

# SARAL / Altika SWH validation

Against Jason-1&2 and CryoSat-2  
and  
NDBC buoy data

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Ifremer LOS July 2013

# Outline

- Data
- Collocation procedure
- Collocation results
- SWH anomalies in rain/clouds
- Conclusion

# Data

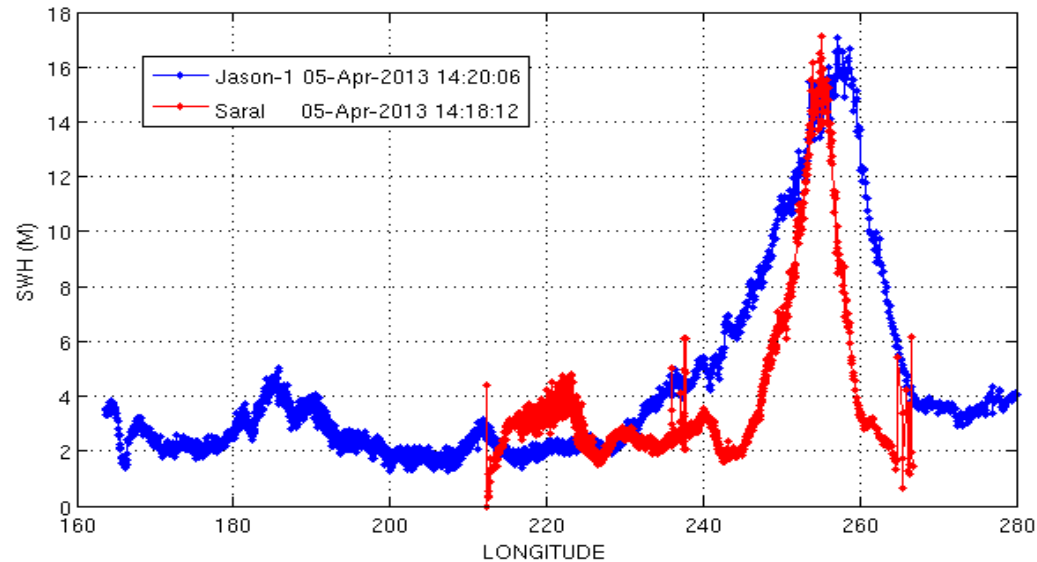
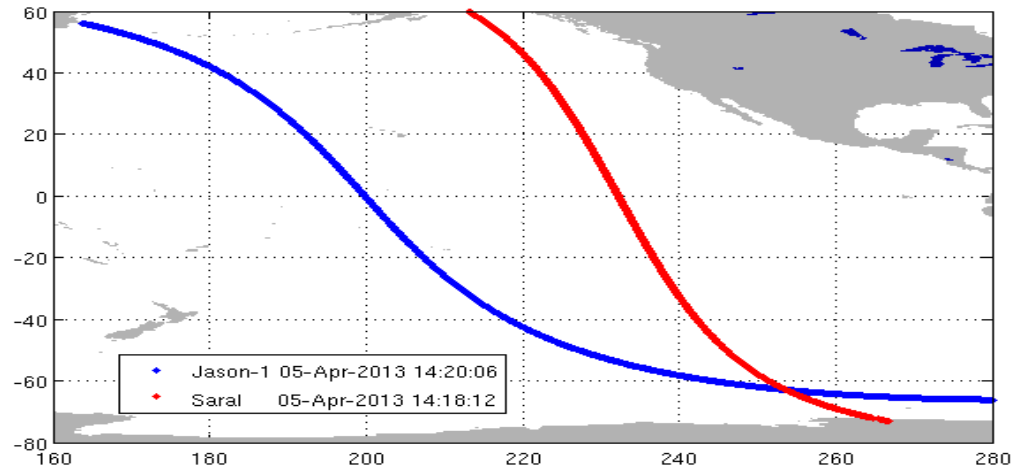
- SARAL IGDR March 12 to July 17 (cycle 0-4)
- Jason-1&2, Cryosat-2 IGDR selected according to the criteria used for the Ifremer Altimeter SWH data base.
- Jason-1 correction :  $1.0211 \times \text{swh} + 0.0139$
- Jason-2 correction :  $1.0149 \times \text{swh} + 0.0277$
- Cryosat-2 correction: non-linear for  $\text{swh} < 2.5 \text{ m}$
- NDBC buoy data collocated by CERSAT (March-June 2013)

# Collocation

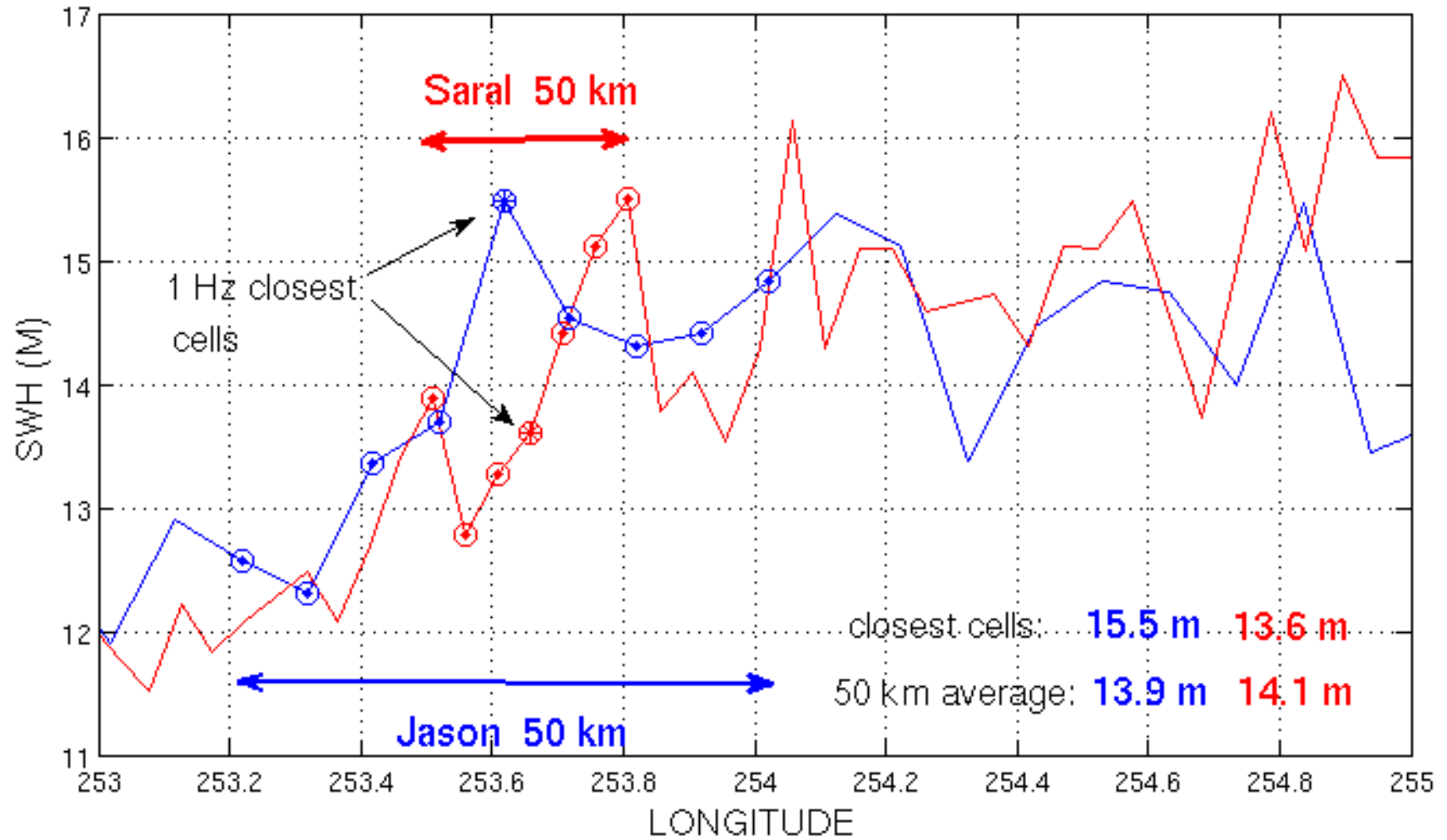
- At crossing tracks
- 1 Hz individual cells, with a 30 mn time window
- 50 km along-track averaged measurements, with all individual 1 Hz measurements valid, with a 1 hour time window
- Buoy data: 30 mn and 50 km maxi – comparison with 1 Hz data or 50 km along-track averages

