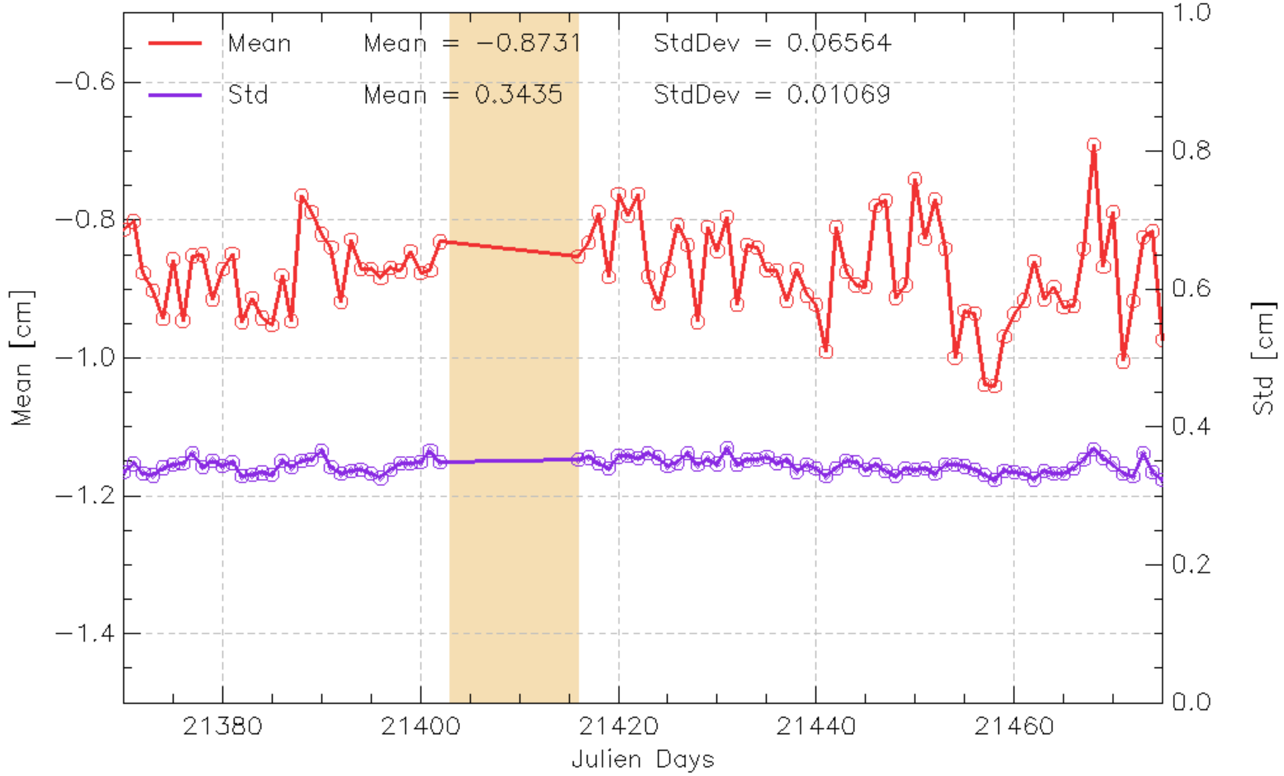
- Good agreement between JA2 and JA1
- Weak regional differences (linked to MQE)



Map of JA1 – JA2 Dual-frequency Ionosphere difference, cycles 0 to 10 [cm]

