SARAL / AltiKa

GDR-F Global Quality Assessment (over 2015)

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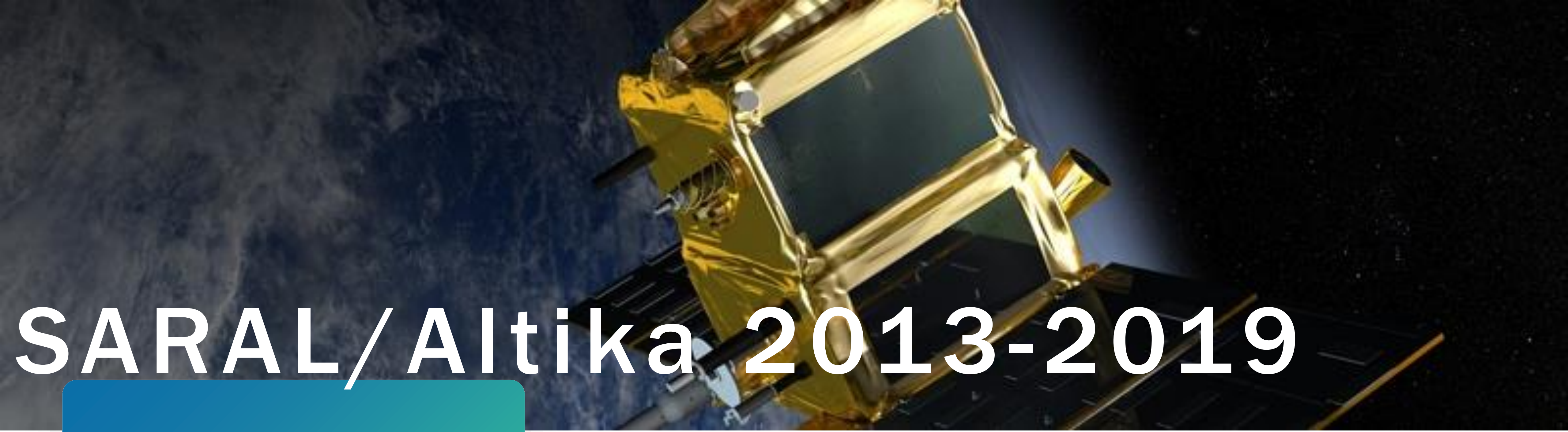
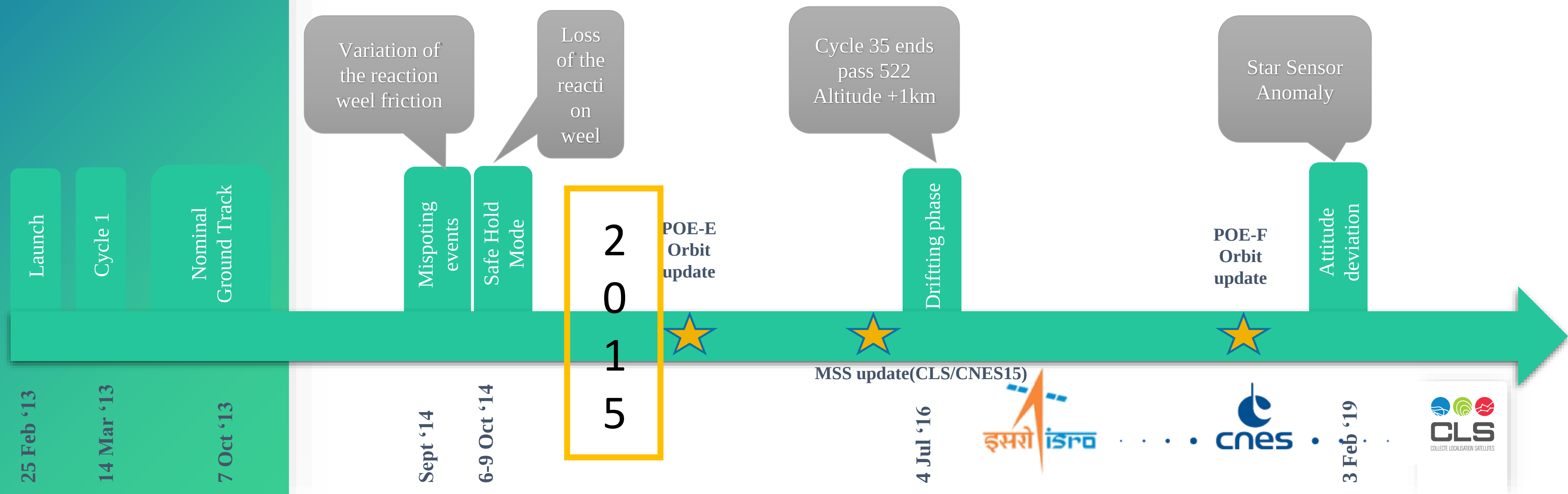
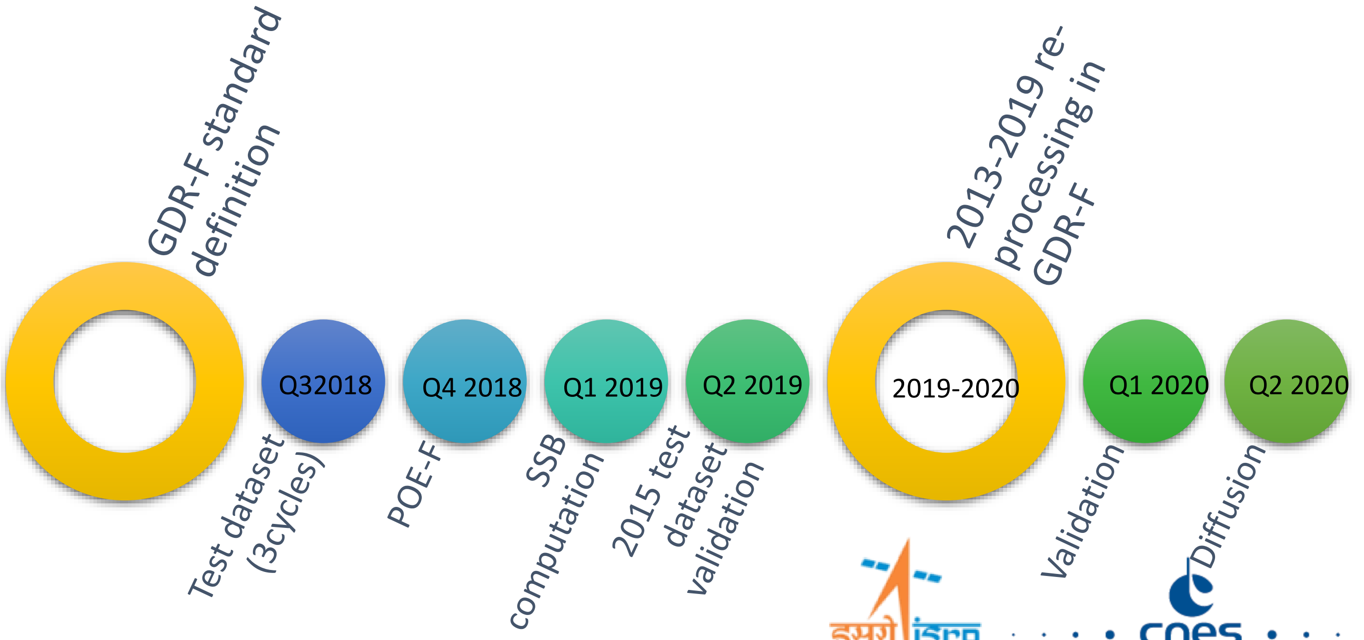
[2] CNES

SARAL/Altika 2013-2019





GDR-F planning



Major evolutions

GDR-T Vs GDR-F

Major evolutions

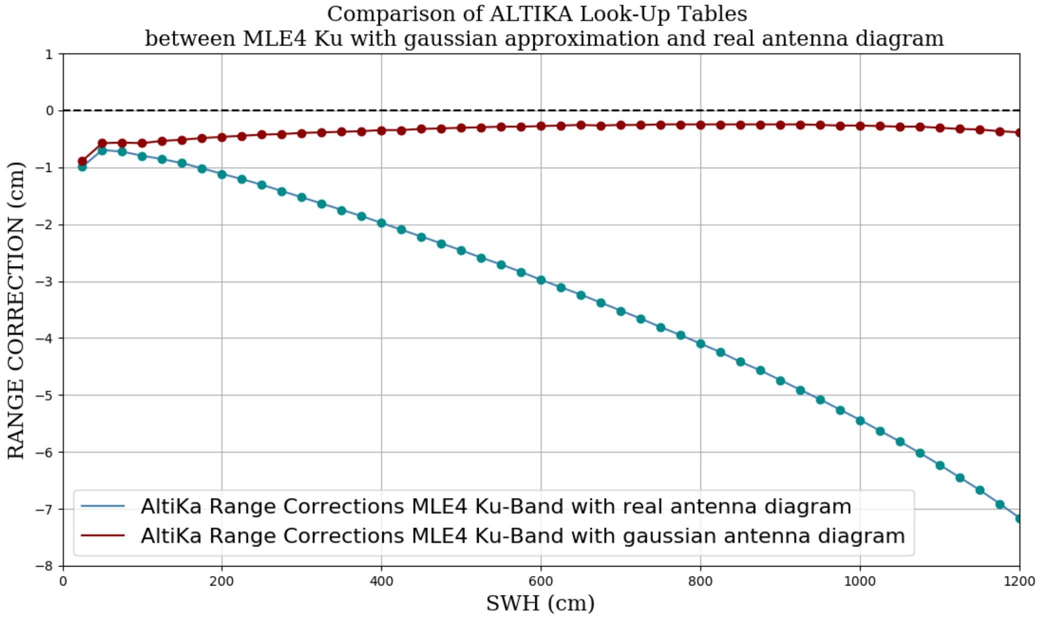
What will not change is the excellent coverage and skills of the instrument!

