Impact of GDR_D standards on SSB corrections

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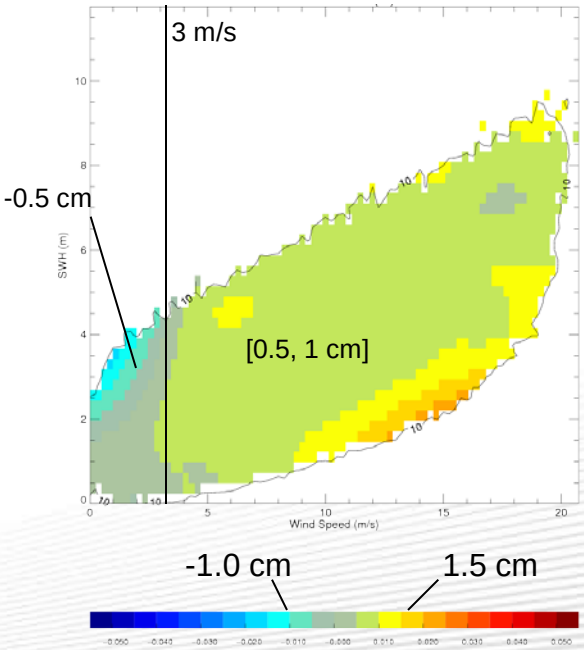
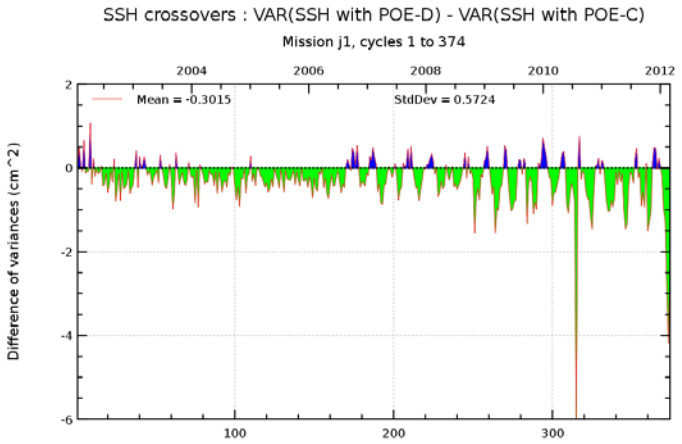
Jason-1 SSB comparison

Model name	Period (year)	Cycles	Colinear method	Data source	Range & SWH	Wind	Reference
SSB_J1_Ref (operational)	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	2012
SSB_J1_NewOrb	3	1-111	modified	GDR_C + GDR_D Orbits	MLE-4	MLE-4	2012