# Example of collocation

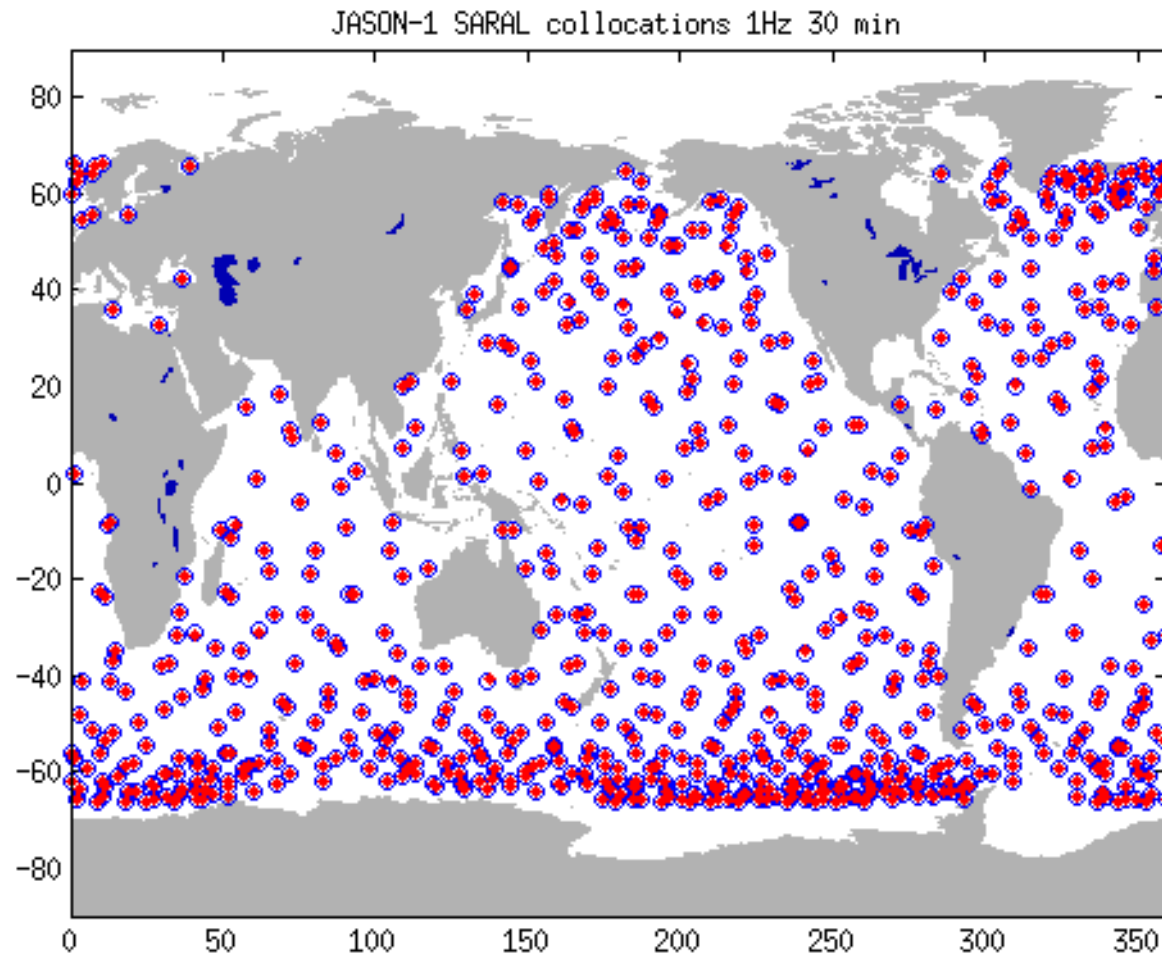
Jason-1 (cycle 530 pass 150) Saral (cycle 1 pass 641 )



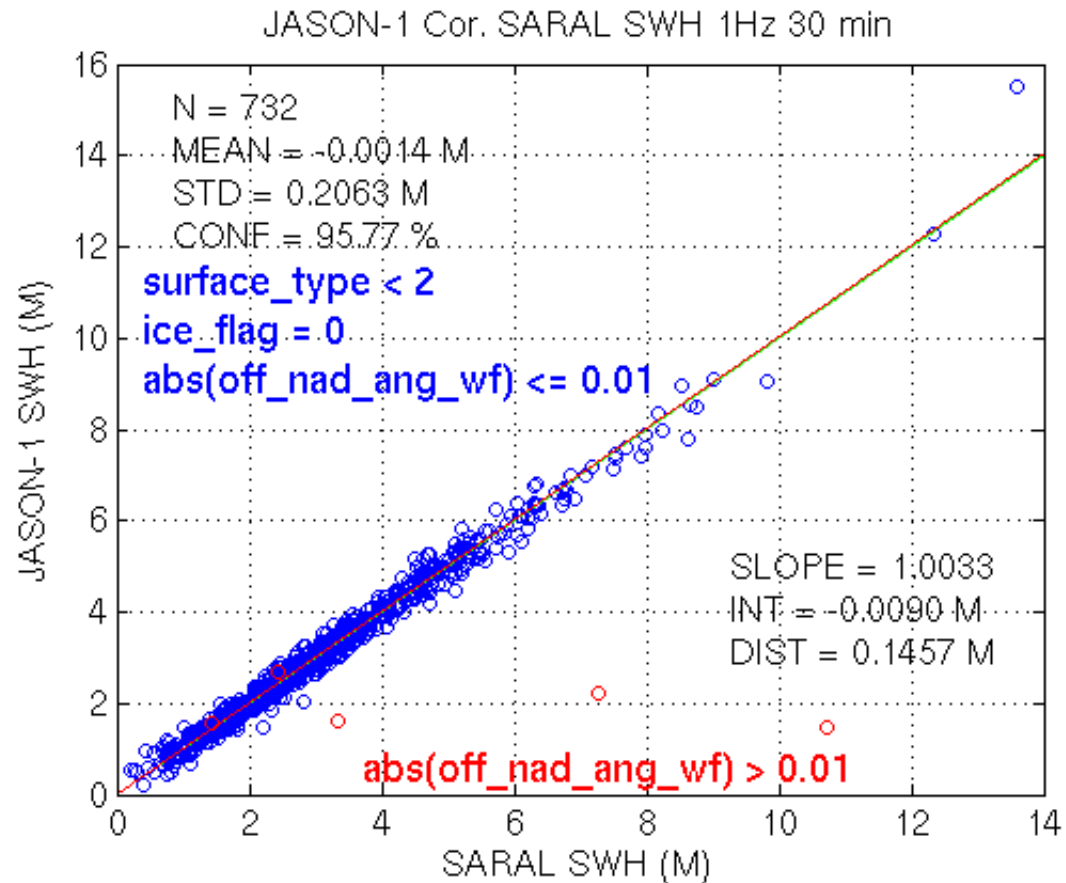
# Example of Jason-1 Saral collocation - zoom



