

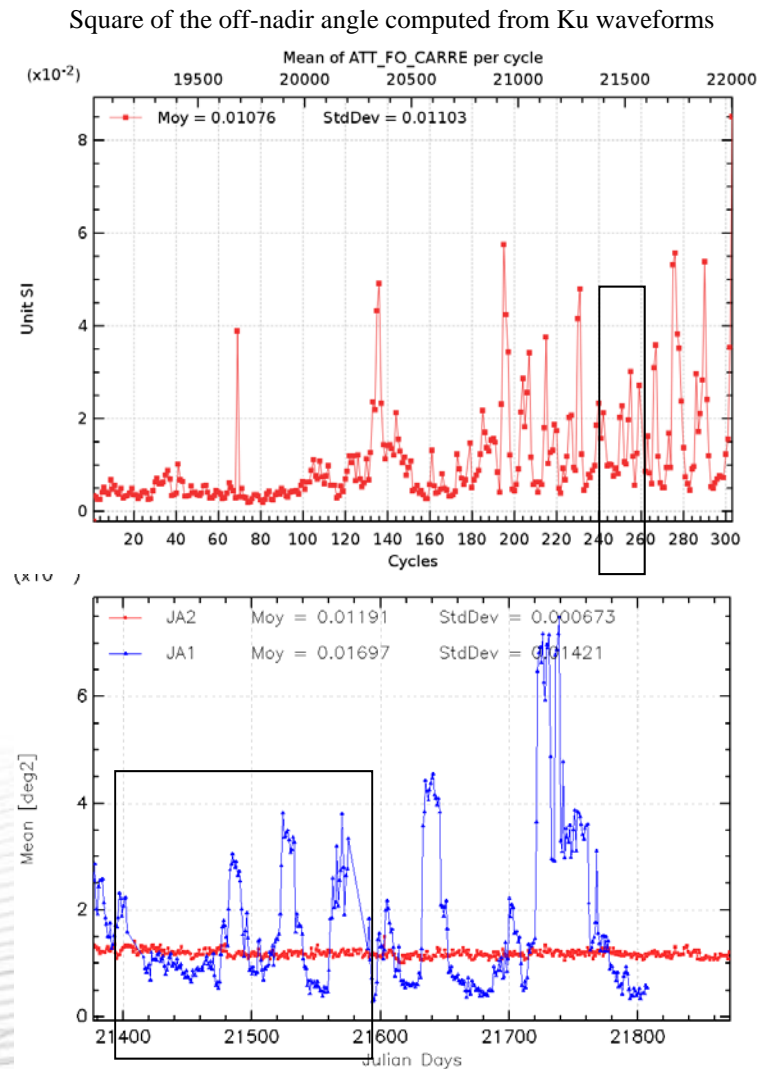


Jason-1, Jason-2 and TOPEX Sea State Bias Overview and Updates

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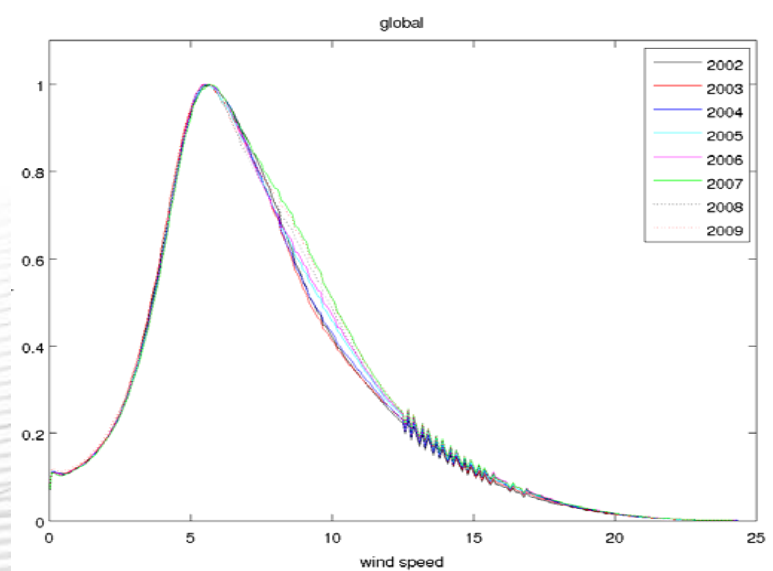