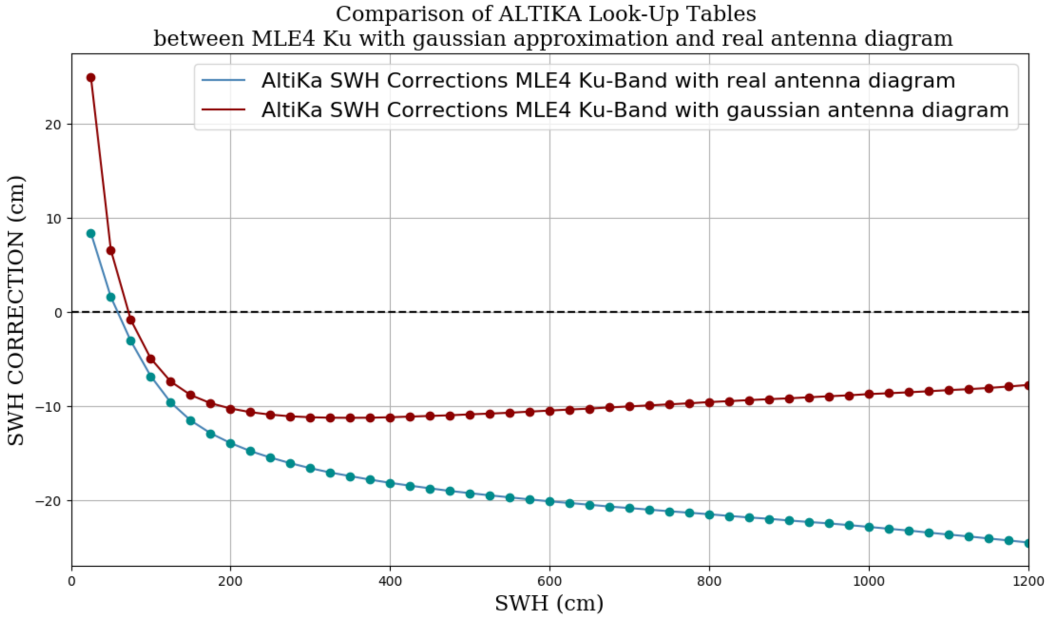
New fields	Updated fields
3-Parameter SSB (SWH, wind and swell)	Retracking accounting for the **actual altimeter antenna aperture**
Wet & dry tropospheric correction based on 3D ECMWF fields	Updated altimeter **calibration schemes** (CAL2 normalization, CAL1 not corrected by CAL2, updated gains values)
Atmospheric correction derived from ECMWF fields	New Radiometer processing algorithms
New geophysical correction : E. Zaron internal tide model	Updated geophysical correction : FES2014 & GOT4.10 ocean tide models S. Desai pole tide with new IERS linear mean pole 2018 Mean Dynamic Topography model EGM 2008 geoid model
Platform mispointing angles Etc …	Netcdf v4 product format Etc …

First assessment of GDR-F products

Over a test dataset covering 2015

Altimeter derived fields



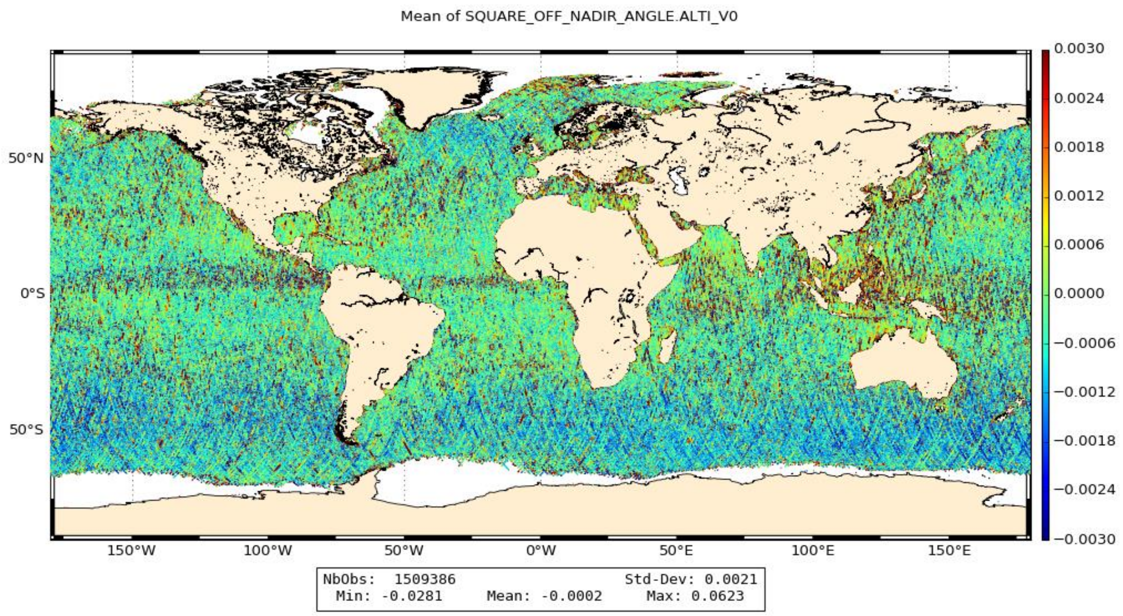


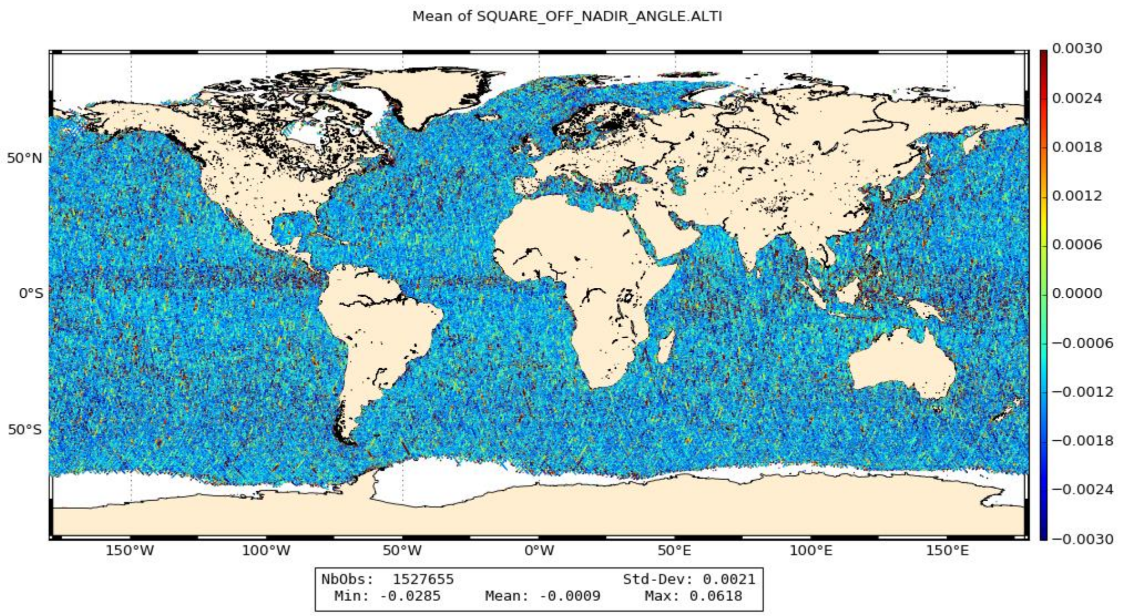
Altimeter derived fields

New look-up tables

Real antenna diagram instead of gaussian model➔ More realistic estimate of Range and SWH