SSB_J1_New – SSB_J1_Ref

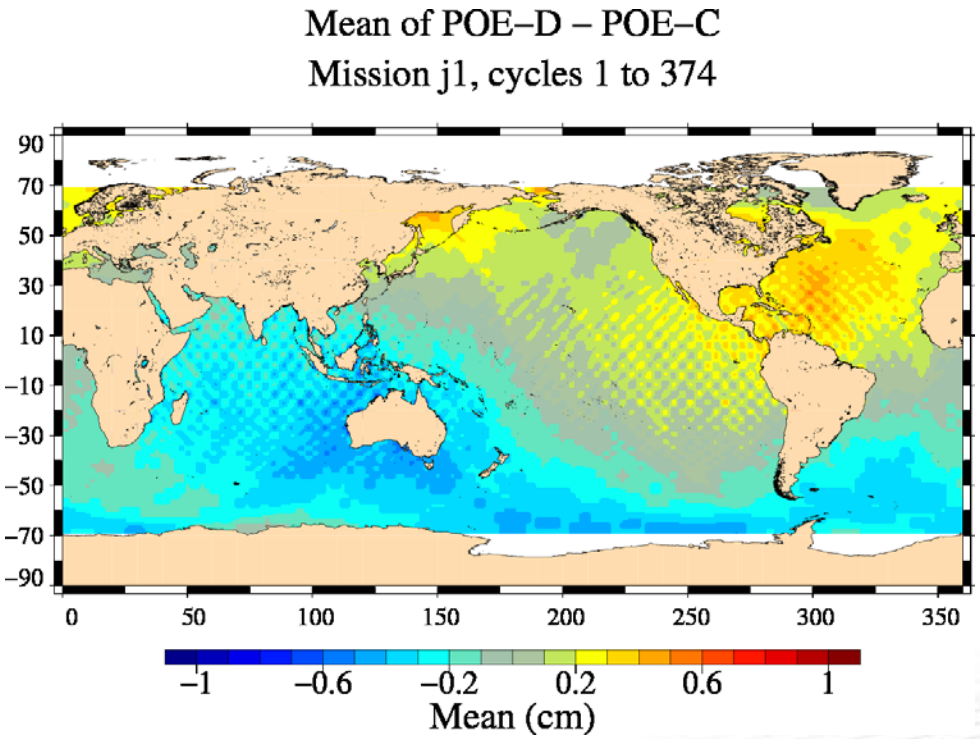


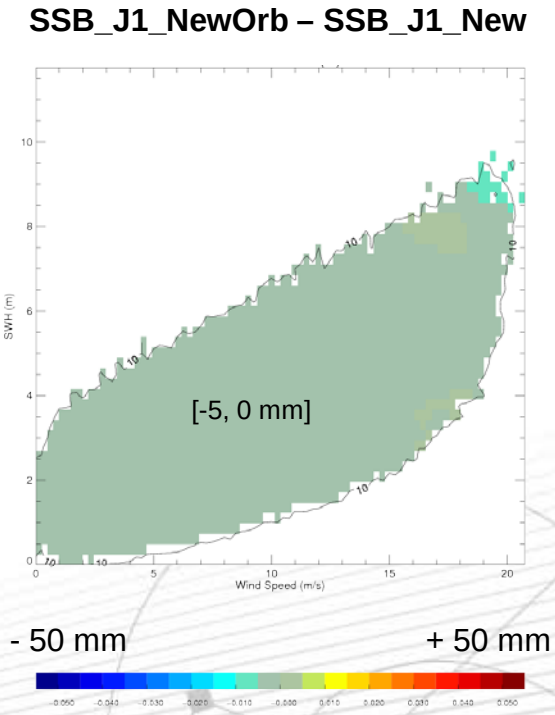
→ mostly a bias of ~0.7 cm (89% of data) except for low wind conditions (8%)



→ GDR_D orbits improve SSH comparison at crossovers
→ impact on SSB model to evaluate

Jason-1 GDR_D orbit update

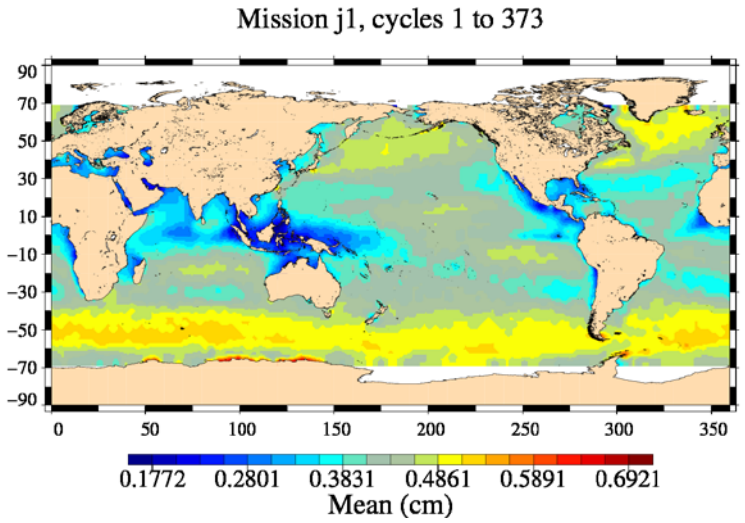


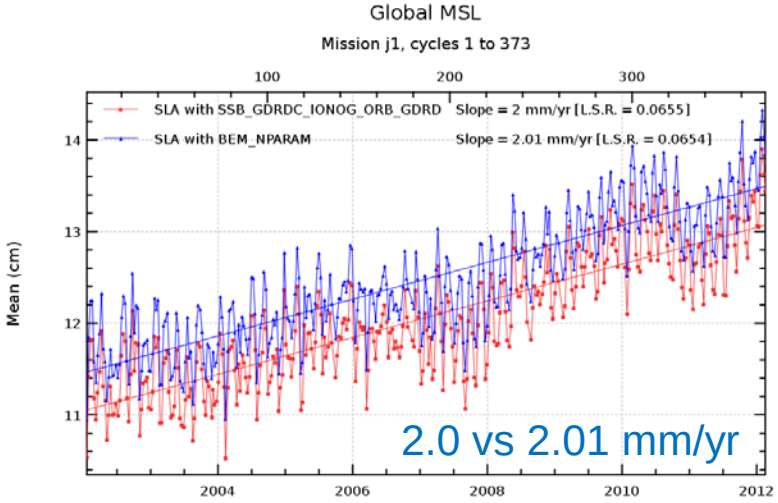


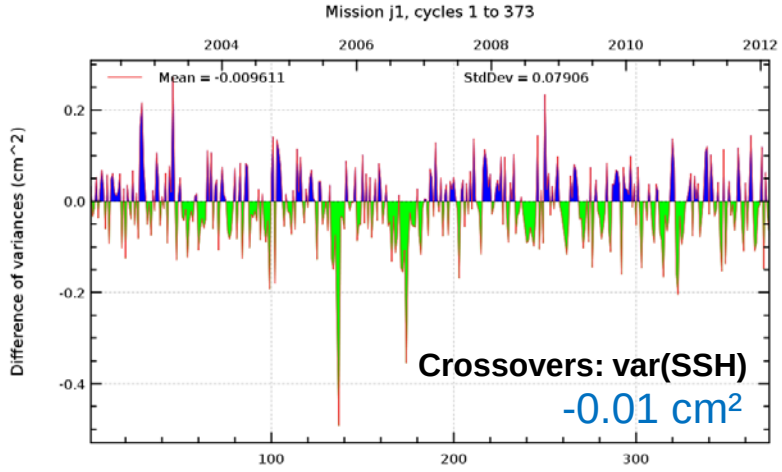
→ No geographically correlated orbit differences with sea state