# SARAL / Jason-1 crossings

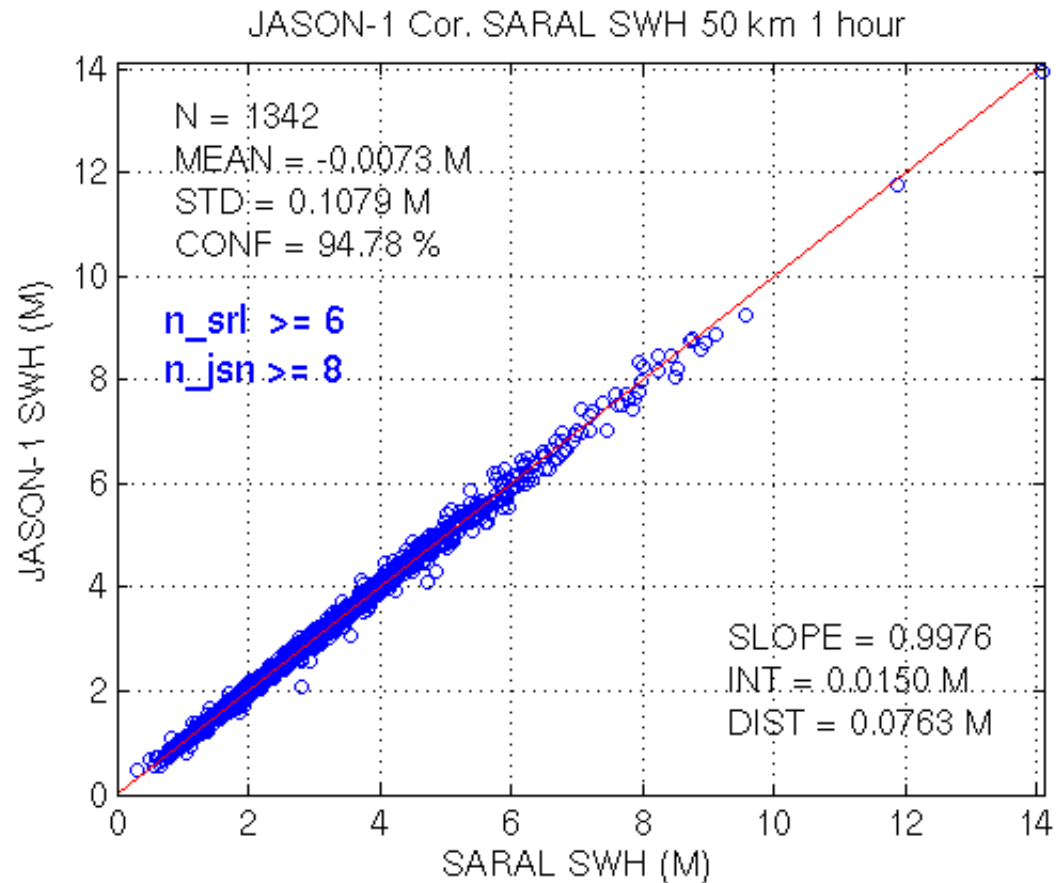


# SARAL / Jason-1 SWH 1 Hz 30 mn

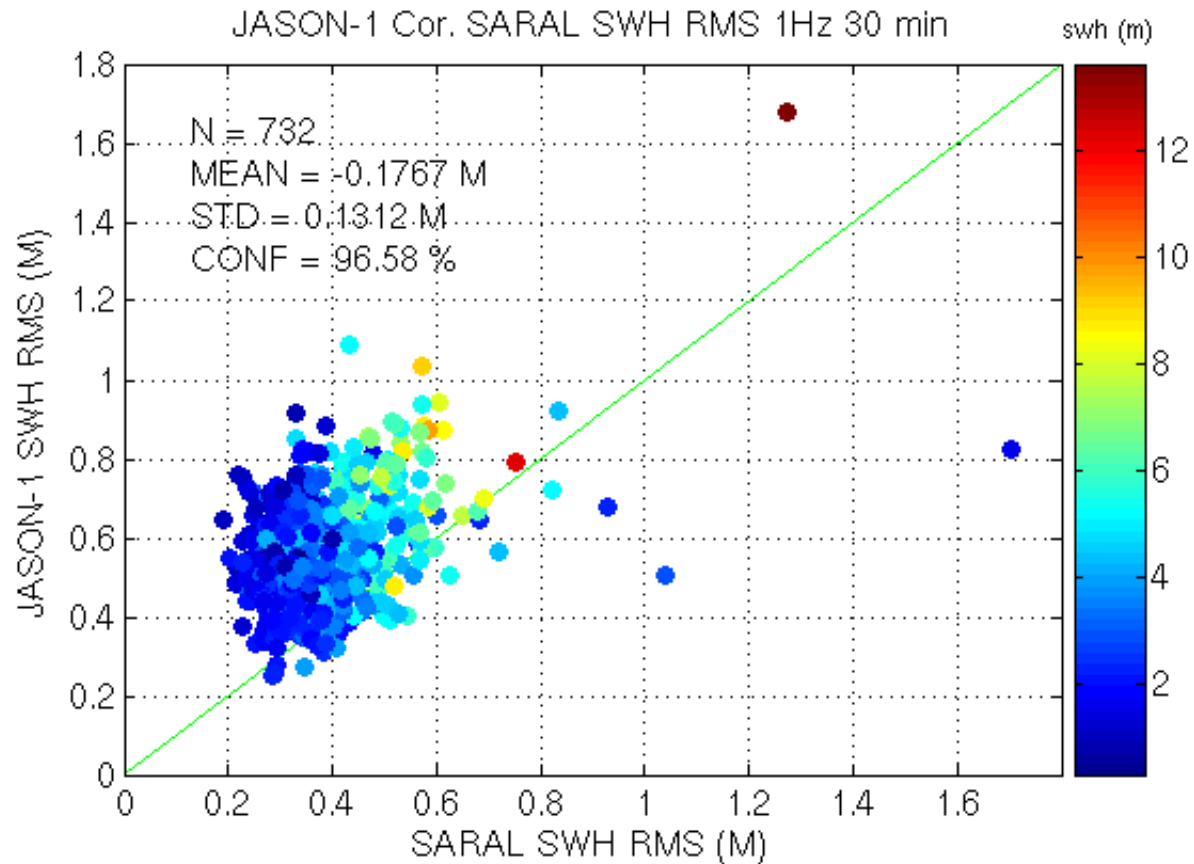




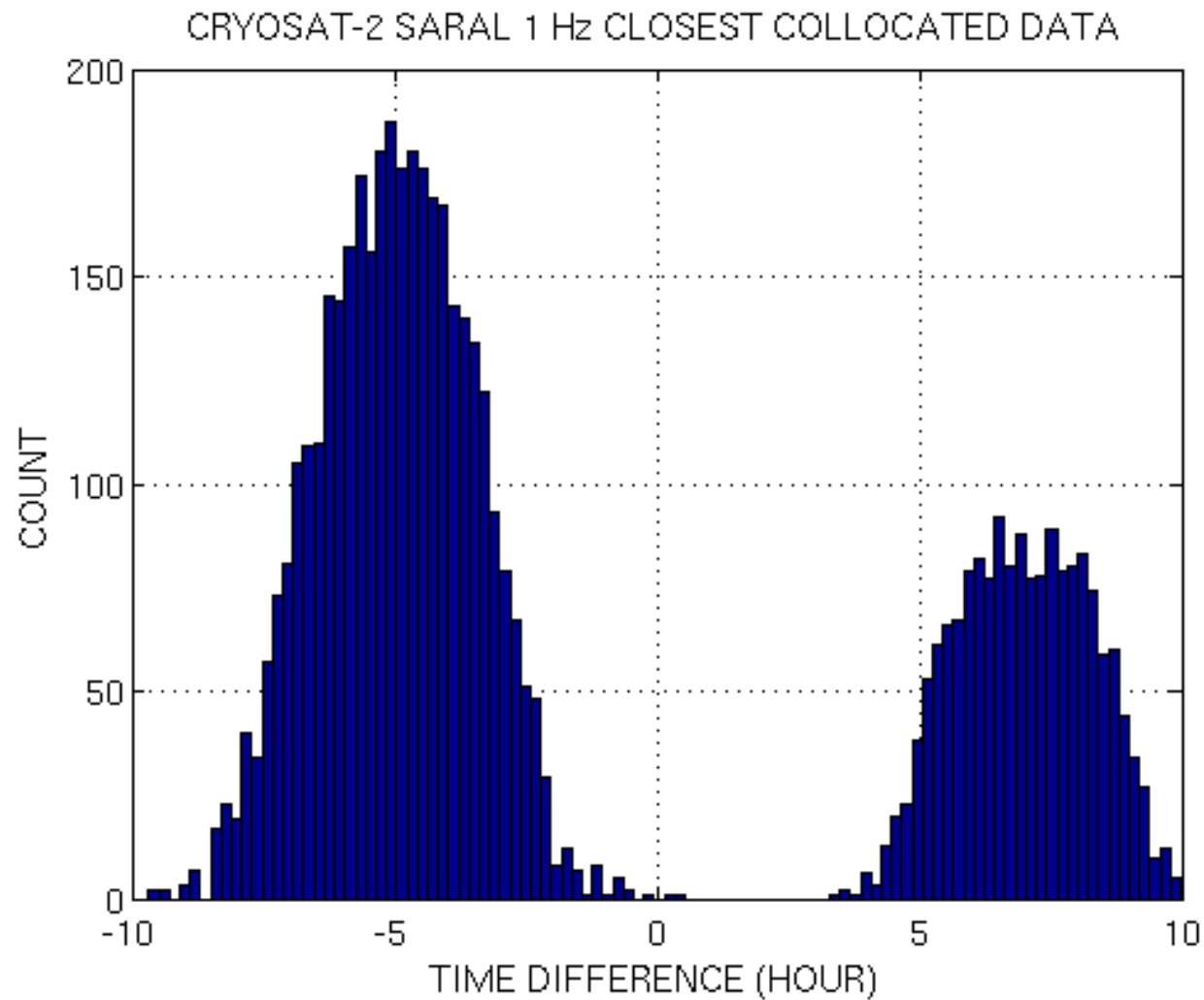
# SARAL / Jason-1 SWH 50 km 1 h



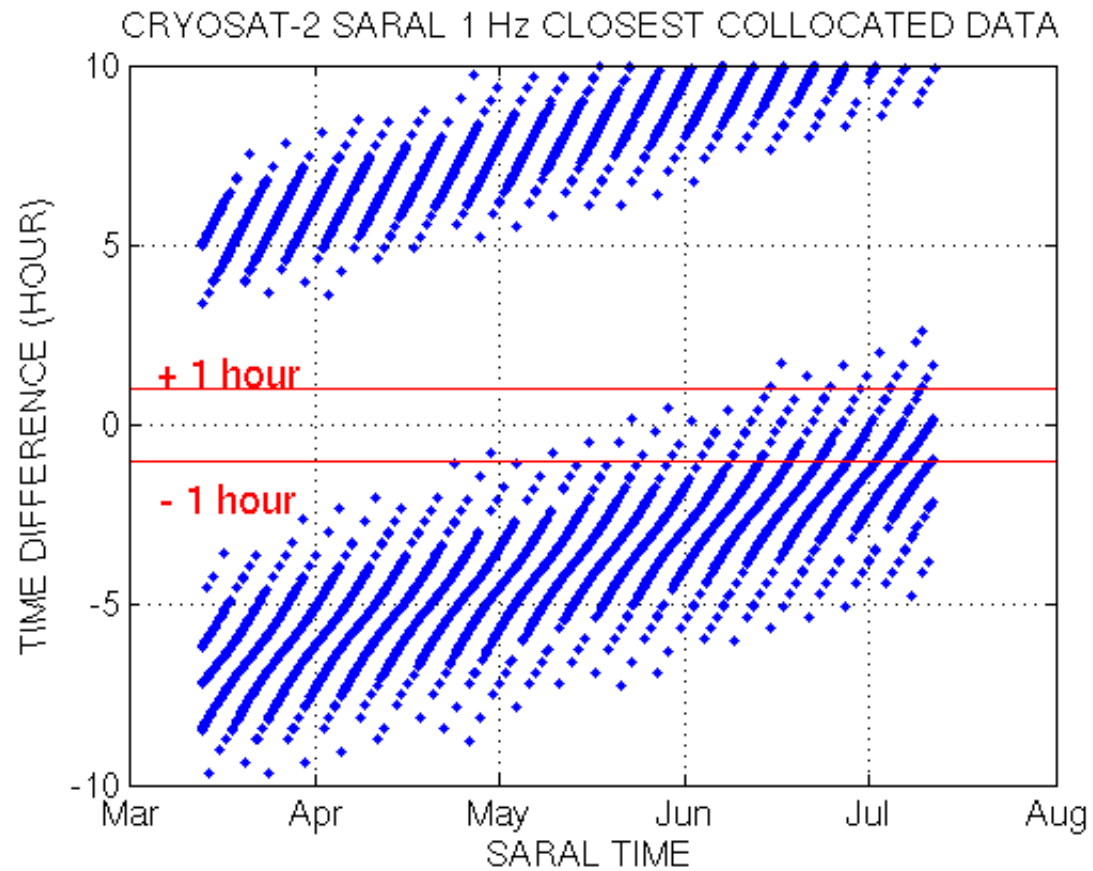