Will no more need to be corrected by Sea State Bias correction

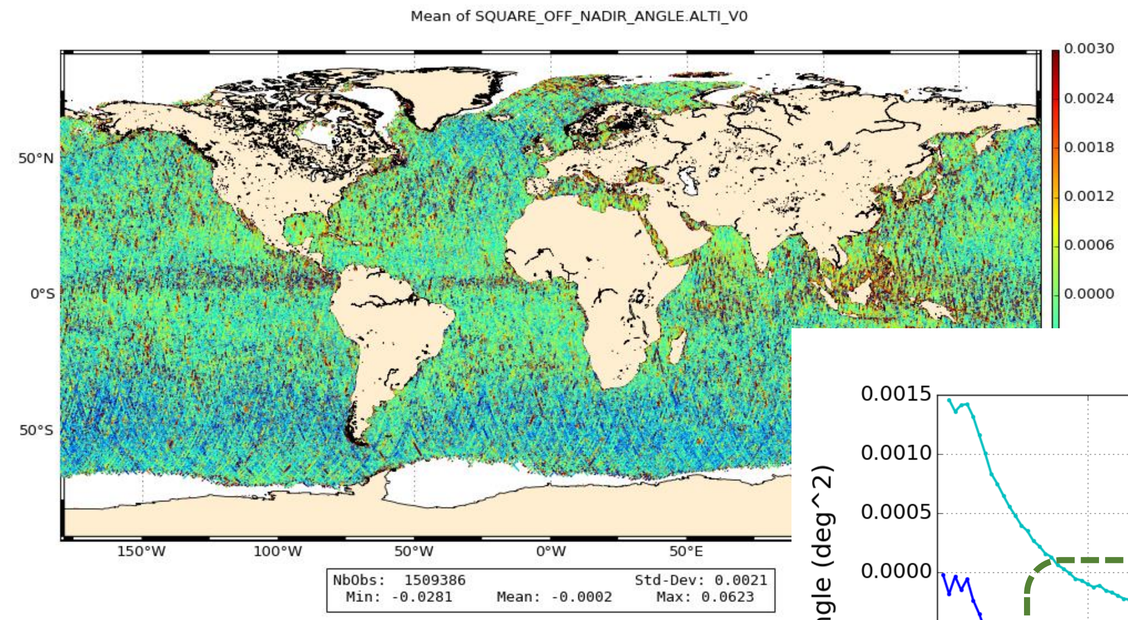


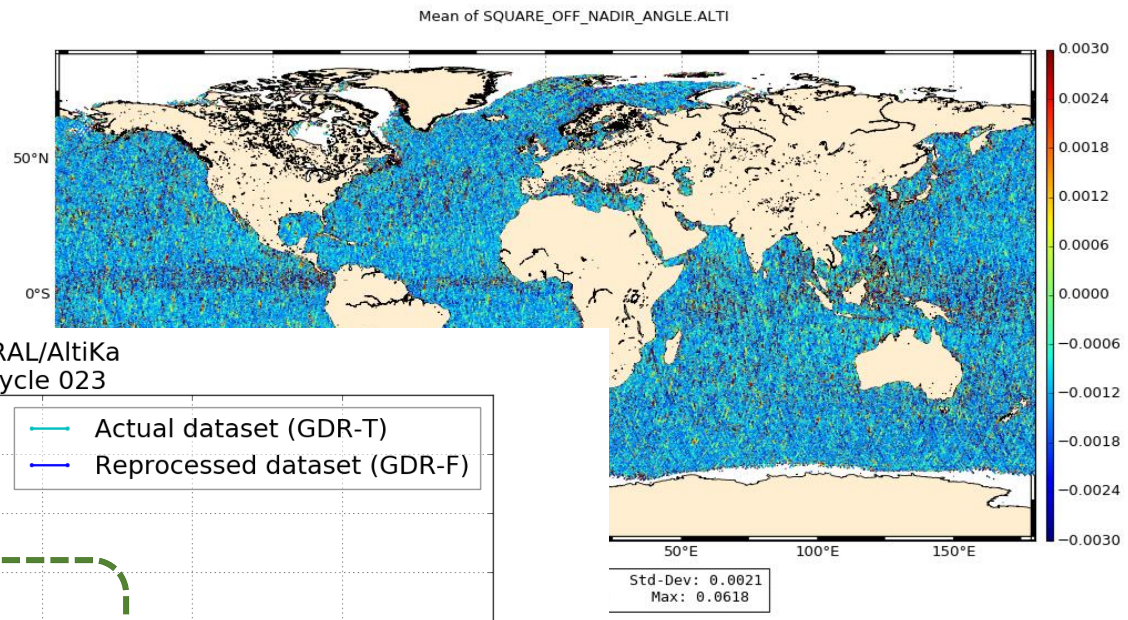


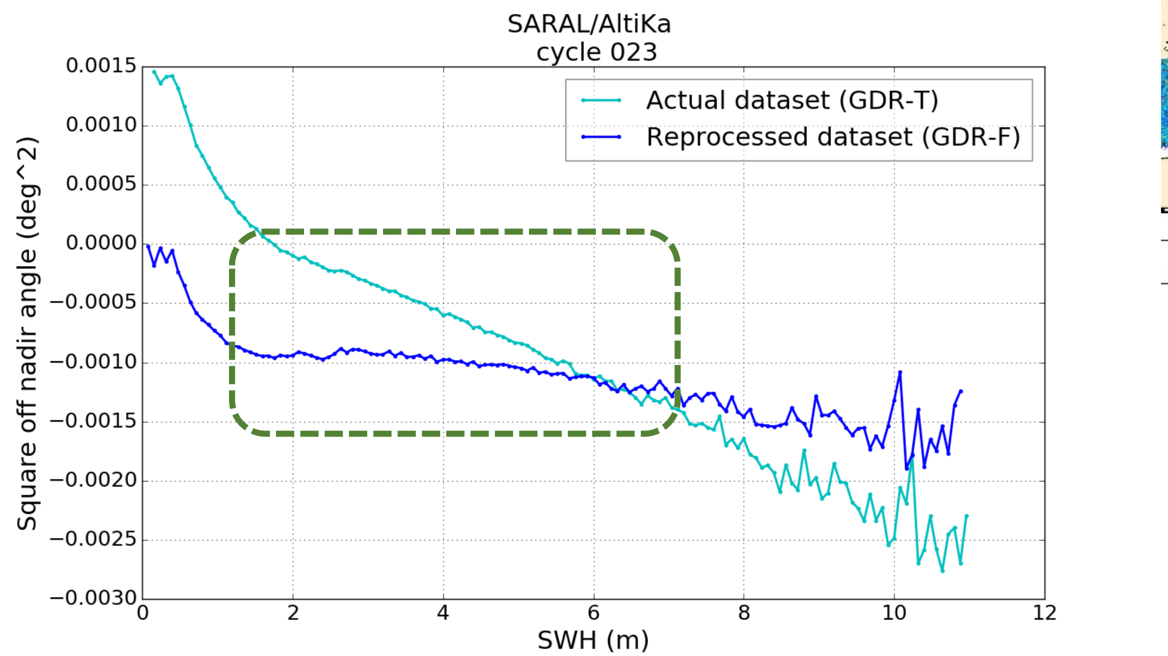
Altimeter derived fields

New look-up tables applied to off nadir angle estimation from waveforms

Look up tables **are now applied to off nadir angle** estimation ➔ No more wave dependency observed







Altimeter derived fields

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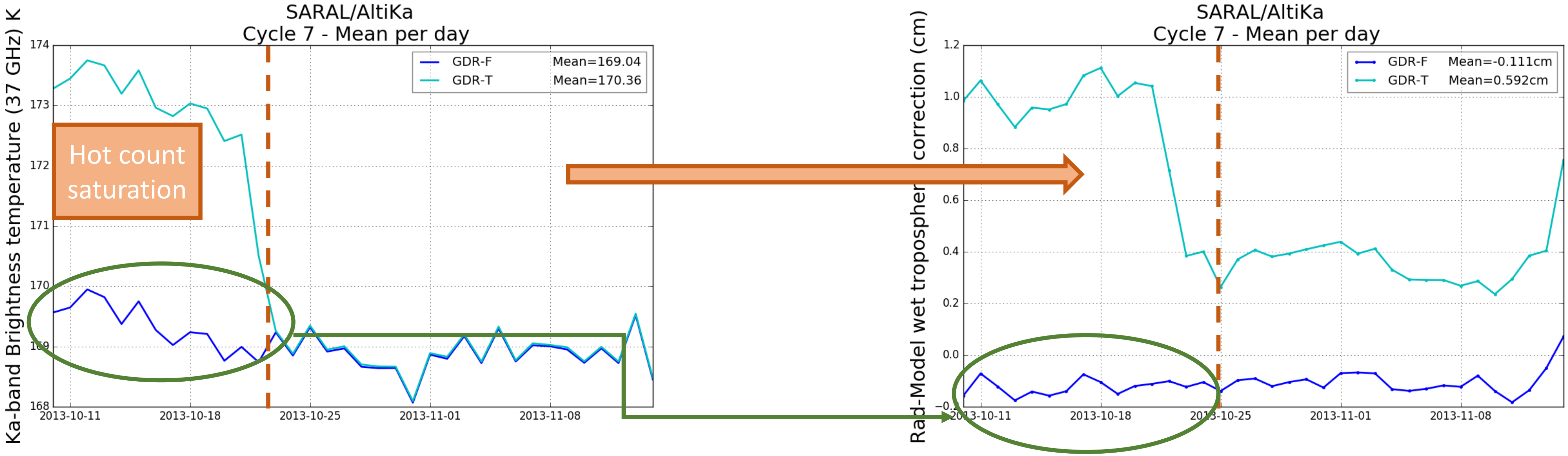
Radiometer derived fields



MWR derived fields

Hot Count Saturation patch on MWR brightness temperatures

The impact of hot count saturation on microwave radiometer parameters has been patched.