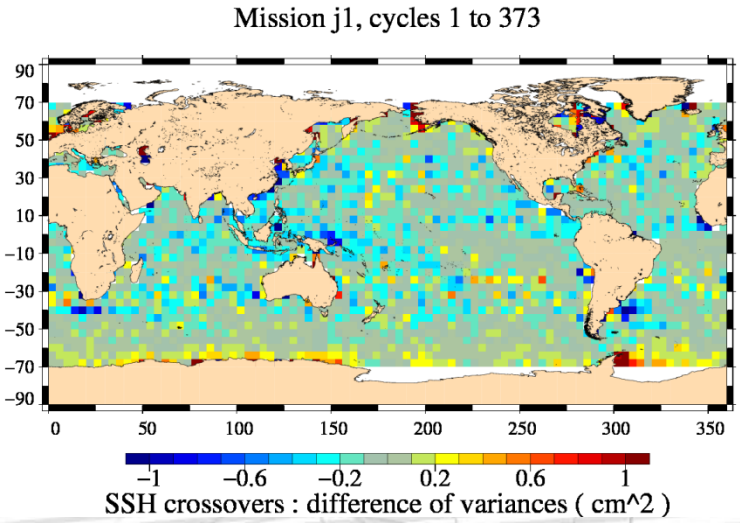
SSH (GDR_C + GDR_D orbit + SSB_J1_NewOrb) vs SSH (GDR_C + GDR_D orbit + SSB_J1_Ref)

SSB_J1_NewOrb – SSB_J1_Ref





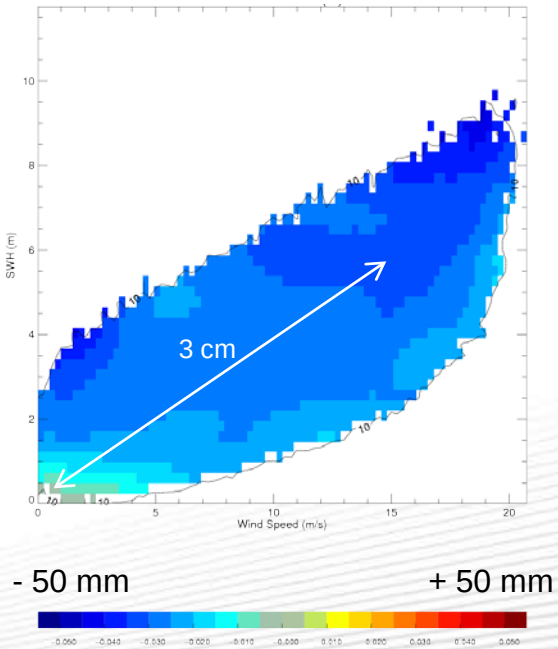




→ No need to change the Jason-1 SSB model

Jason-2 SSB comparison

Model name	Period (year)	Cycles	Colinear method	Data source	Range & SWH	Wind	Reference
SSB_J2_Ref (operational)	1	7-43	modified	GDR_T + GOT4v7 + retracking reprocessed at CLS	MLE-4	MLE-4	2011
SSB_J2_New	1	1-36	modified	GDR_D	MLE-4	MLE-4	2012