# SARAL / Jason-1 SWH RMS 1 Hz 30 mn



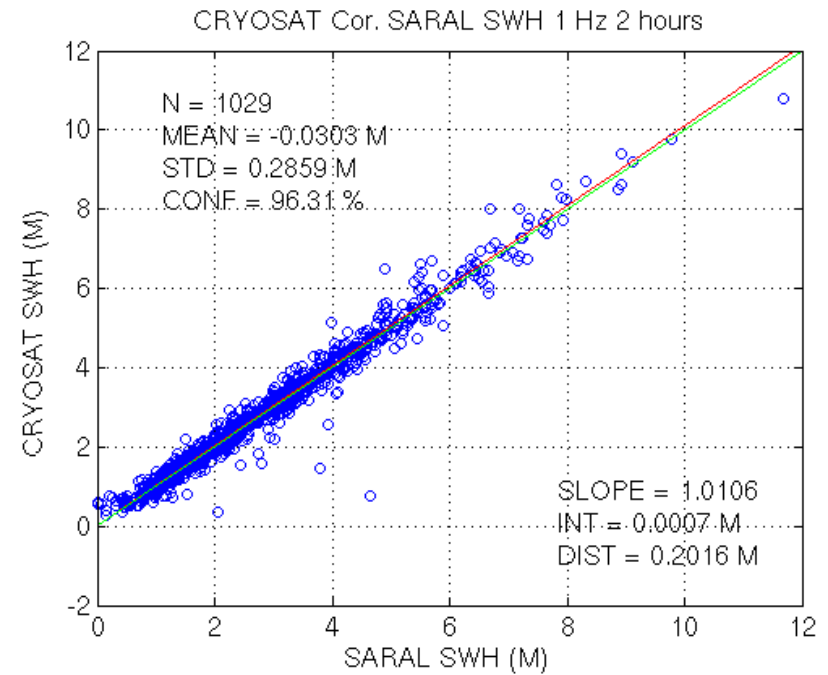
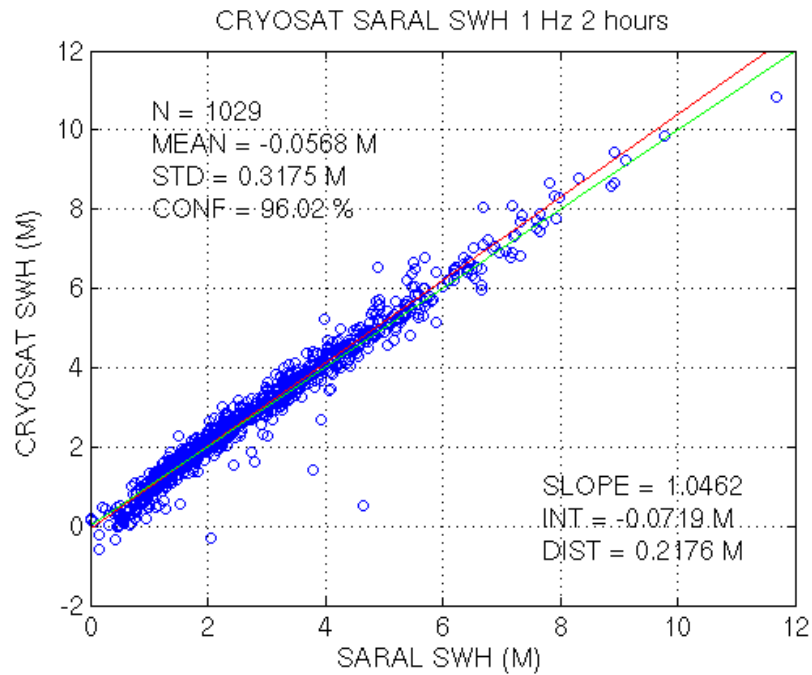
# SARAL / CryoSat



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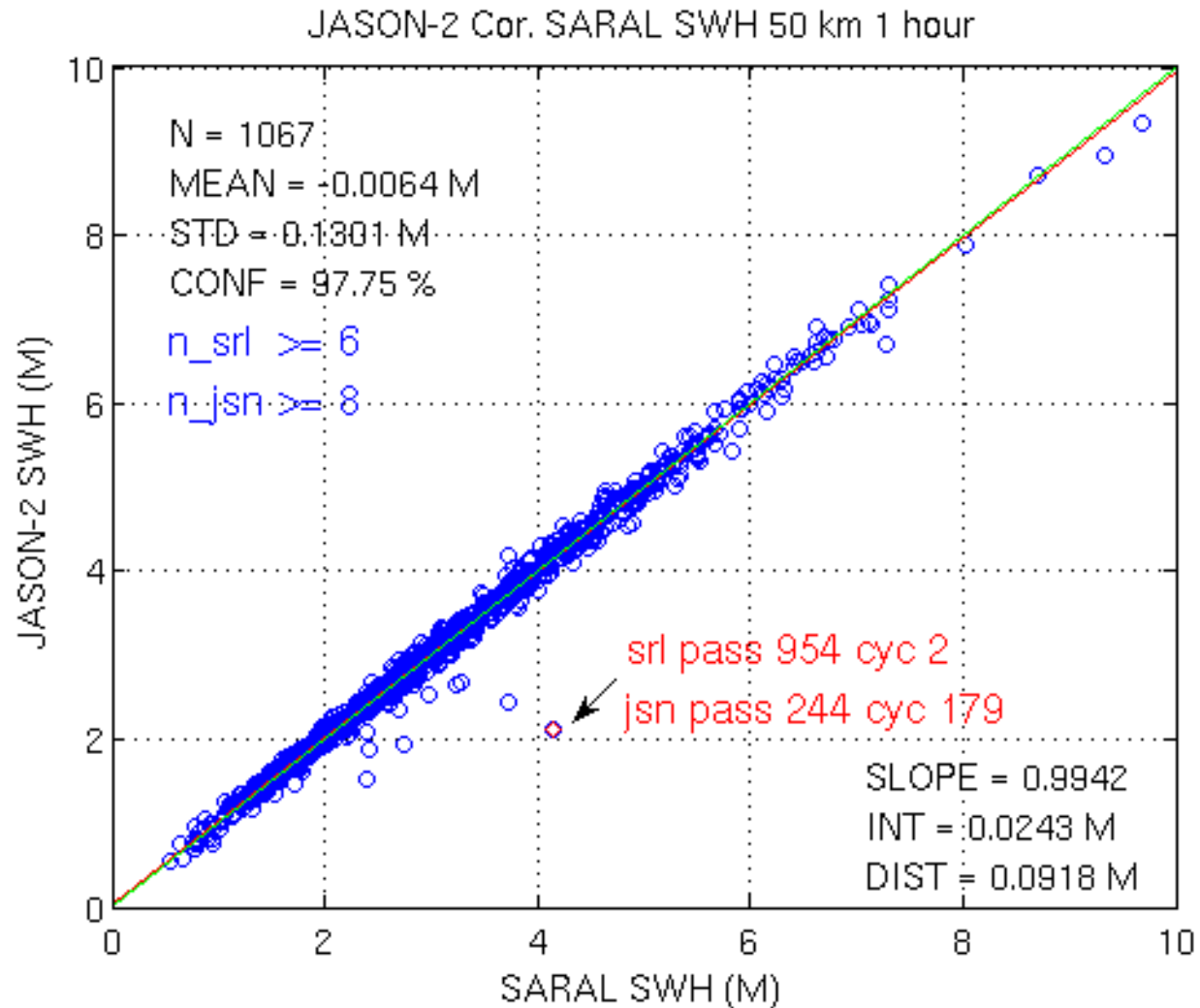
# SARAL SWH summary

## cross-validation 1 Hz 30 