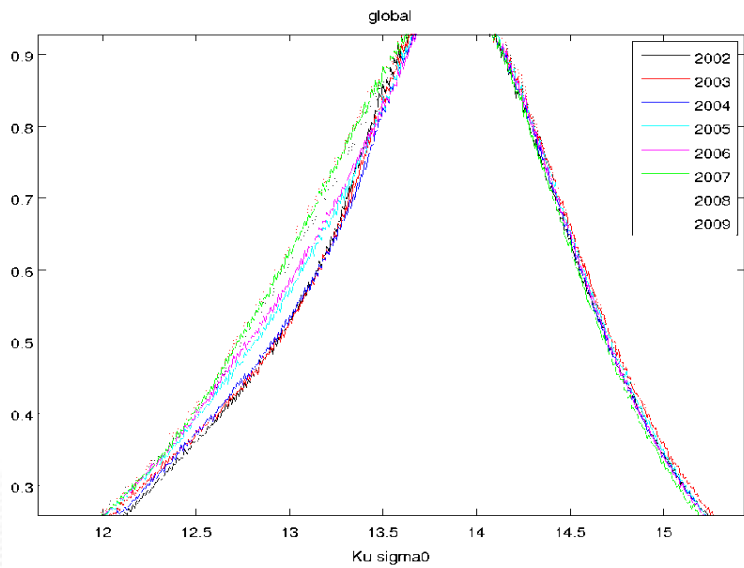
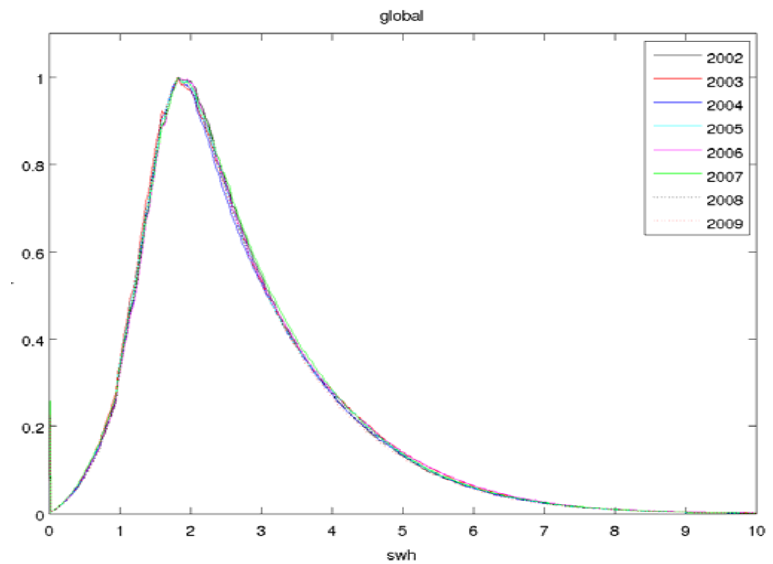
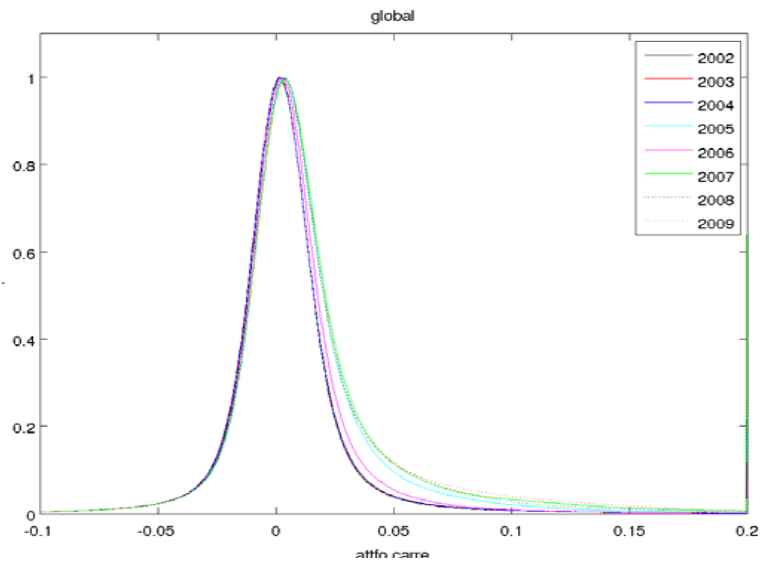
Approaches for Wind Speed Calibration