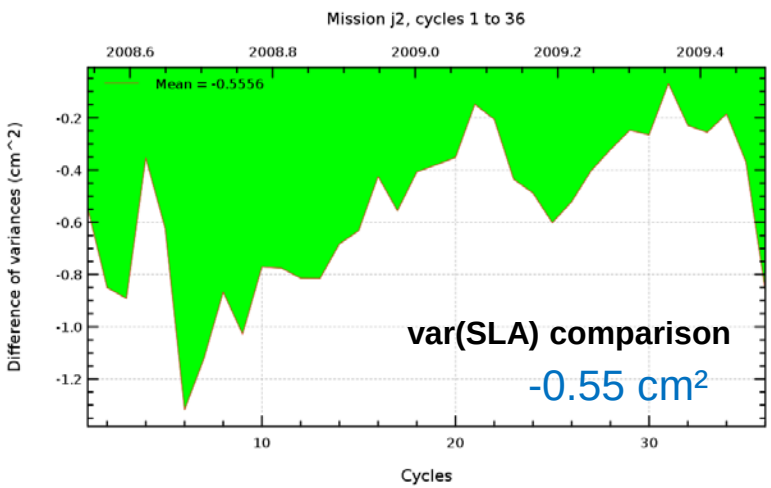


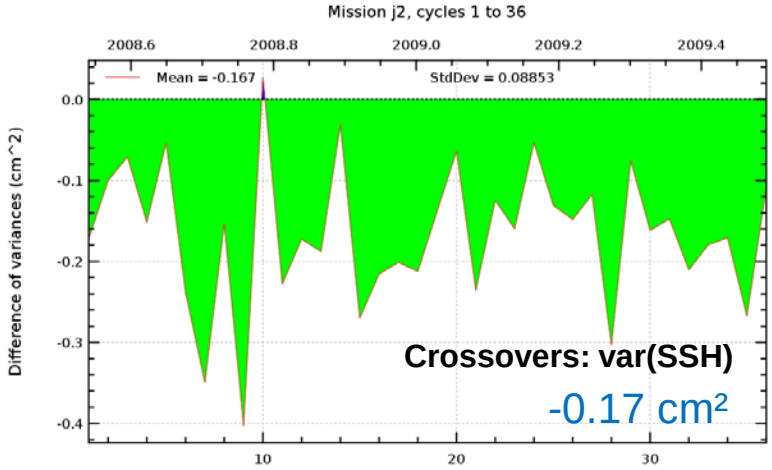
Where do these differences come from?

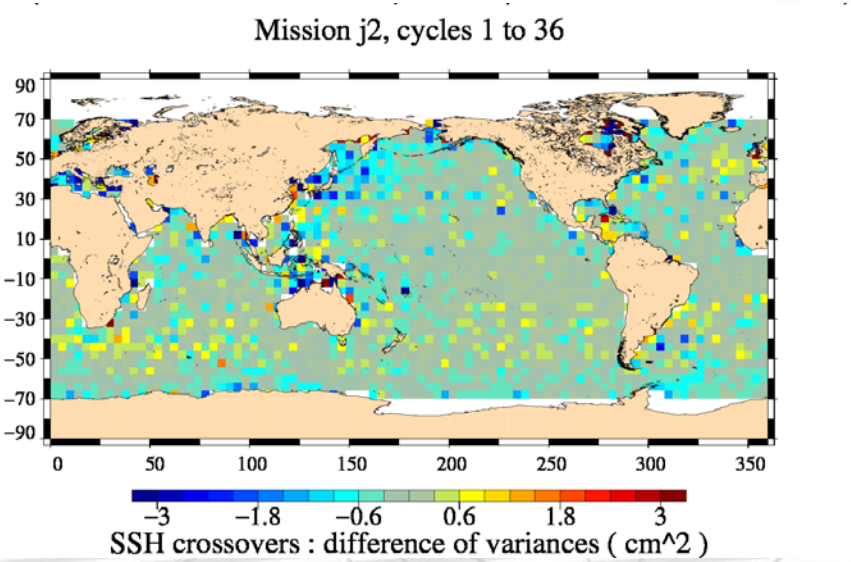
To evaluate impact on SSB model of:

→ changes in radiometer parameters
→ change in orbit
→ change in tide model
→ changes in altimeter derived parameters

SSH (GDR_D + SSB_J2_New) vs SSH (GDR_D + SSB_J2_Ref)