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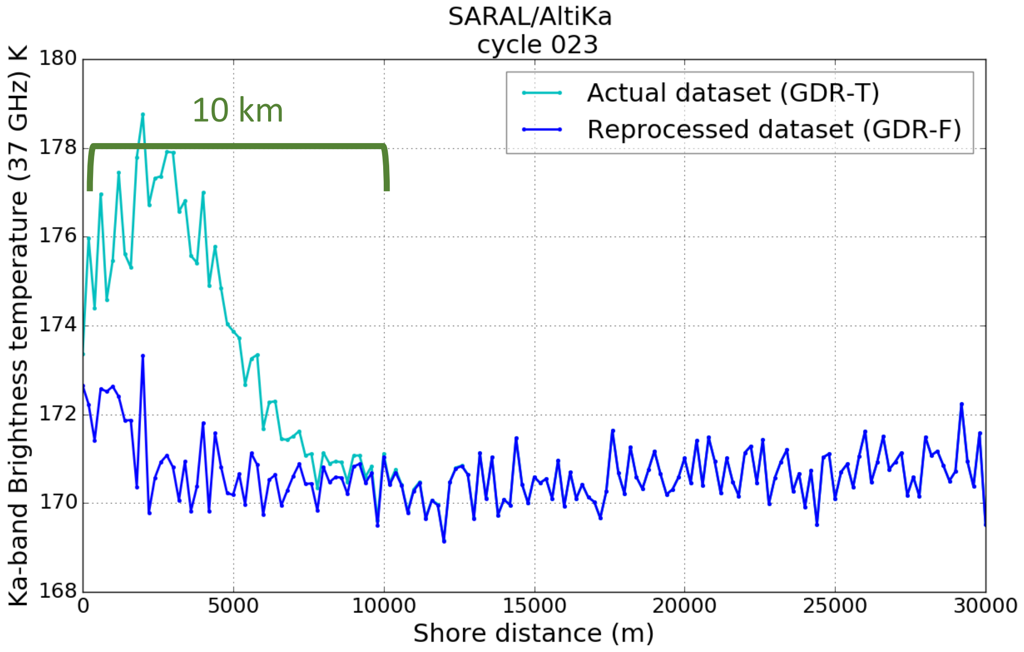
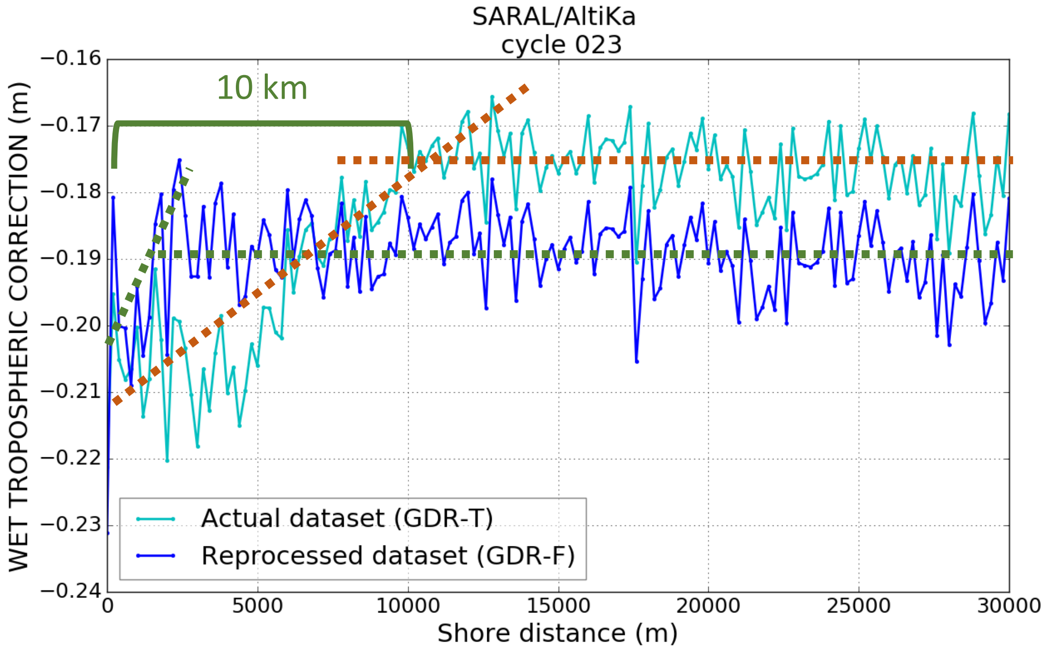


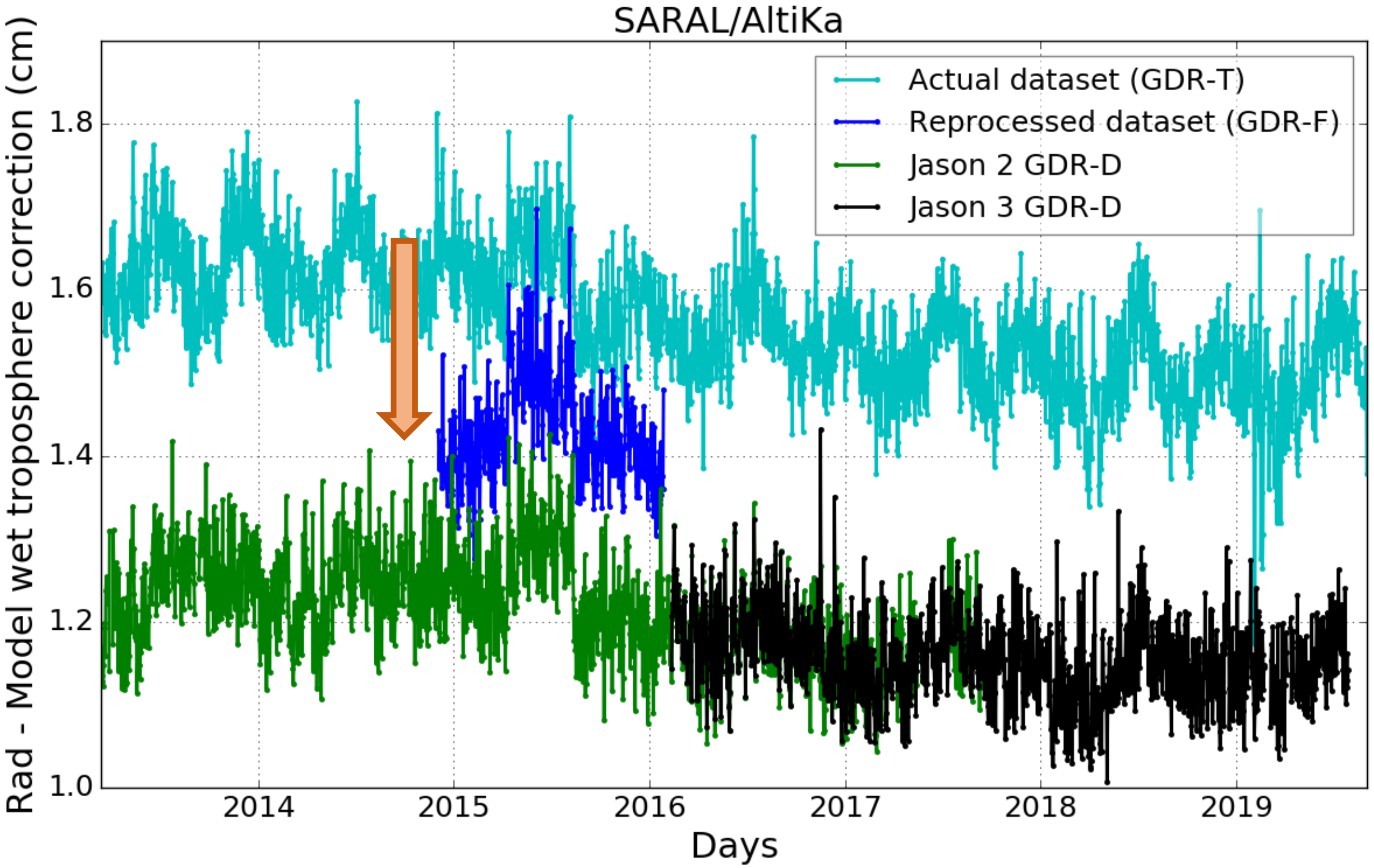


MWR derived fields

Costal interpolation of MWR brightness temperatures (Picard, Frery et al. 2016)

Better approach of the shore with smoothed brightness temperature leading to a more coherent wet troposphere correction

Standard deviation of the difference reduced



MWR derived fields

Comparison to ECMWF model with respect to reference missions

A closer evolution of radiometer wet troposphere correction compared to ECMWF model, with an error (standard deviation) of the same order of magnitude as reference missions Jason-2 & Jason-3

Impact on mesoscale error

Crossover analysis

Principle of crossover analysis

To compare SSH information on Ascending/Descending tracks, is a good absolute quality criteria.

Estimate of the mesoscale errors.