- **Two possibilities:**
 - Use of the data from the tandem 6-month period (J1: 240-259 / J2: 1-20)
 - Use of Jason-1 global histograms from yearly datasets since we have the same spatial coverage of the ocean by Jason-2
- **Tandem period:**
 - Cross-comparison easy (same ground track and 55 seconds apart before change of orbit for Jason-1)
 - Drawback: lot of Jason-1 platform mispointing events during this period
 - Risk: introduction of Jason-1 mispointing effects on σ_0 in Jason-2 σ_0 signatures by cross-calibration
- **Use of global 1-year histograms**
 - Requirements: Analysis of the effects of platform mispointing problem on Jason-1 data (σ_0 , SWH, wind speed)
 - Stability of the histograms from year to year ?



From Calval Reports

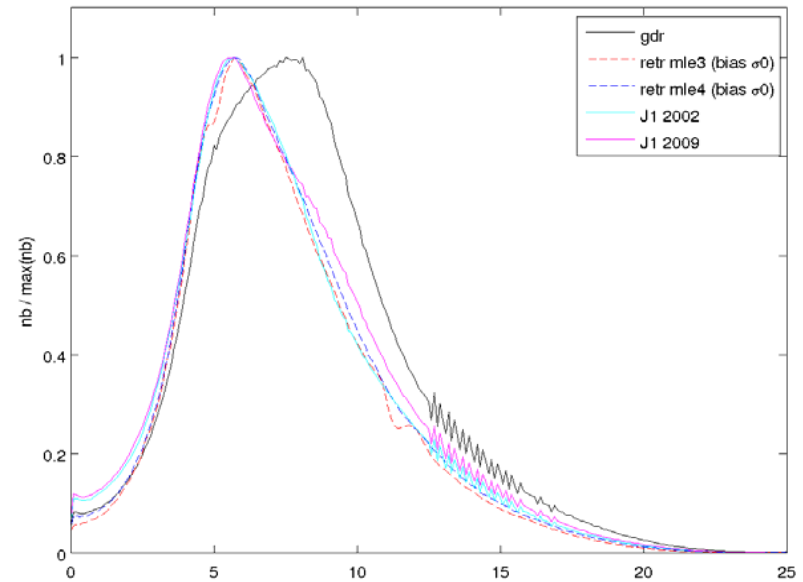
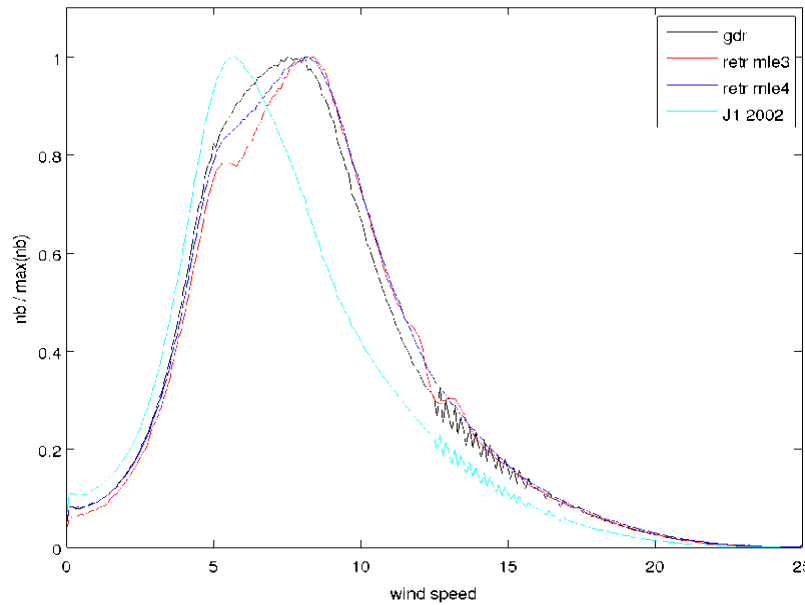
Impact of mispointing events on Jason-1 data