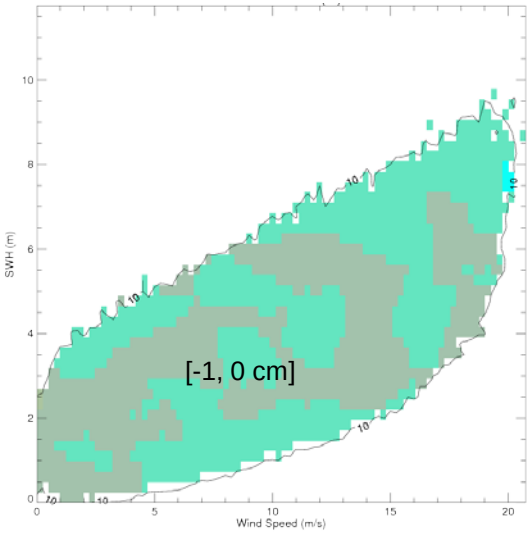




→ Better to use this last Jason-2 SSB model , small improvement observed

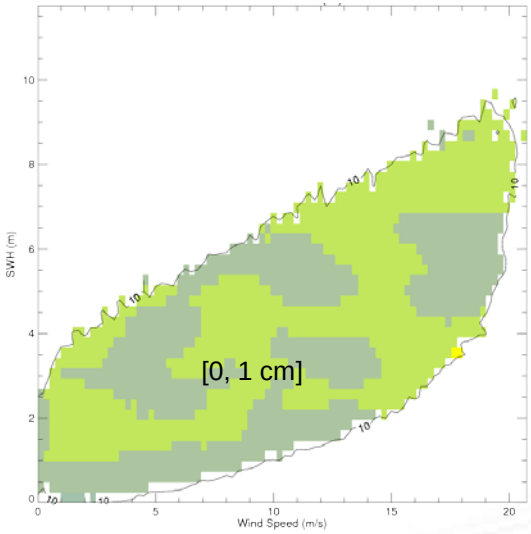
Impact on SSB of changes in standard

Radiometer wet troposphere correction change impact



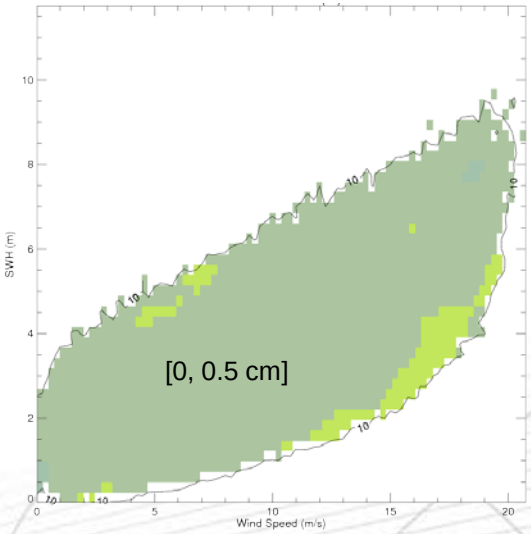
- 50 mm + 50 mm

Orbit change impact



- 50 mm + 50 mm

GOT4.8-GOT4.7 change impact

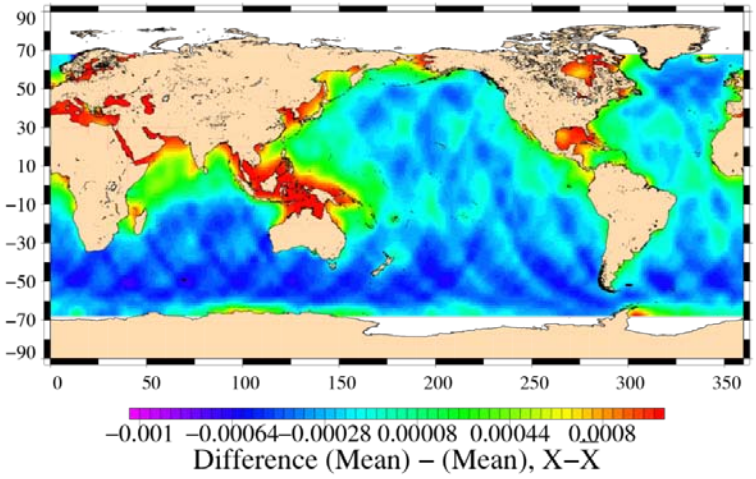


- 50 mm + 50 mm

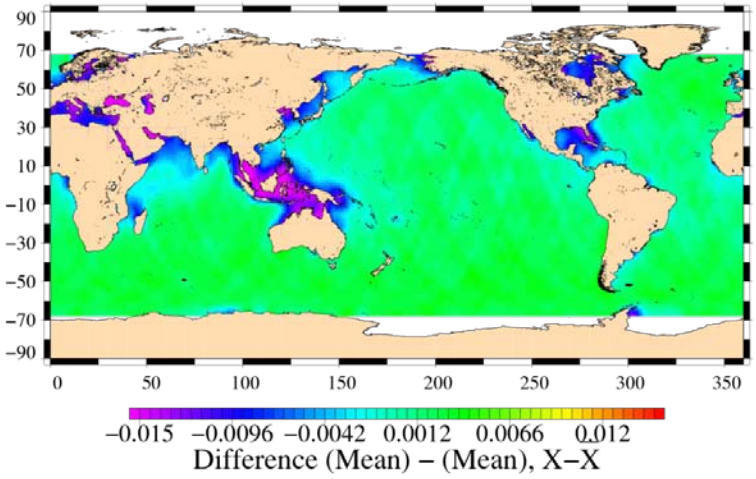
→ No impact on SSB solutions

Range & SWH comparison

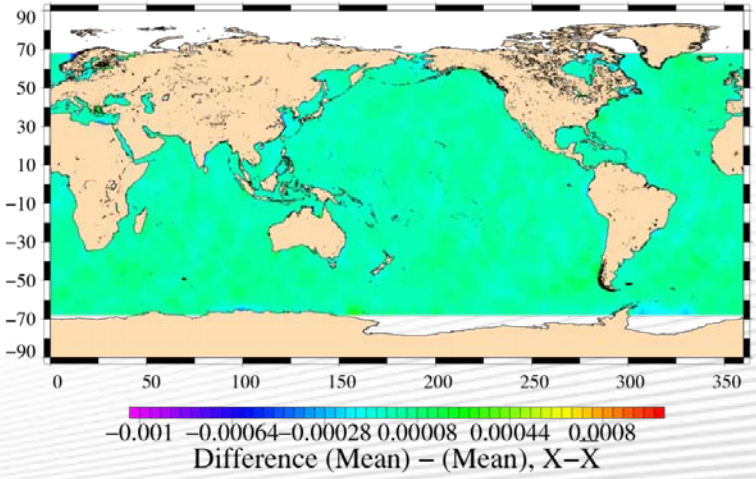
GDR_T(range)−GDR_D(range)