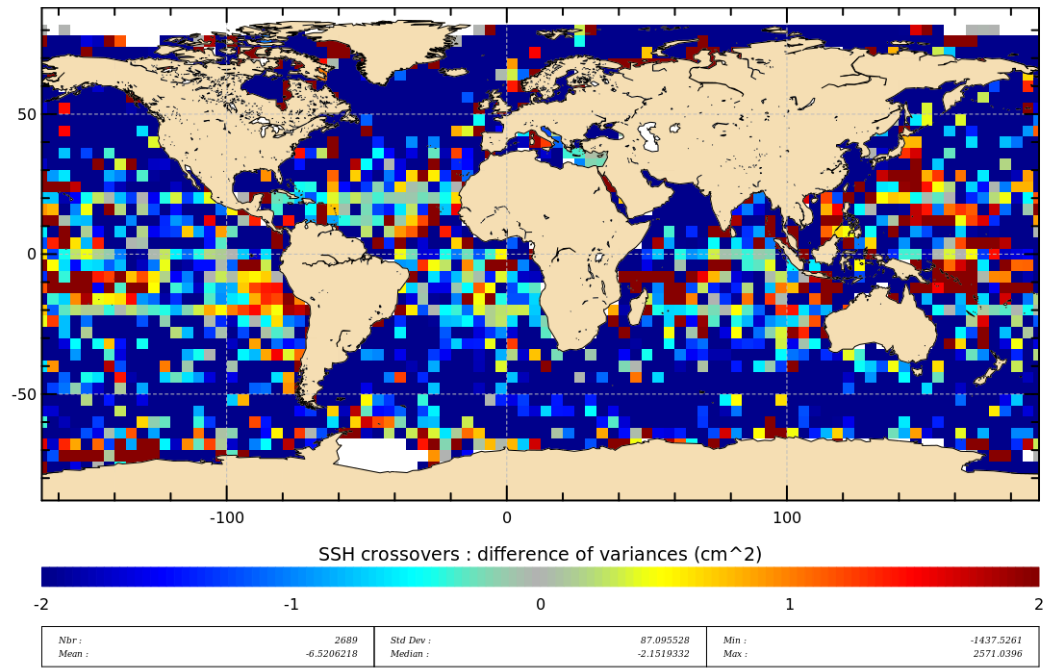
Computation of crossover points below 10 days

Statistics (Average and variance) of SSH difference in 2x2° boxes

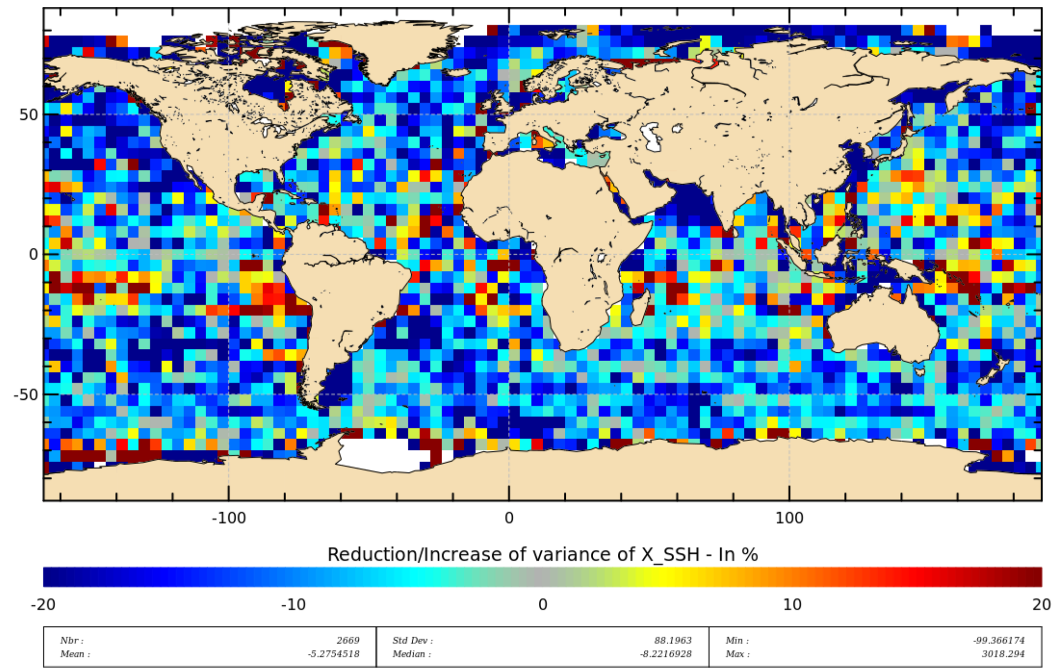
Difference of average and of variance at crossovers with standard GDR-T vs GDR-F

The smallest the best!

VAR (SSH crossovers GDR-F) – VAR (SSH crossovers GDR-T)



Percentage of variance reduction



Crossovers analysis Variance reduction

Mono-mission crossover analysis

A globally improved performance at crossovers ➔ Variance reduction of -6.5 cm^2 in average

5% error reduction globally, up to 20% locally

Blue = Improvement / Red = Degradation
of GDR-F vs GDR-T

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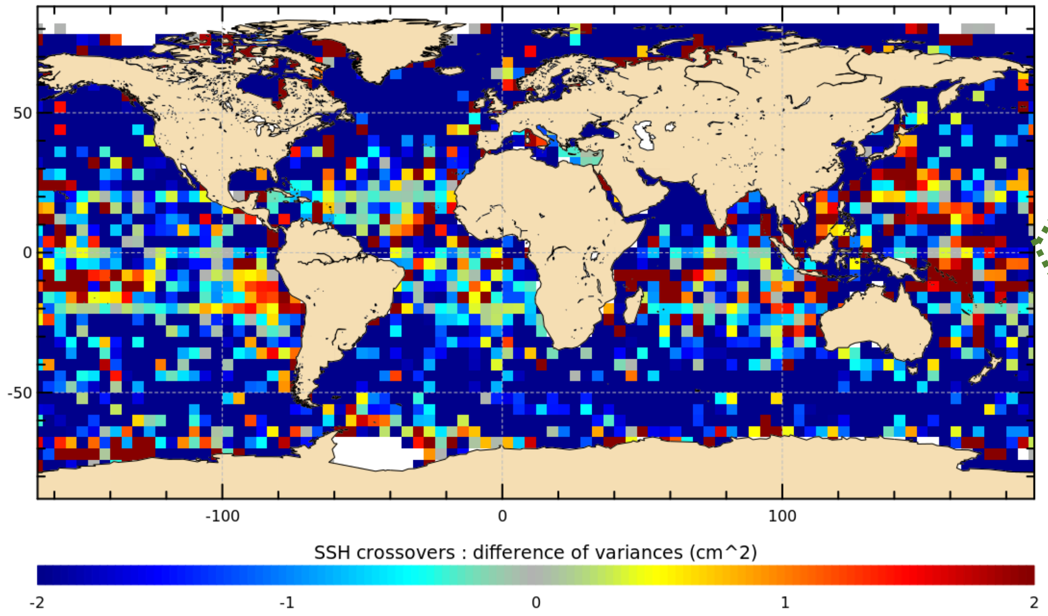
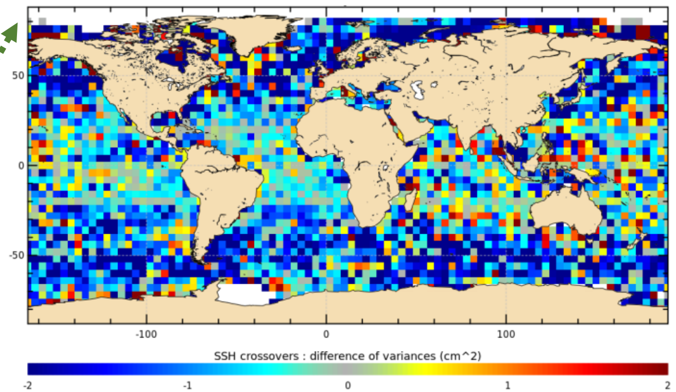
VAR (SSH crossovers GDR-F) – VAR (SSH crossovers GDR-T)

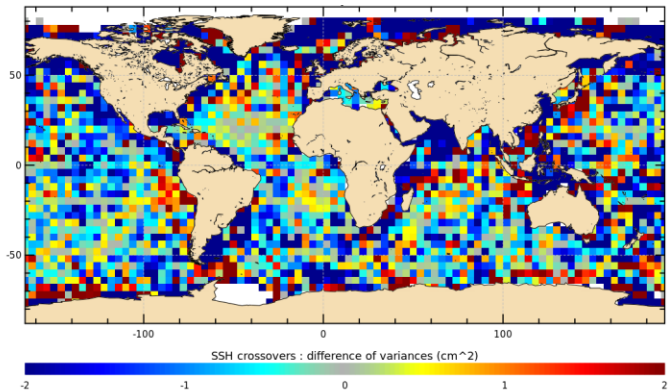


Nbr :	2689	Std Dev :	87.095528	Min :	-1437.5261
Mean :	-6.5206218	Median :	-2.1519332	Max :	2571.0396