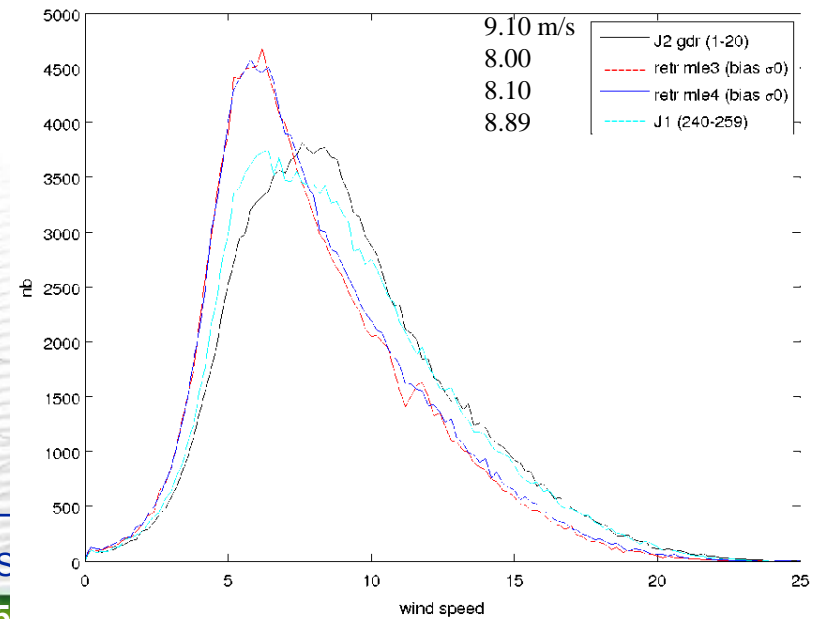
Jason-2 reprocessed data at CLS

- Reprocessing of cycles 1 to 43 to generate 1-Hz dataset (homogeneous with GDR_C product, see N. Picot's presentation):
 - Use of the new Jason-2 altimeter characterization file with :
 - Antenna aperture angle (at 3 dB) for Ku-band of 1.29 deg (unchanged for the C-band at 3.38 deg)
 - Modification of the AGC gain values (see J.-D. Desjonqueres technical note, 2010). Introduction of the 20Hz AGC correction
 - Use in parallel of both the ocean-2 (MLE3) and ocean-3 (MLE4) retracking algorithms for the Ku-band
 - Modification of the MQE editing criterion to compress the data from 20-Hz to 1-Hz
 - Update of the Look Up Tables (MLE3 and MLE4)
- Comparison of MLE3 and MLE4 wind speed estimates
- Assessment of the impact of the wind speed change on the Jason-2 SSB table

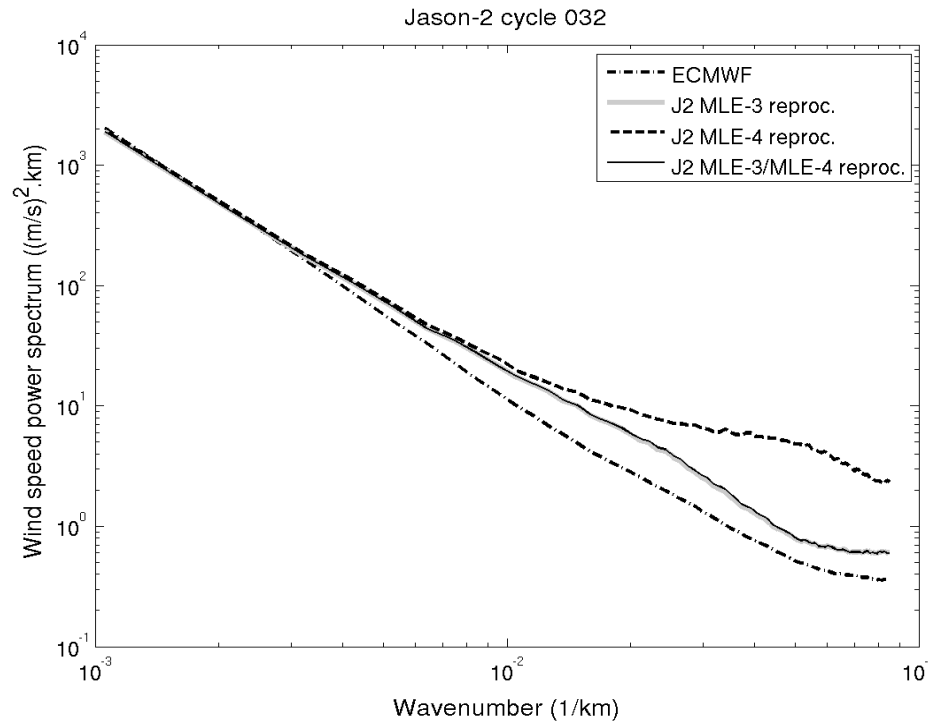
J1 (2002 & 2009) / J2 (1year: cycles 7– 43) wind speed data