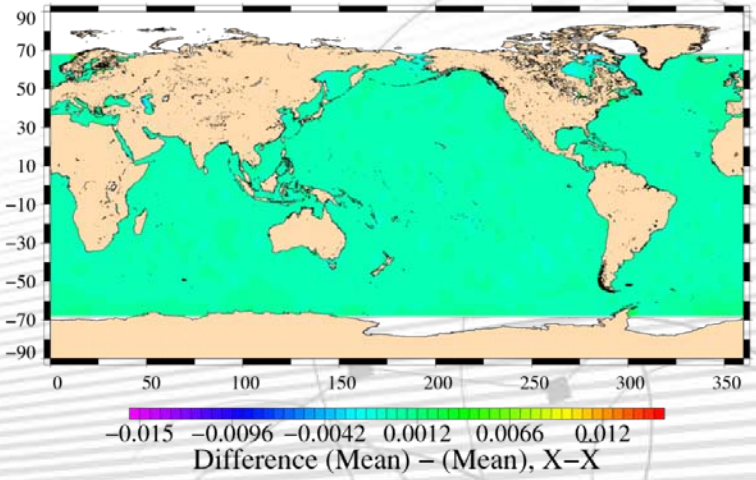
GDR_T(SWH)−GDR_D(SWH)



CLS reprocessed(range)−GDR_D(range)



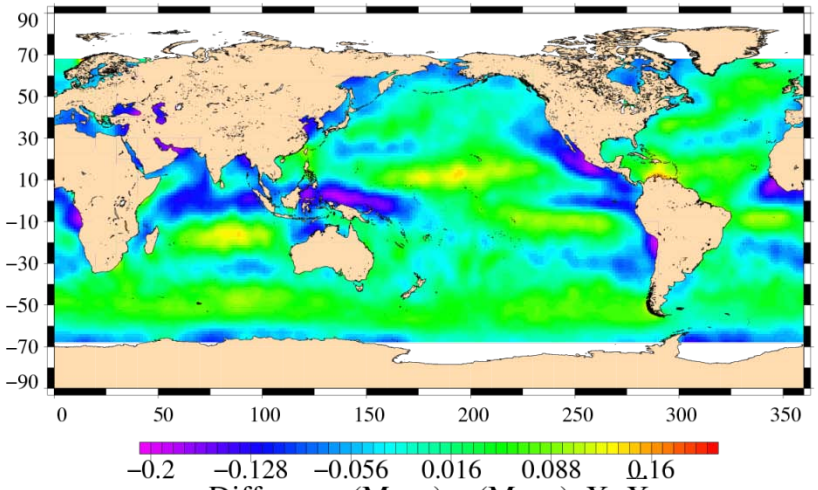
CLS reprocessed(SWH)−GDR_D(SWH)



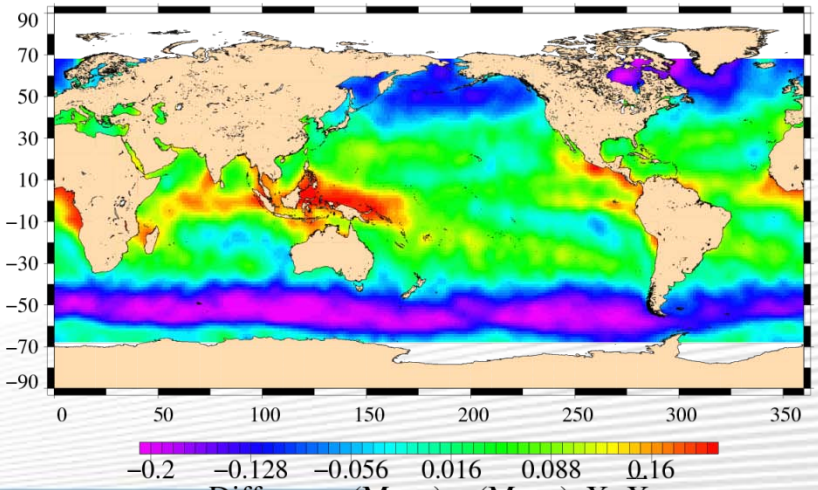
→ No significant differences between GDR_D and CLS processings

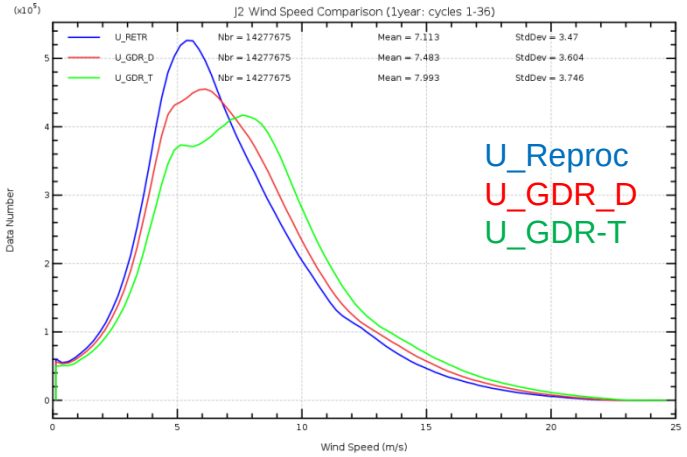
Wind speed comparison

GDR_T(wind)−GDR_D(wind)