mn

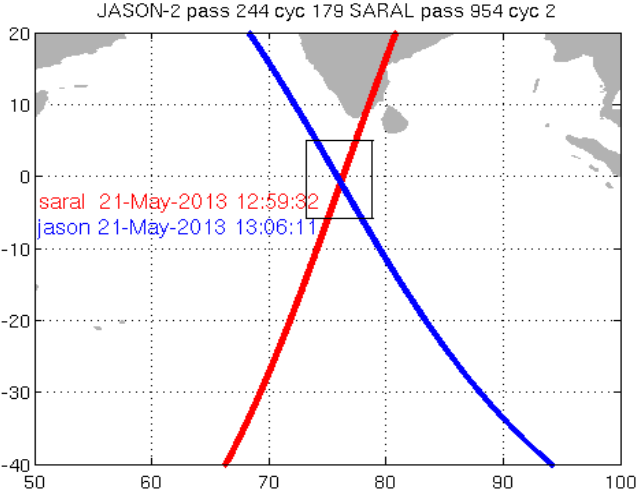
	N	Bias (cm)		Std (cm)		(Slope -1)x100		Interc. (cm)	
Jason-1	732	8	0	21	21	-1.7	0.3	2	1
Jason-2	861	6	-1	20	20	-2.1	-0.6	1	3
CryoSat (2h)	1029	-6	-3	32	29	4.6	1.1	-7	0

\*Second column for corrected altimeter swh (J1,J2, CryoSat)