Biases on J2 wrt J1	MLE3	MLE4
σ_0 (dB)	+0.32	+0.28



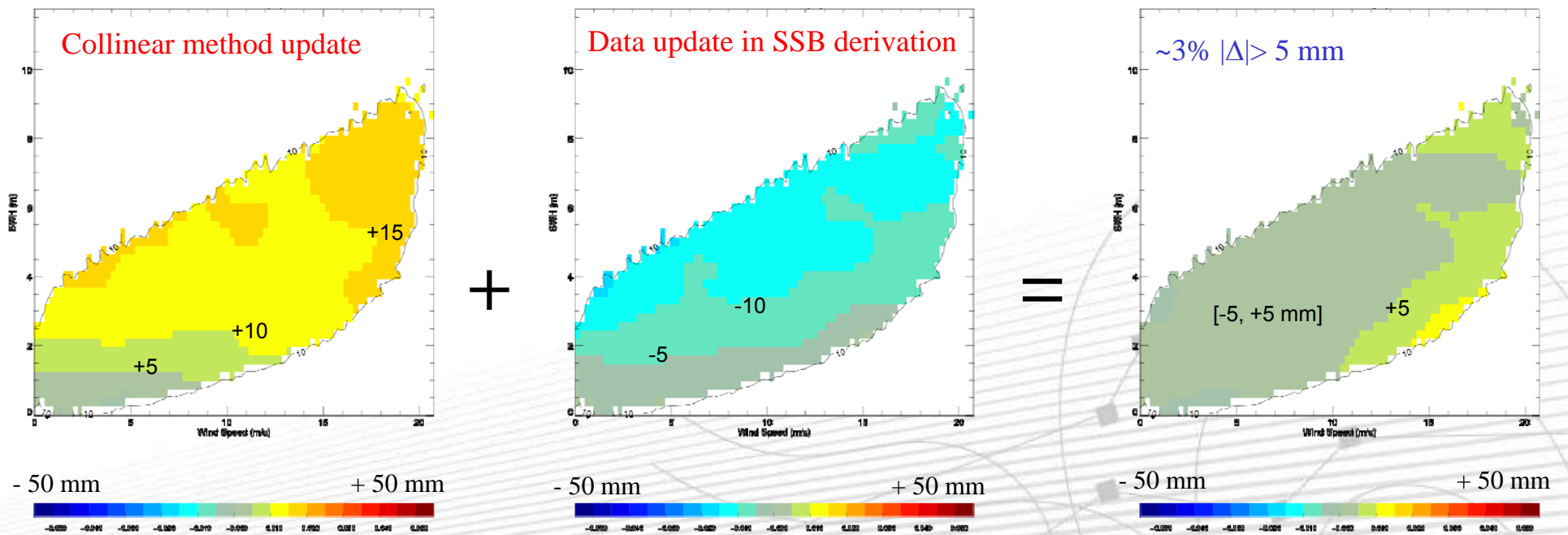
Wind Speed energy spectra



→ Use of MLE-3 σ_0 to compute the wind speed to have better estimates.