CLS reprocessed(wind)−GDR_D(wind)



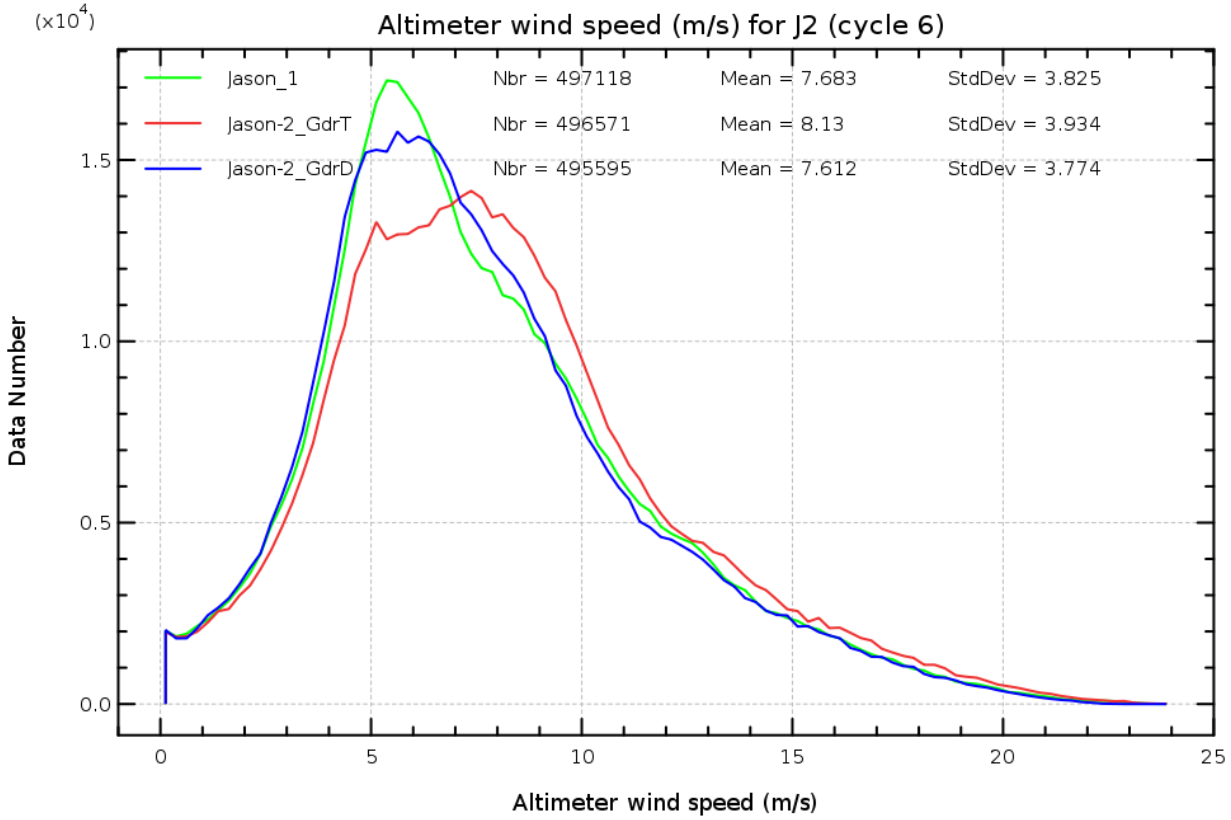


→ Observed differences in SSB due to differences in wind speed estimates

→ SSB models in GDR_D based on a wind speed (U_reproc) tuned with a preliminary bias on sigma0 (09/2011)