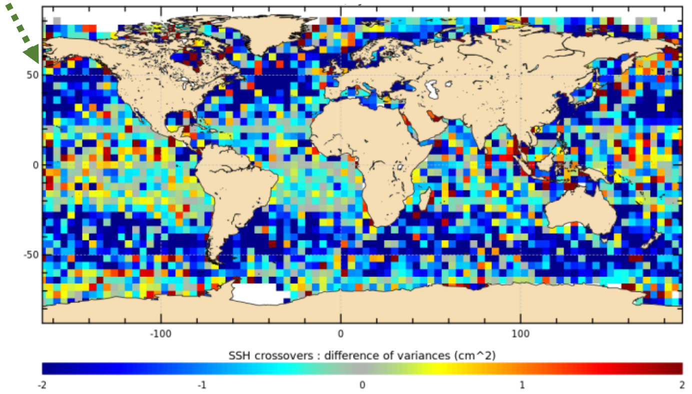
Range & SSB (TRAN19) contribtion



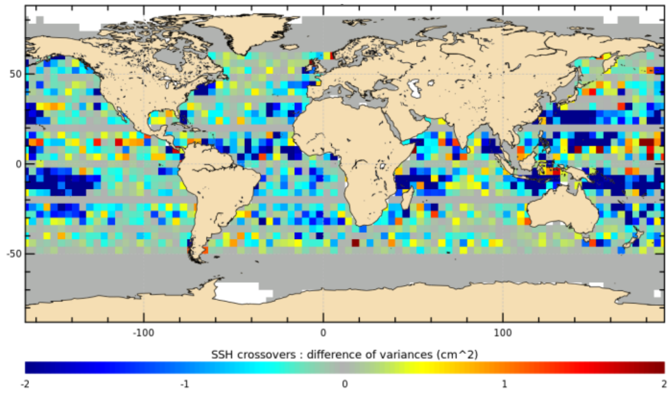
Ocean tide (FESb) contribution



Wet troposphere (P4) contribution



Internal tide (E.Zaron) contribution



Crossovers analysis
Variance reduction

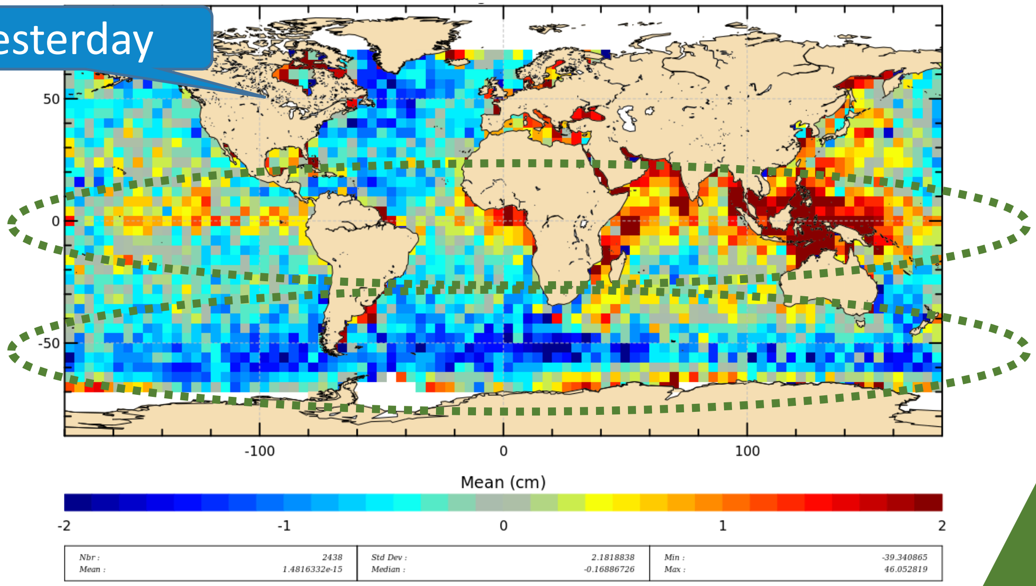
Blue = Improvement / Red = Degradation
of GDR-F vs GDR-T

Mono-mission crossovers analysis

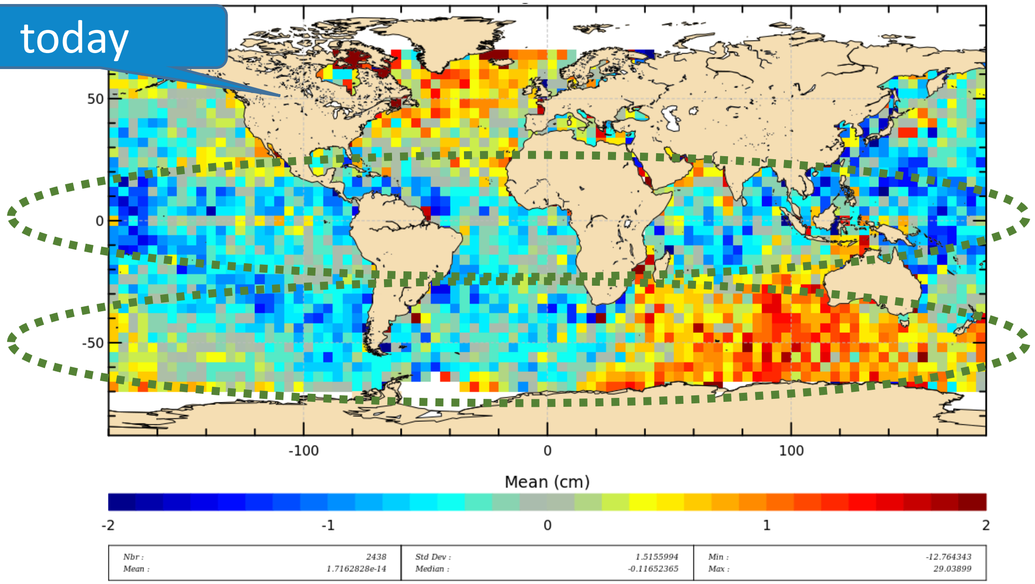
Major contributors to crossovers error reduction

- Sea state bias
- FES14b ocean tide model
- New neuronal network for wet troposphere correction
- E.Zaron internal tide model included in SSH computation

J2-AL SSH Xovers (SARAL/AltiKa with GDR-T standards)
Centered – original mean 4,86 cm



J2-AL SSH Xovers (SARAL/AltiKa with GDR-F standards)
Centered – original mean 7,4 cm



Regional biases inversion

Crossovers analysis Versus Jason-2

SARAL/Jason-2 crossovers analysis

Global bias slightly changed between missions, still under analysis

But geographically more homogeneous → better

More homogeneous = Improvement
of GDR-F vs GDR-T

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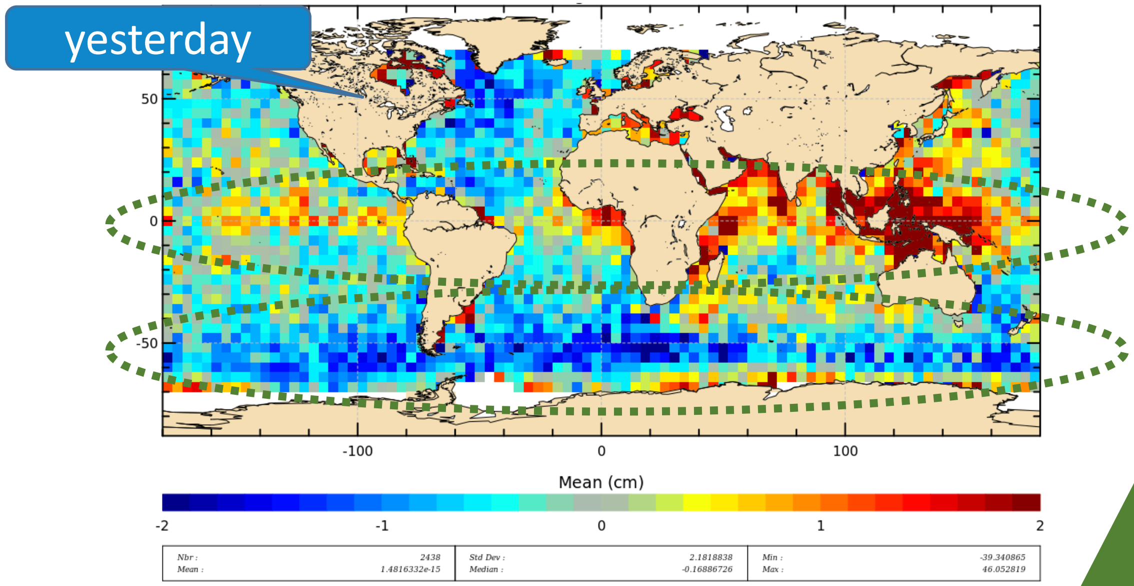