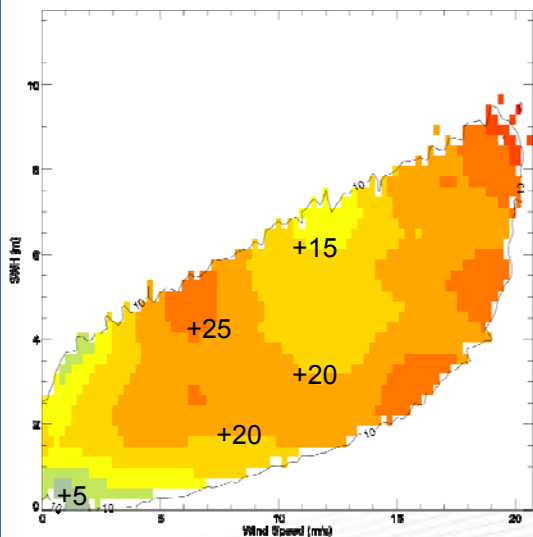
Jason-1 SSB solutions

Model name	Period (year)	Cycles	Colinear Method	Data source	Range & SWH	Wind	Reference
SSB_J1_Ref	3	1-111	standard	GDR_B	MLE-4	MLE-4	Labroue, 2008
SSB_J1_New	3	1-111	modified	GDR_C	MLE-4	MLE-4	Tran et al, 2010



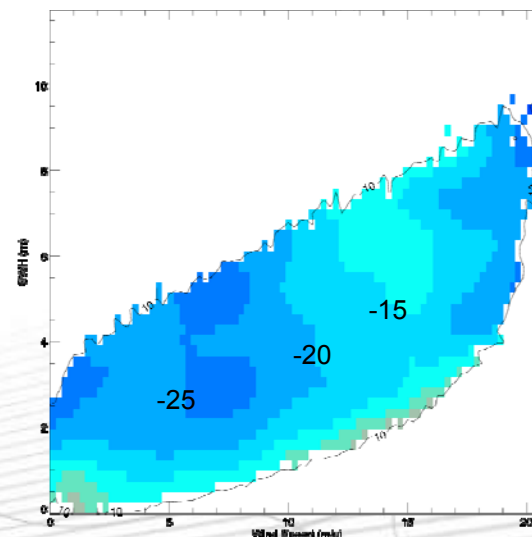
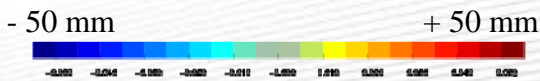
Jason-2 SSB solutions

Model name	Period (year)	Cycles	Colinear Method	Data source	Range & SWH	Wind	Reference
SSB_J2_Ref	1	1-38	modified	GDR	MLE-4	MLE-4	Tran et al, 2010
SSB_J2_U_MLE4	1	7-43	modified	Reprocessed at CLS	MLE-4	MLE-4	2010



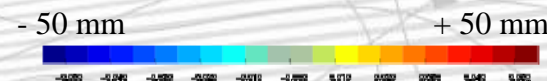
SSB_J2_Ref – SSB_J1_Ref

- Diff of estimation approach
- Diff of data version
- Diff of wind speed distribution