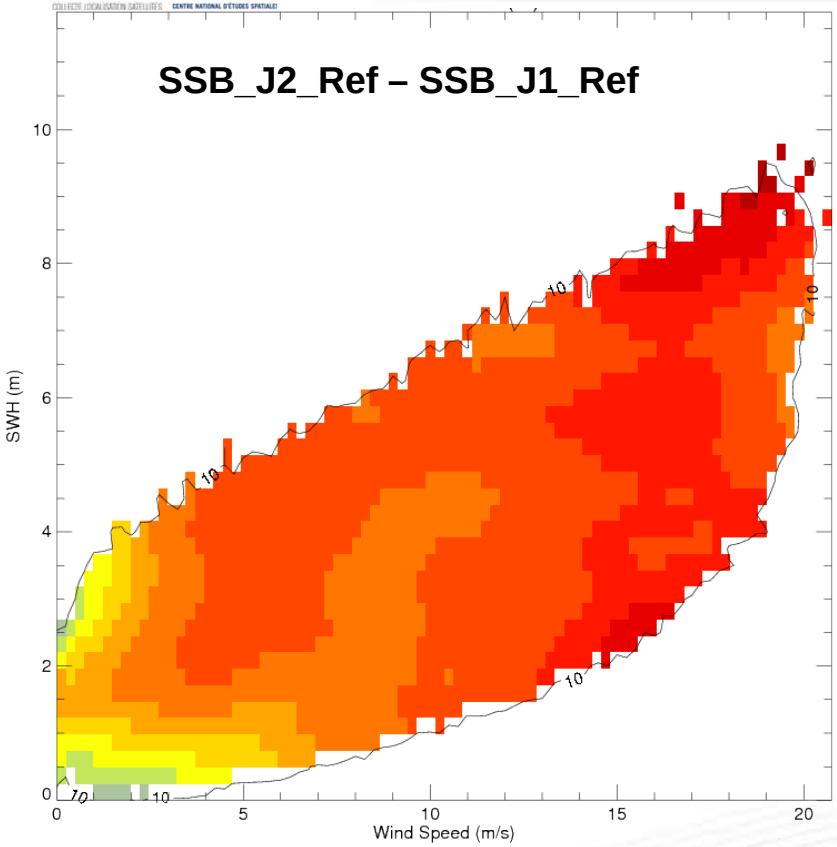
→ Wind speed in GDR_D computed with a fine-tuned bias (01/2012) that takes into account additionally a correction from LTM and corrected atmospheric correction from S. Brown in sigma0

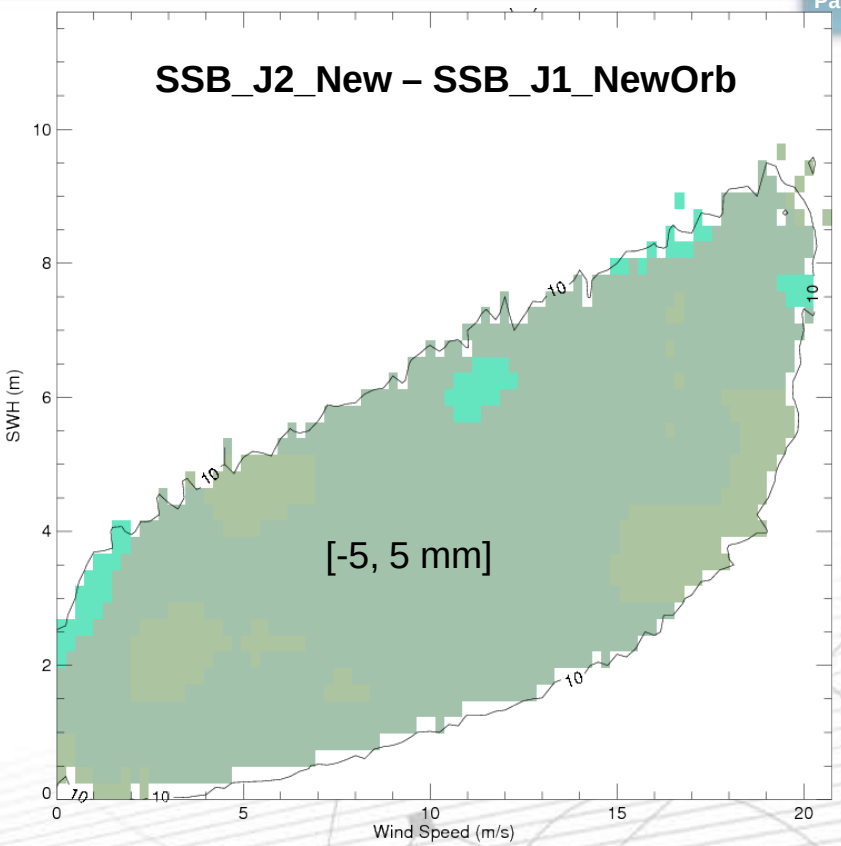
Jason-1/-2 Wind speed



→ good consistency between Jason-1 and Jason-2 GDR_D estimates
Slight differences expected due to Jason-1 mispointing effects on σ0 during the tandem period.

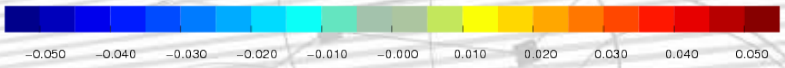
Jason-1/-2 SSB comparison





- 50 mm + 50 mm

- 50 mm + 50 mm



→ When we use latest developed models for both missions: no SSB differences (within 5 mm) between Jason-1 & Jason-2

Summary and Conclusions

- There is no need to update the Jason-1 SSB model otherwise that for consistency with Jason-2 to insure a seamless transition between missions.
- It looks slightly better to use for Jason-2 the SSB model derived directly from the GDR_D products due to some small changes in wind speed reference.
- There is no SSB differences between Jason-2 and Jason-1 (SSB_J2_New vs SSB_J1_NewOrb) when these solutions are derived from homogeneous datasets and in similar ways.
- These models are available on request (ntran@cls.fr)