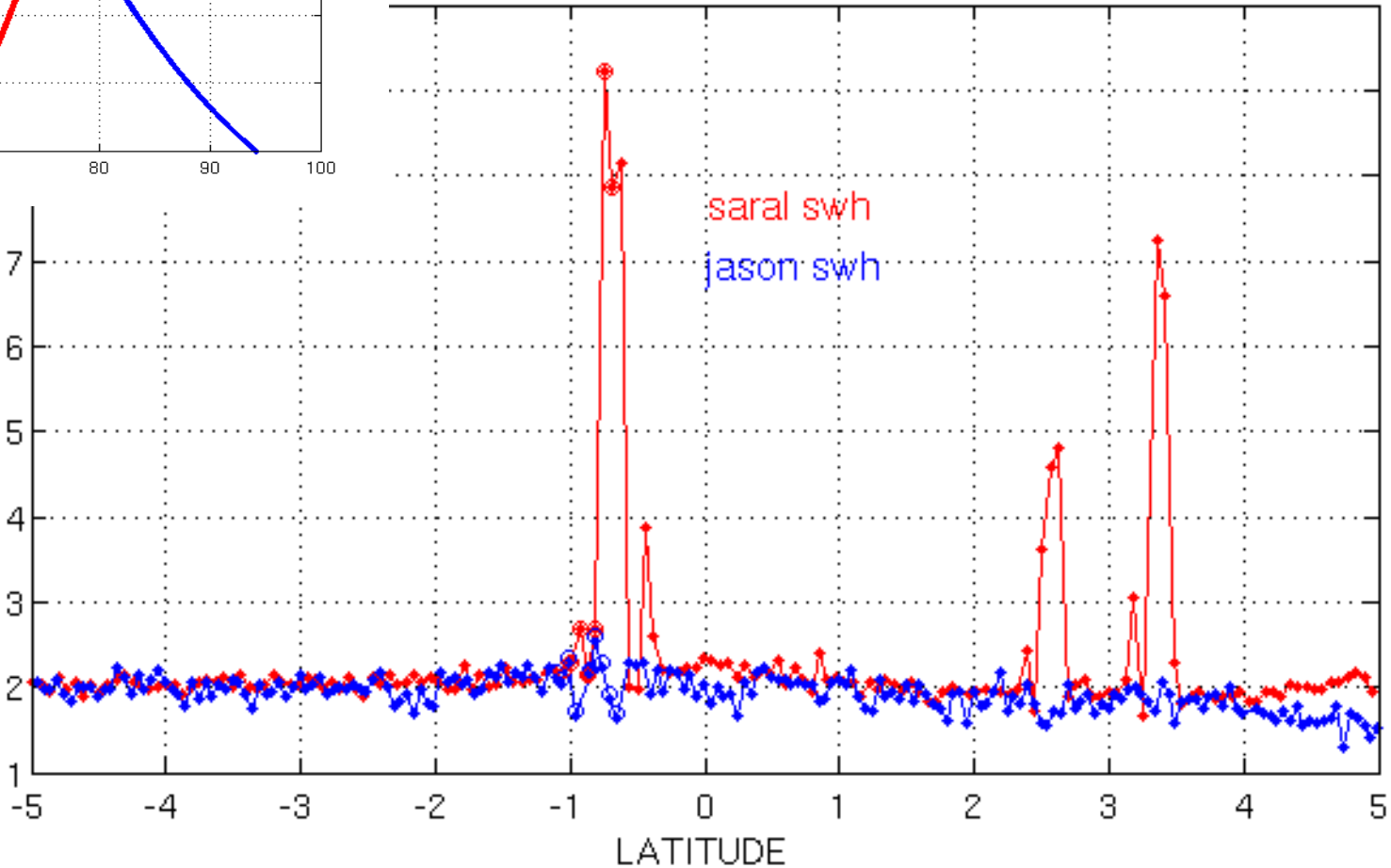
# SARAL / Jason-2 SWH 50 km 1 h



# SARAL SWH anomalies



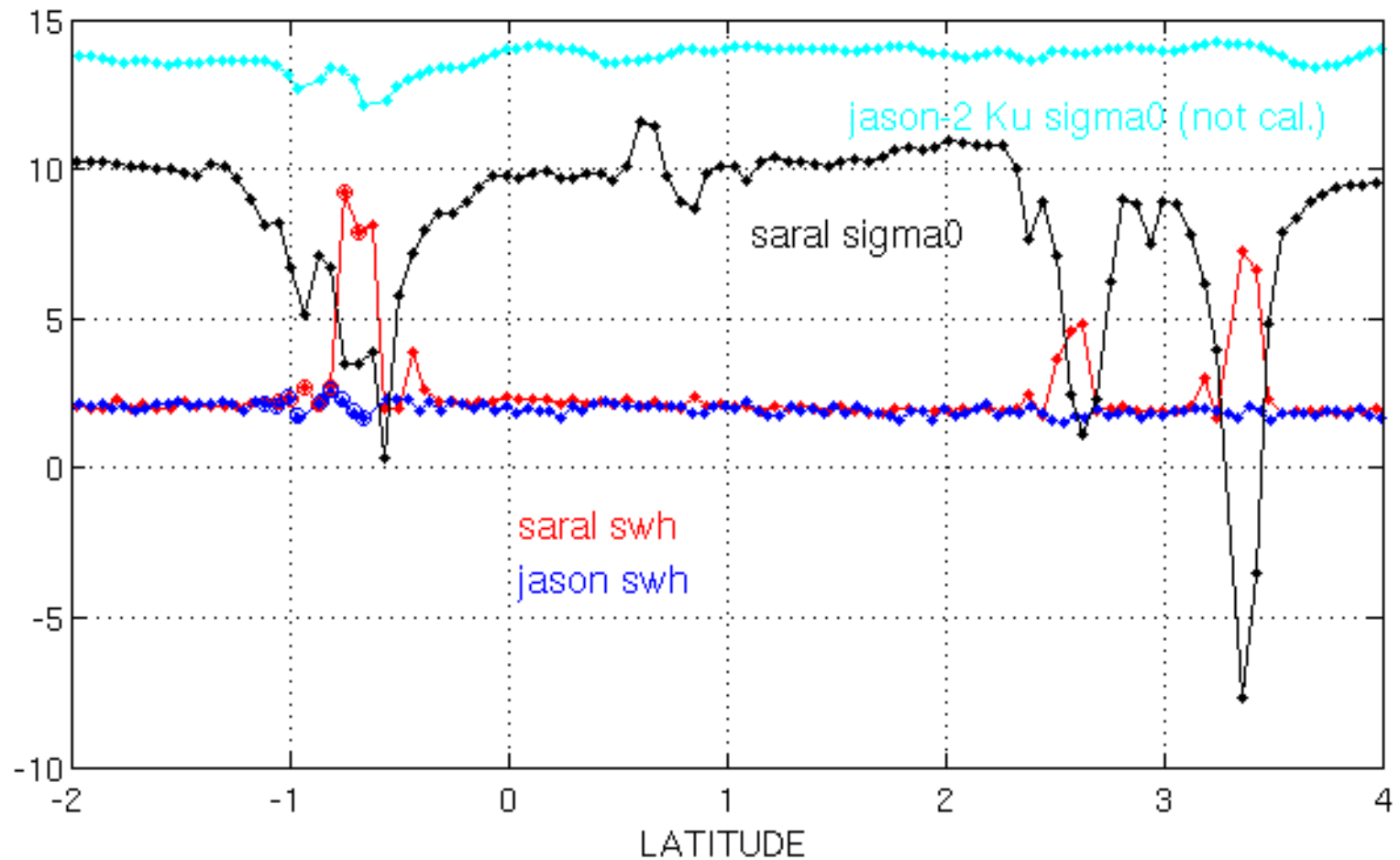
N-2 pass 244 cyc 179 SARAL pass 954 cyc 2