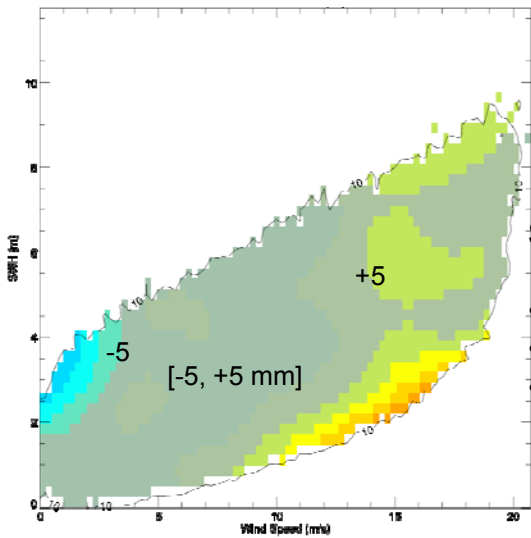


SSB_J2_U_MLE4 – SSB_J2_Ref

- Diff in characterization file
- Wind speed adjustment

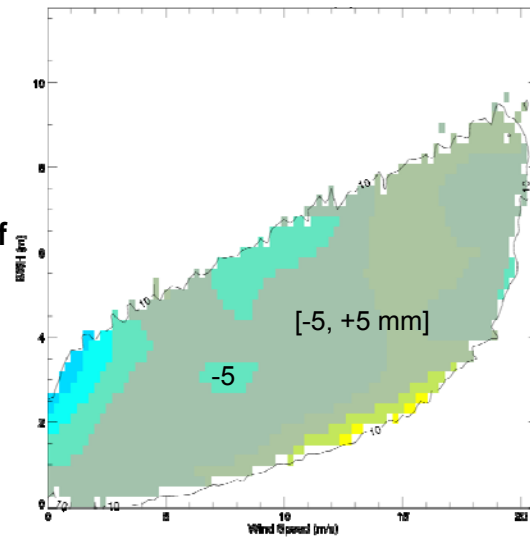
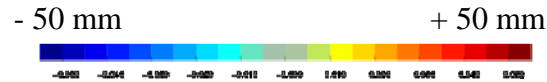


Comparison of Jason SSB



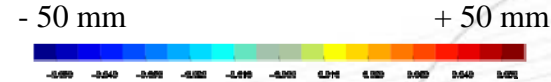
SSB_J2_U_MLE4 - SSB_J1_Ref

- Diff of estimation approach
- Diff of data version
- Similar wind speed histogram



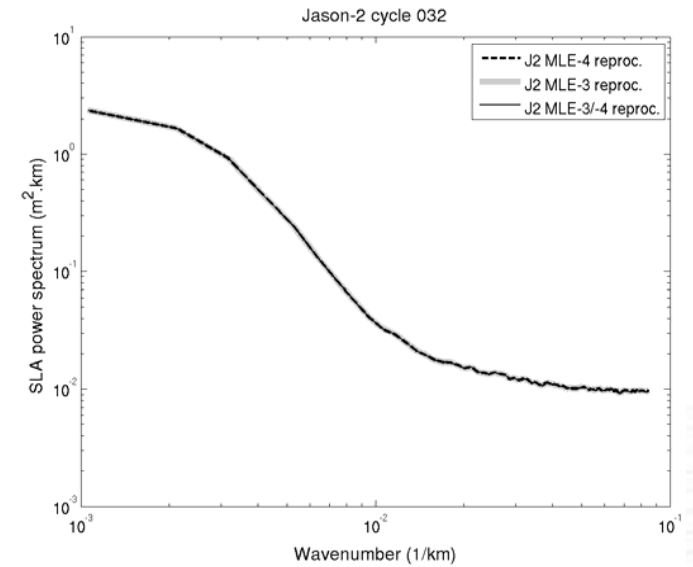
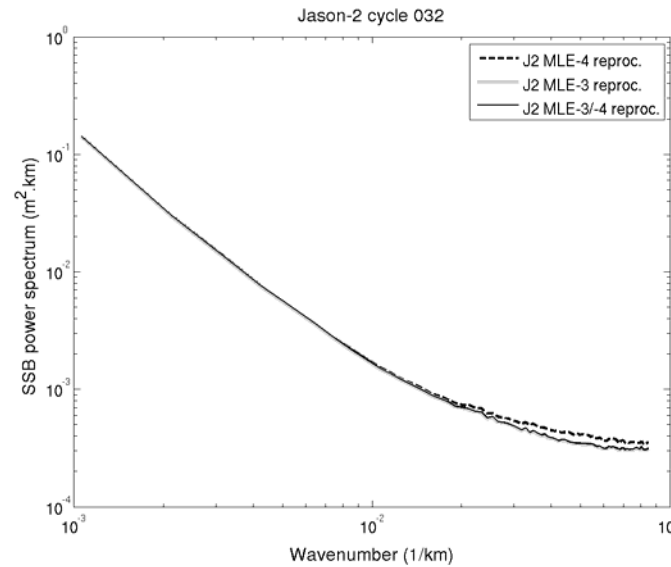
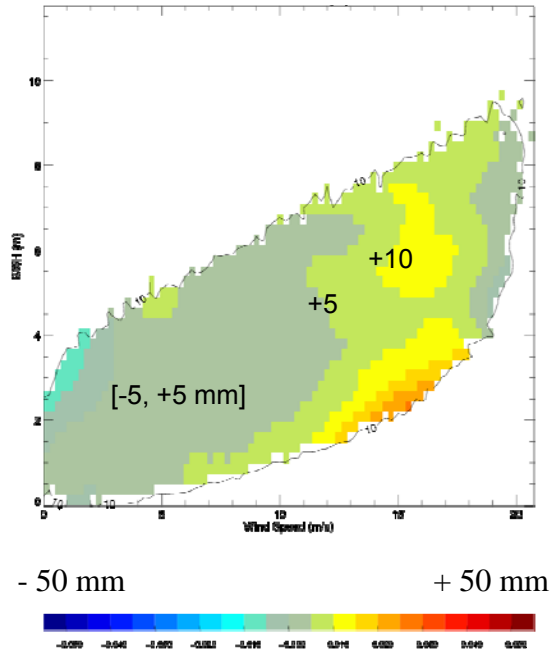
SSB_J2_U_MLE4 - SSB_J1_New