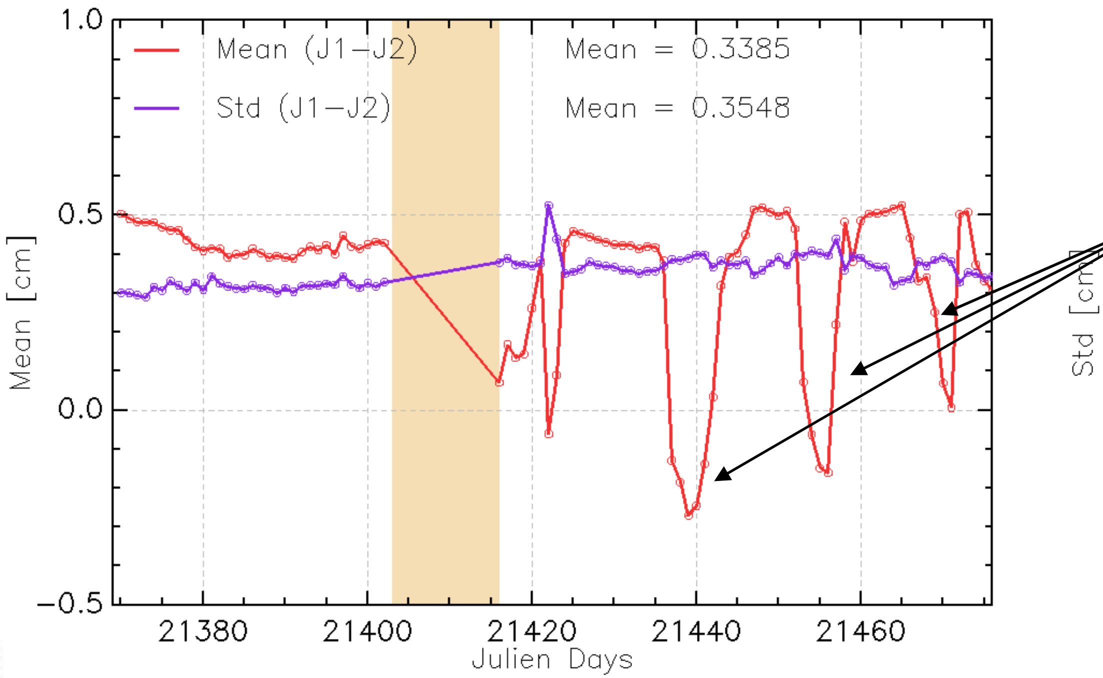
Dual-frequency Ionospheric Correction

- Good agreement between JA2 and JA1
- Daily monitoring: no drift between JA2 and JA1
- Global bias: -0.87 cm with small (2mm) day to day variations



Wet tropospheric correction

- Daily monitoring: JA1 – JA2 radiometer wet troposphere correction not stable



Signals up to 7 mm amplitude

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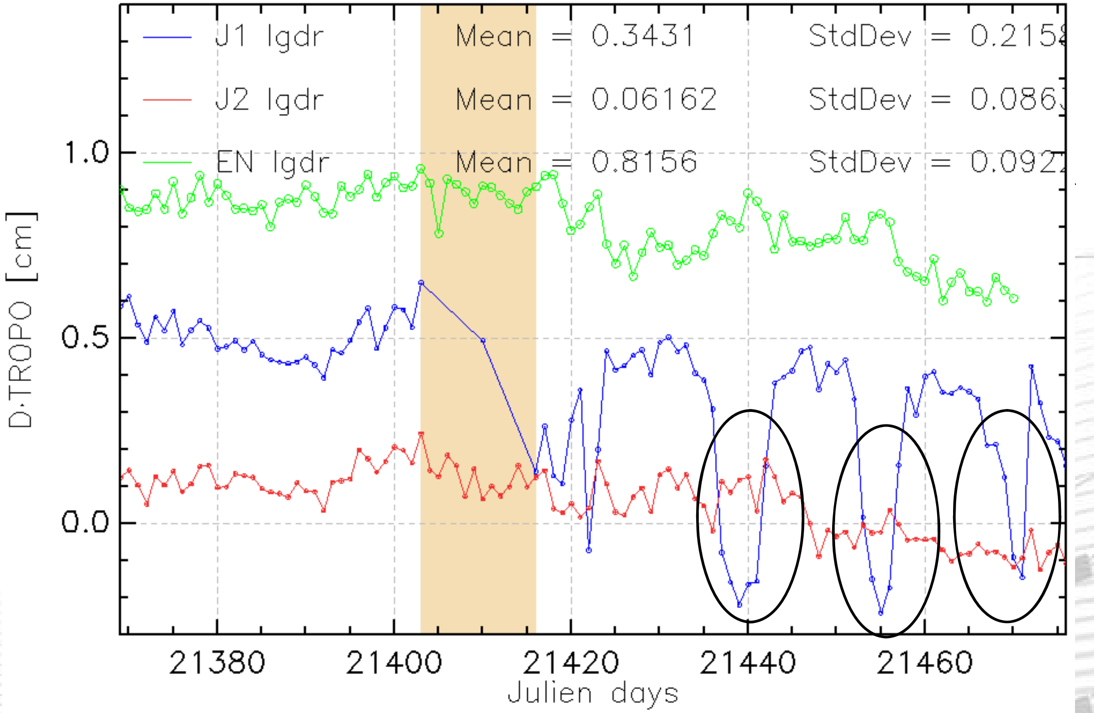
- **Wet tropospheric correction**