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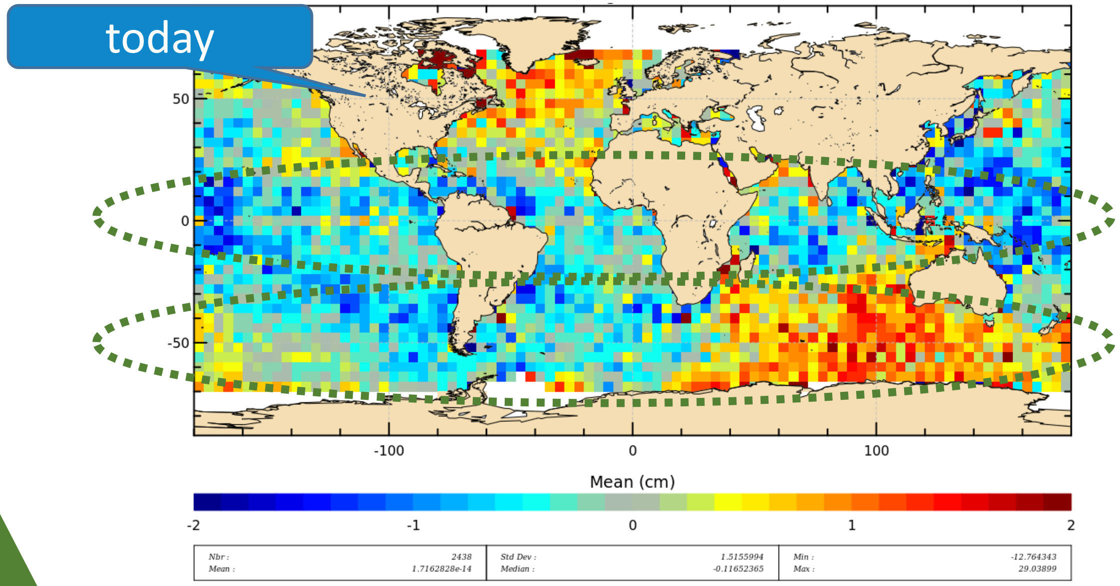
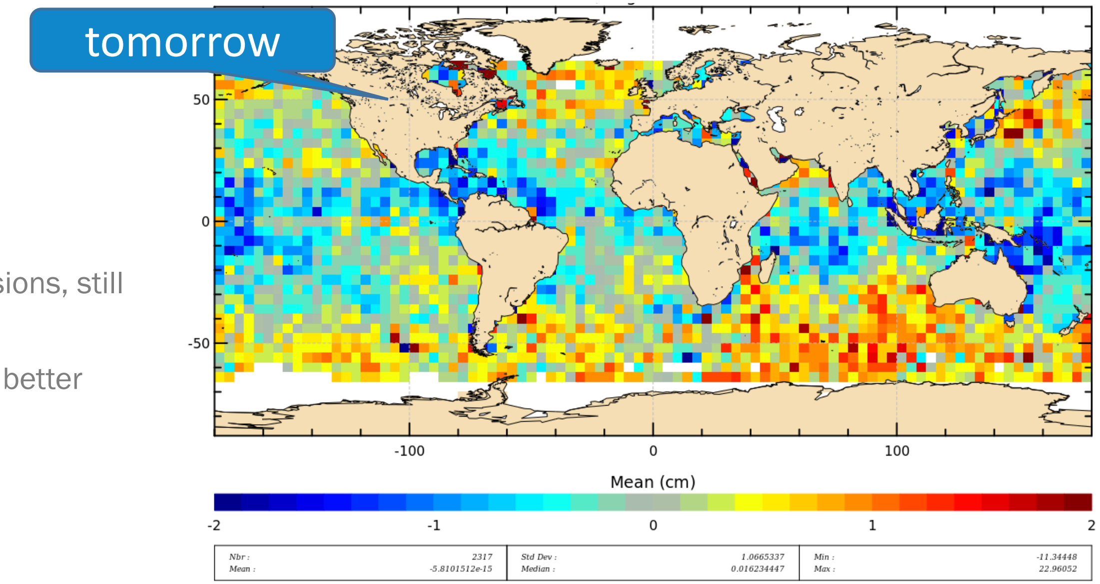


Regional biases inversion

J2-AL SSH Xovers (J2 && AL with GDR-F standards)
Centered – original mean 9,5 cm



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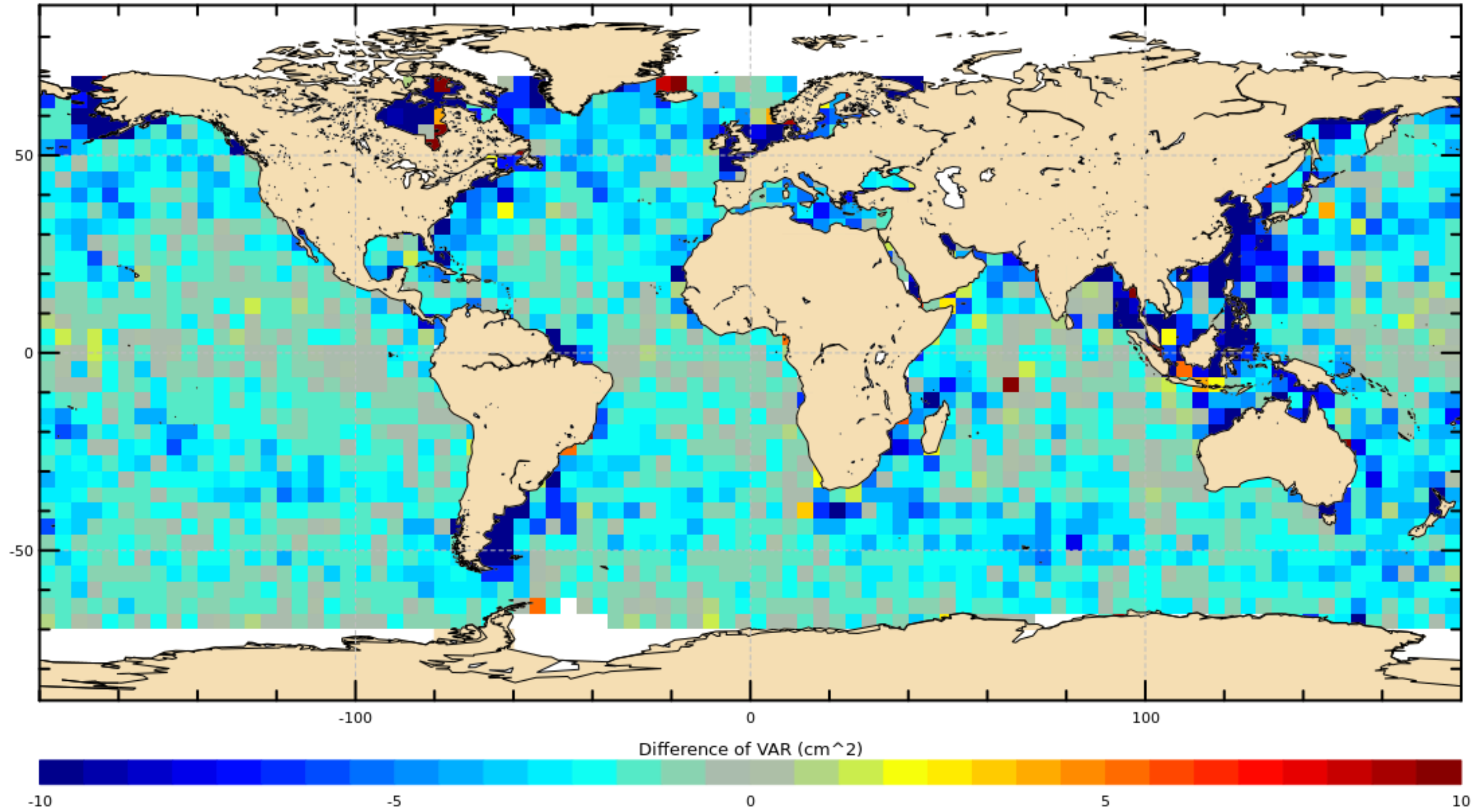
More homogeneous = Improvement
of GDR-F vs GDR-T

VAR (SSH crossovers J2/ AL _GDR-F) – VAR (SSH crossovers J2/AL _GDR-T)



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Conclusion

Major impacts over ocean

Expected impacts

Upgraded/New fields	Expected impacts
Orbit POE-F standard MSS_CNES_CLS15 MWR brightness temperatures (including hot count saturation patch)	Homogeneous time series
New Radiometer processing algorithm (near shore interpolation) Neuronal network for MWR derived fields (Patch4) E. Zaron internal tide model S. Desai pole tide with new IERS linear mean pole 3-parameter SSB FES14 ocean tide model	Mesoscale variability improved Near shore stability increased Short scales error reduction (crossovers)
Look Up Tables accounting for the actual altimeter antenna diagram	Unbiased estimation of all altimeter retracked parameters(with respect to SWH)
Updated altimeter calibration schemes (CAL2 normalization, CAL1 not corrected by CAL2, updated gains values)	Minor impacts on Range SWH and Sigma0

Thank you all for your attention

Data soon available : Enjoy!

Year GDR-F 2015 will be made available to users under a demo-release pack, within few weeks.

On the Aviso Web site !

The full reprocessing dataset is expected by the end of spring 2020 (May/June).