- Same estimation approach
- Same data version
- Similar wind speed histogram



→ No SSB differences between Jason-1 & Jason-2
when data are homogeneous and processed in similar ways

Use of MLE-3 wind speed for Jason-2



SSB_J2_U_MLE3 – SSB_J1_New

- Same estimation approach
- Same data version
- Similar wind speed histogram (but J1 MLE4 vs J2 MLE3 estimates)

→ SSB with MLE-3 wind displays slightly lower energy level in HF spectrum part.
→ No significant effect on SLA spectra.

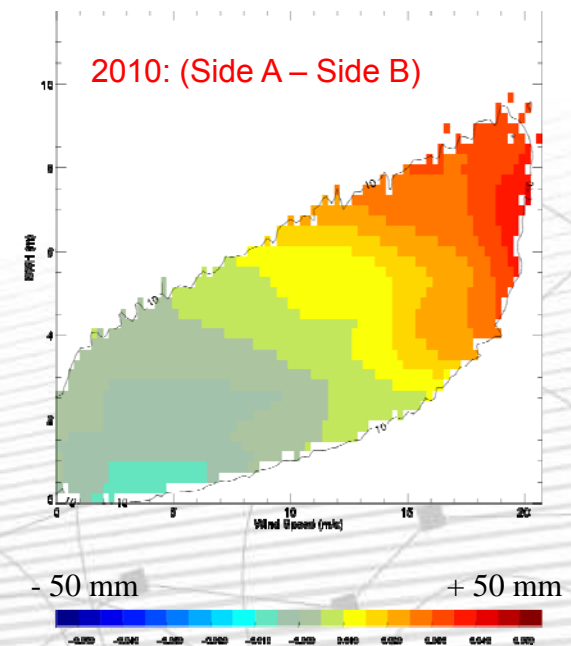
Topex SSB solutions

Model name	Period (year)	Cycles	Colinear Method	Data source	Range & SWH	Wind	Reference
SSB_TPA_2010	3	21-131	modified	MGDR + CLS dataset	MGDR	Gourrion et al	Tran et al, 2010
SSB_TPB_2010	3	240-350	modified	MGDR + CLS dataset	MGDR	Gourrion et al	Tran et al, 2010

Recomputed solutions used in the new release of DUACS Delayed Time products v3.0 (July 2010)

- orbit GFSC POE (std0809)
- corrected TMR wet tropospheric corr.
- high resolution mog2D + IB for DAC
- GOT4.7 for tides
- filtered dual-frequency ionospheric corr.
- ECMWF rectangular grids (new S1 and S2 atmospheric tides are included) for dry tropospheric corr.

→ Still some SSB differences



Conclusion & Recommendations

- For Jason-1, during platform mispointing events σ_0 measurements are under-estimated and thus wind speed are over-estimated.
- Use of a bias on σ_0 is necessary to adjust Jason-2 wind speeds to Jason-1 values.
- It is recommended to derive Jason-2 wind from MLE-3 σ_0 instead of MLE4 value to get better estimates.
- It would be good to have retracking algorithm that estimates separately σ_0 and off-nadir angle from waveform.
- Concerning SSB, there is no SSB differences between Jason-2 and Jason-1 when these solutions are derived from homogeneous data and in similar ways. This is not the case today between TOPEX-A and TOPEX-B.
- It is recommended to put specific Jason-2 solution in Jason-2 products, now that it is available.