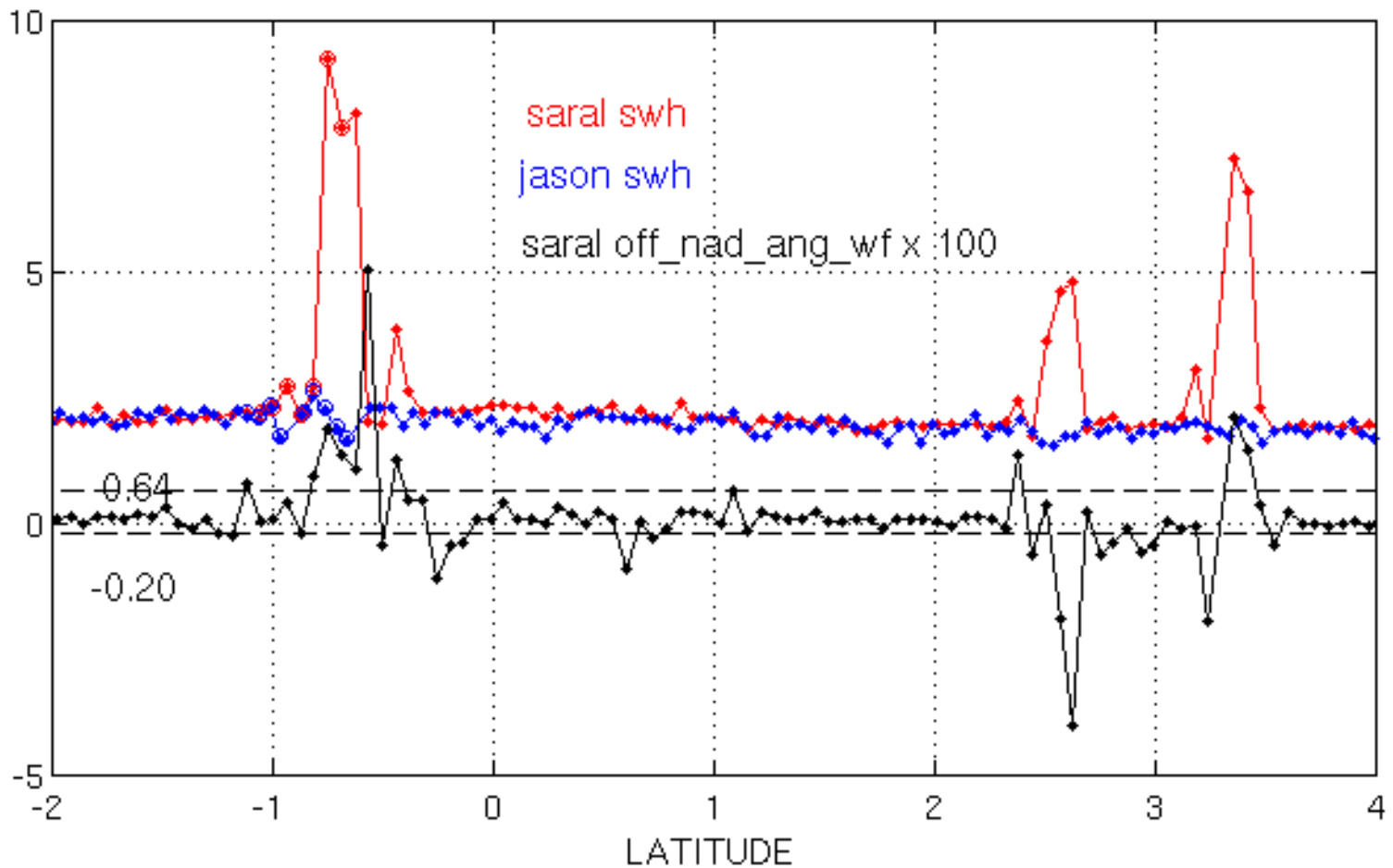
# SARAL SWH anomalies

JASON-2 pass 244 cyc 179 SARAL pass 954 cyc 2



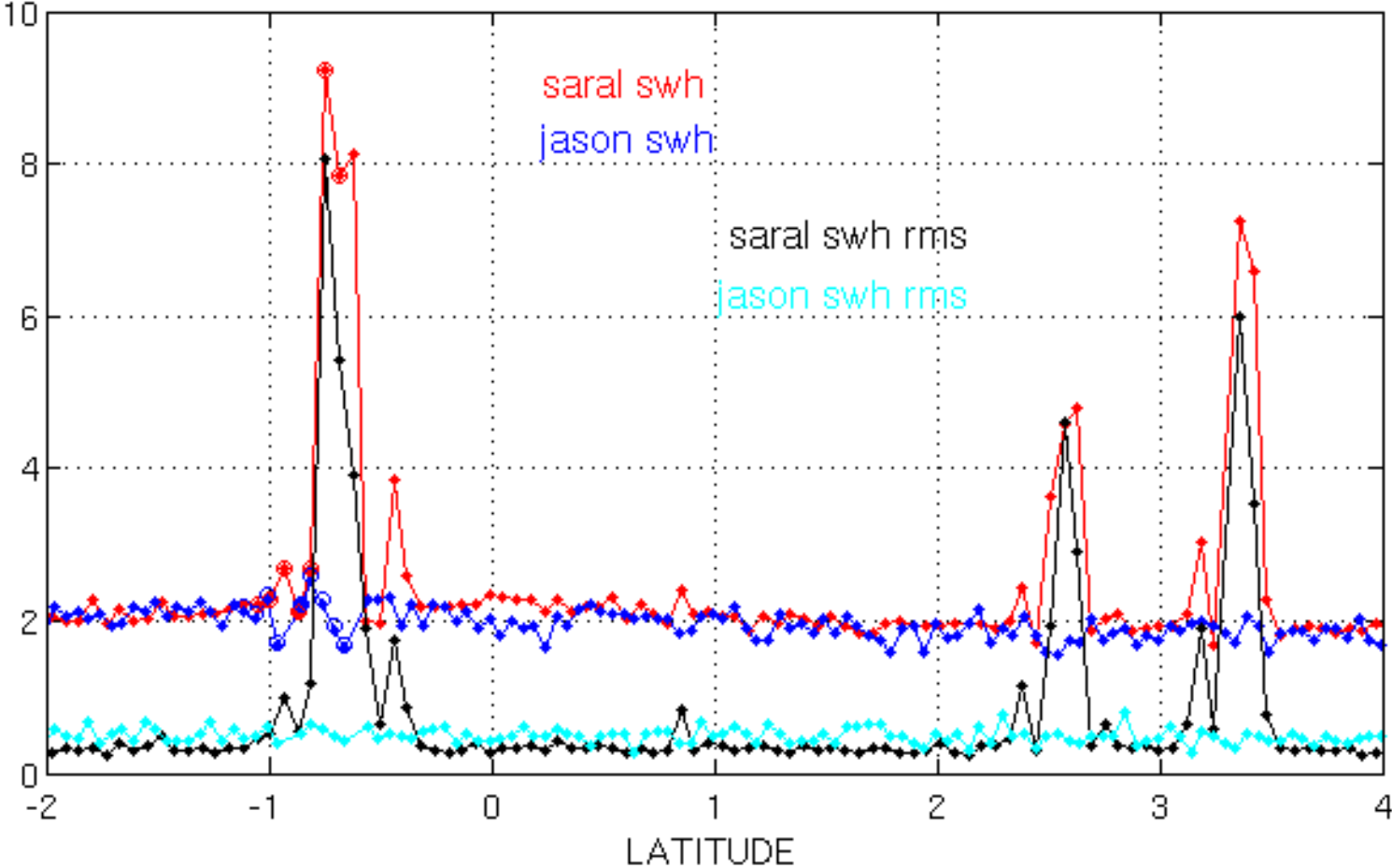
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JASON-2 pass 244 cyc 179 SARAL pass 954 cyc 2