Conclusion

Wet tropospheric correction

- Daily monitoring: JA1 – JA2 radiometer wet troposphere correction not stable
- Comparison with ECMWF model ⇨ reveals strange behavior of JMR, since JA1 safehold



Radiometer – ECMWF model

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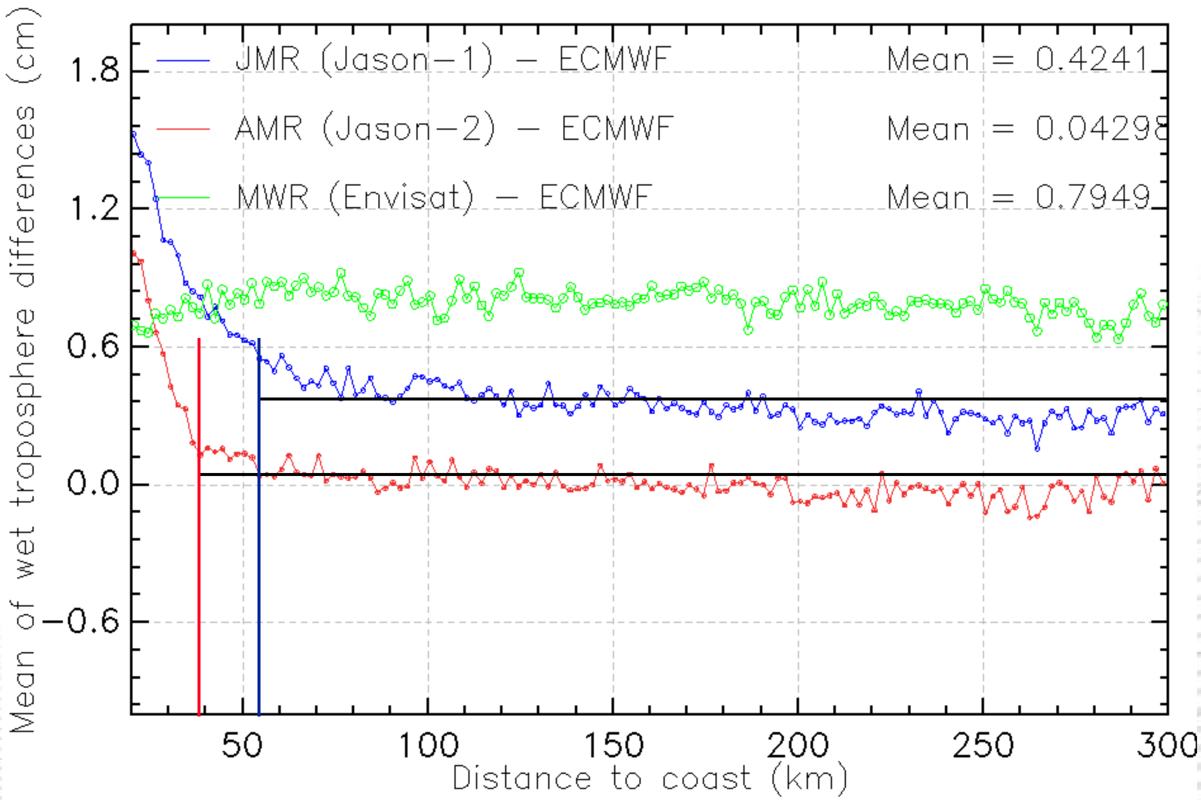
Conclusion

Wet tropospheric correction

- Radiometer – ECMWF model difference vs coast distance
  - Similar behavior of AMR and JMR far from coasts
  - AMR stays longer stable when approaching coast (different antenna properties)



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- **Conclusion**

- Use of 11 Jason-2 cycles in tandem configuration with Jason-1
- Very good consistency between altimetric parameters of Jason-2 and Jason-1
- Improvement observed thanks to new JA2 radiometer (AMR) ⇒ more stable than JMR
- Parameter analysis reveal no particular behavior linked to use of different tracking modes (Median, Diode/DEM)
- Small differences observed (principally in C-band) likely linked to MQE editing criteria ⇒
  - Do not impact SSH computation (talk M. Ablain)