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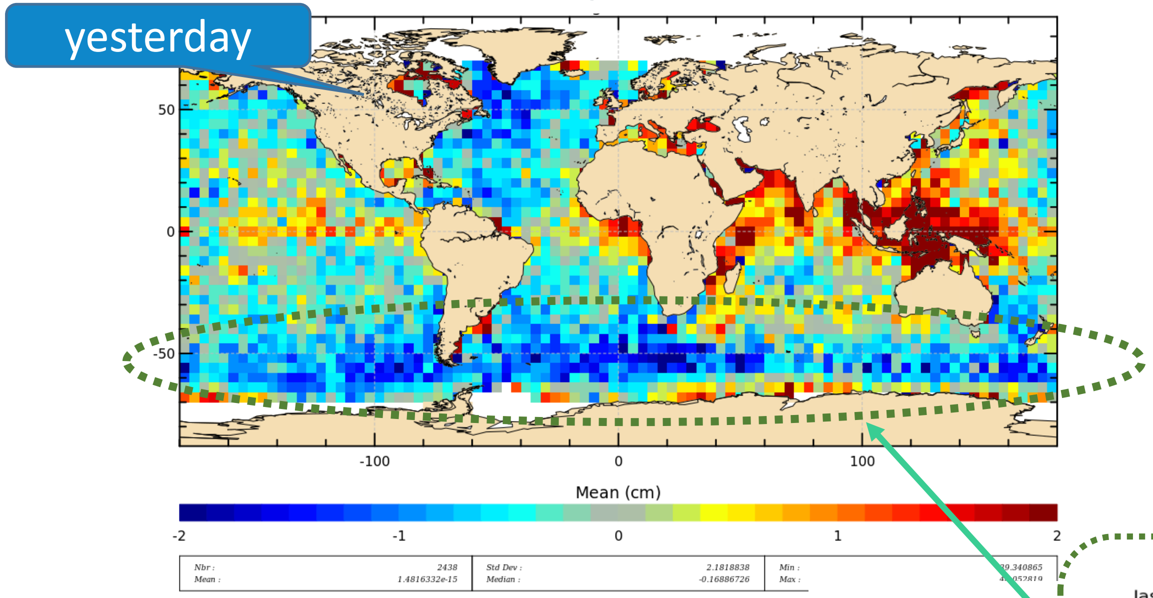
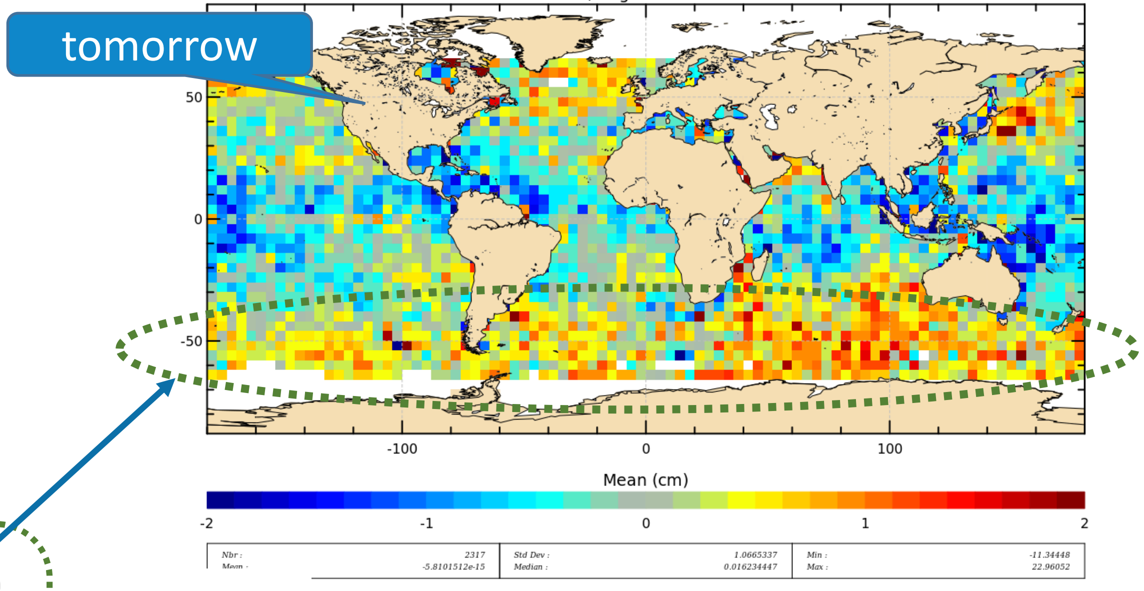
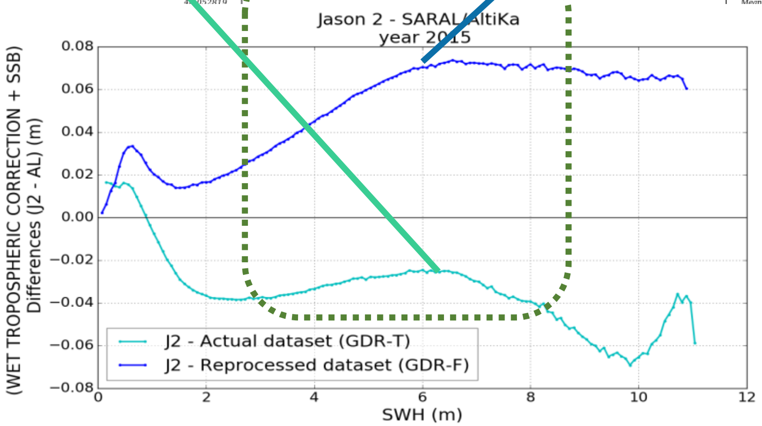
Back up slides

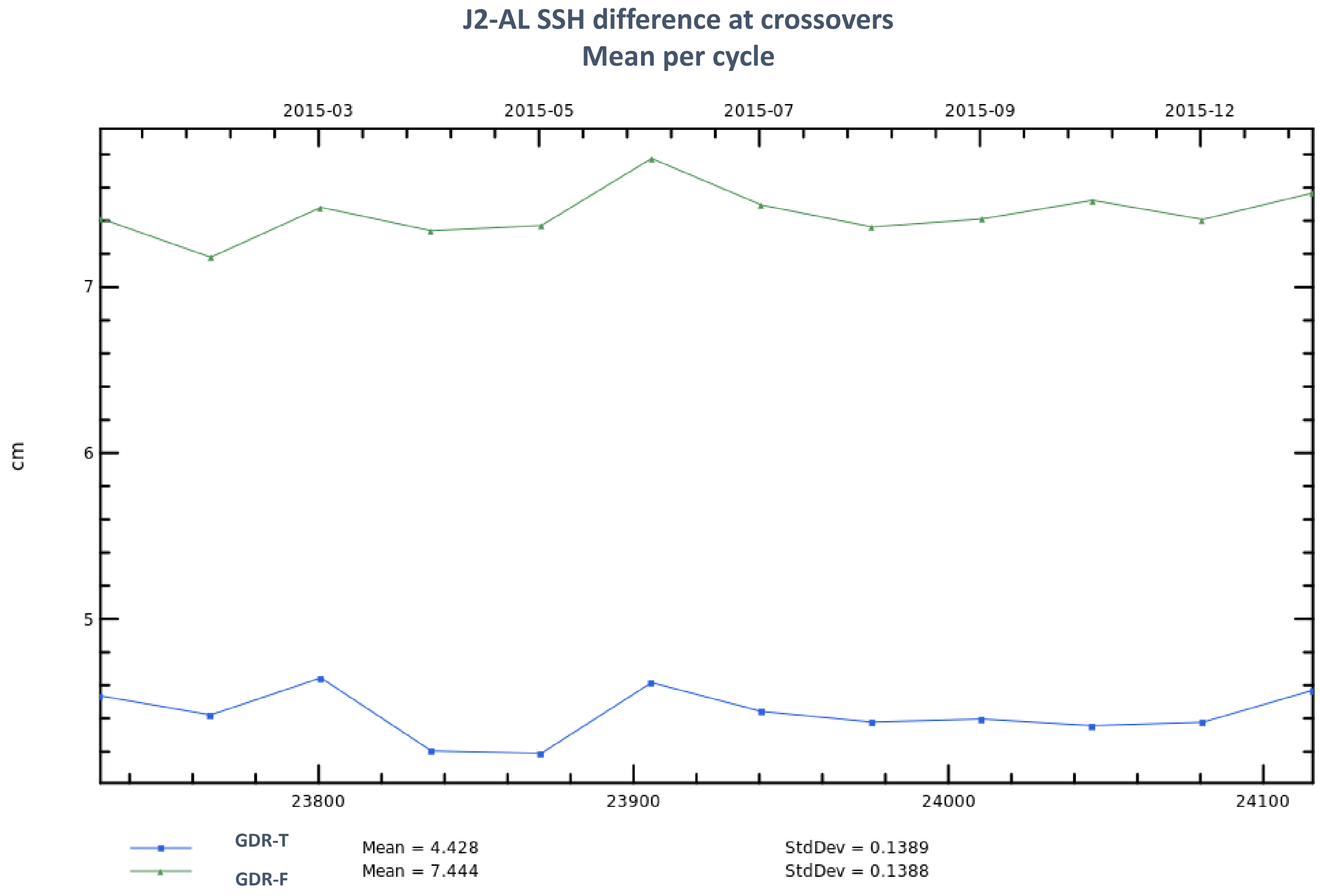
J2-AL SSH Xovers (SARAL/AltiKa with GDR-T standards)
Centered – original mean 4,86 cm



Mean of differences at crossovers : SSH (J2 GDR_F like) - GDR_F (AL)
Year 2015 - centered , original mean: 9.53447983866898







Crossovers analysis

SARAL/Jason-2 crossovers analysis

Stable evolution of SSH differences at crossovers Jason-2/SARAL

Jason-2 - SARAL (GDR-T) at Xovers ➔ 4.4 cm

Jason-2 – SARAL (GDR-F) at Xovers ➔ 7.5 cm