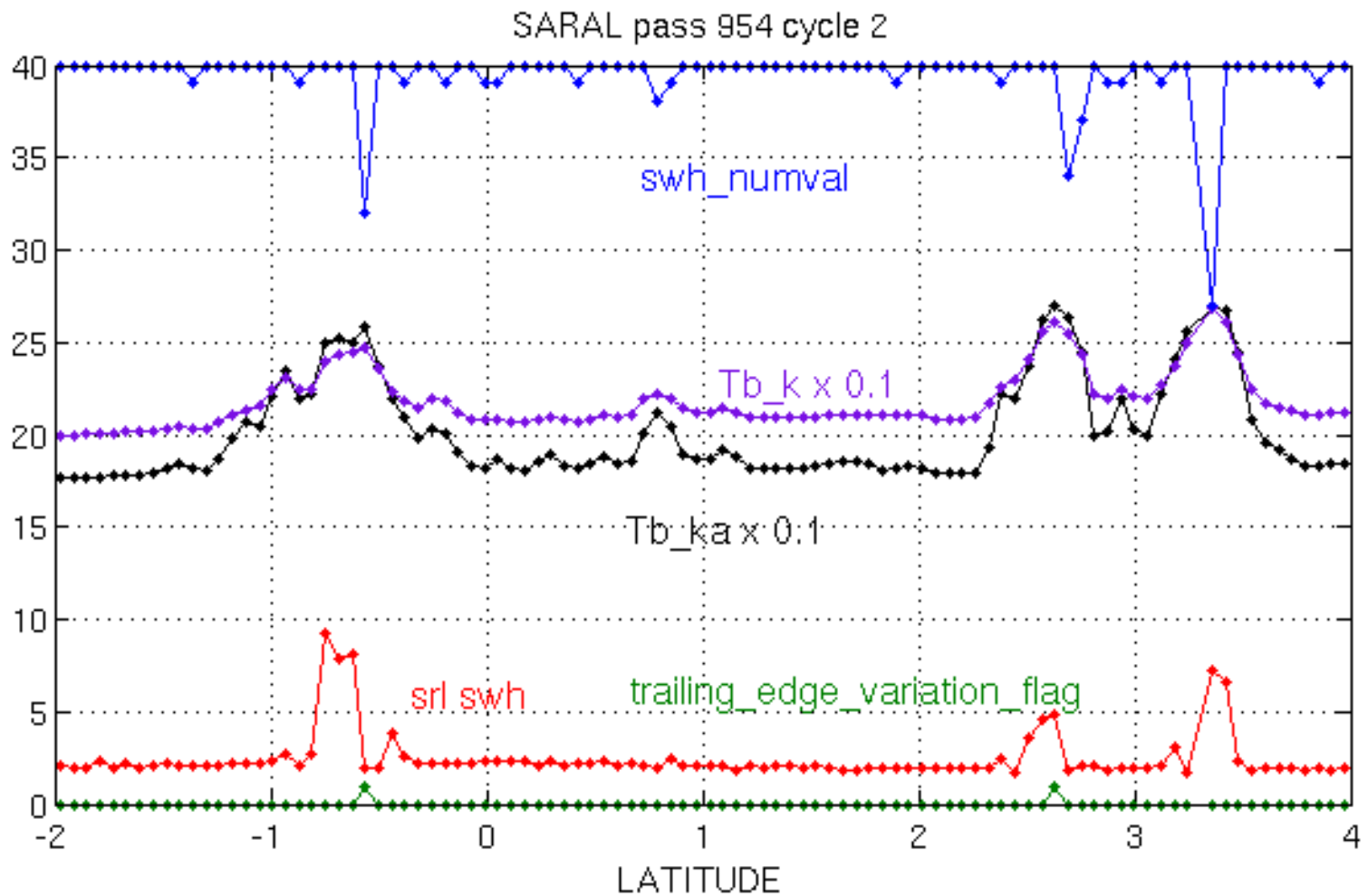


# SARAL SWH anomalies

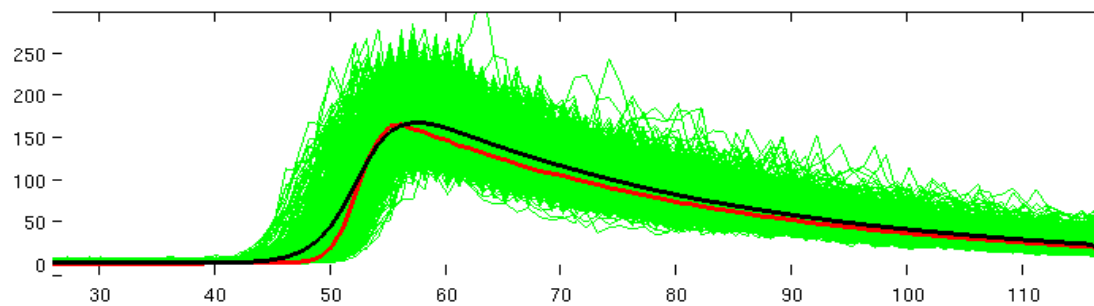
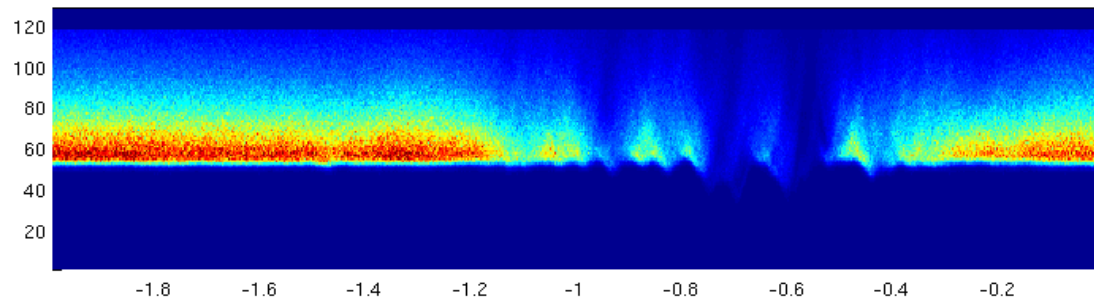
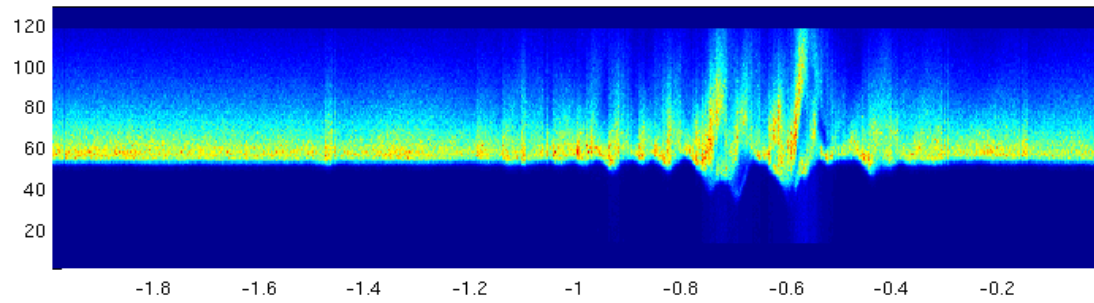
JASON-2 pass 244 cyc 179 SARAL pass 954 cyc 2



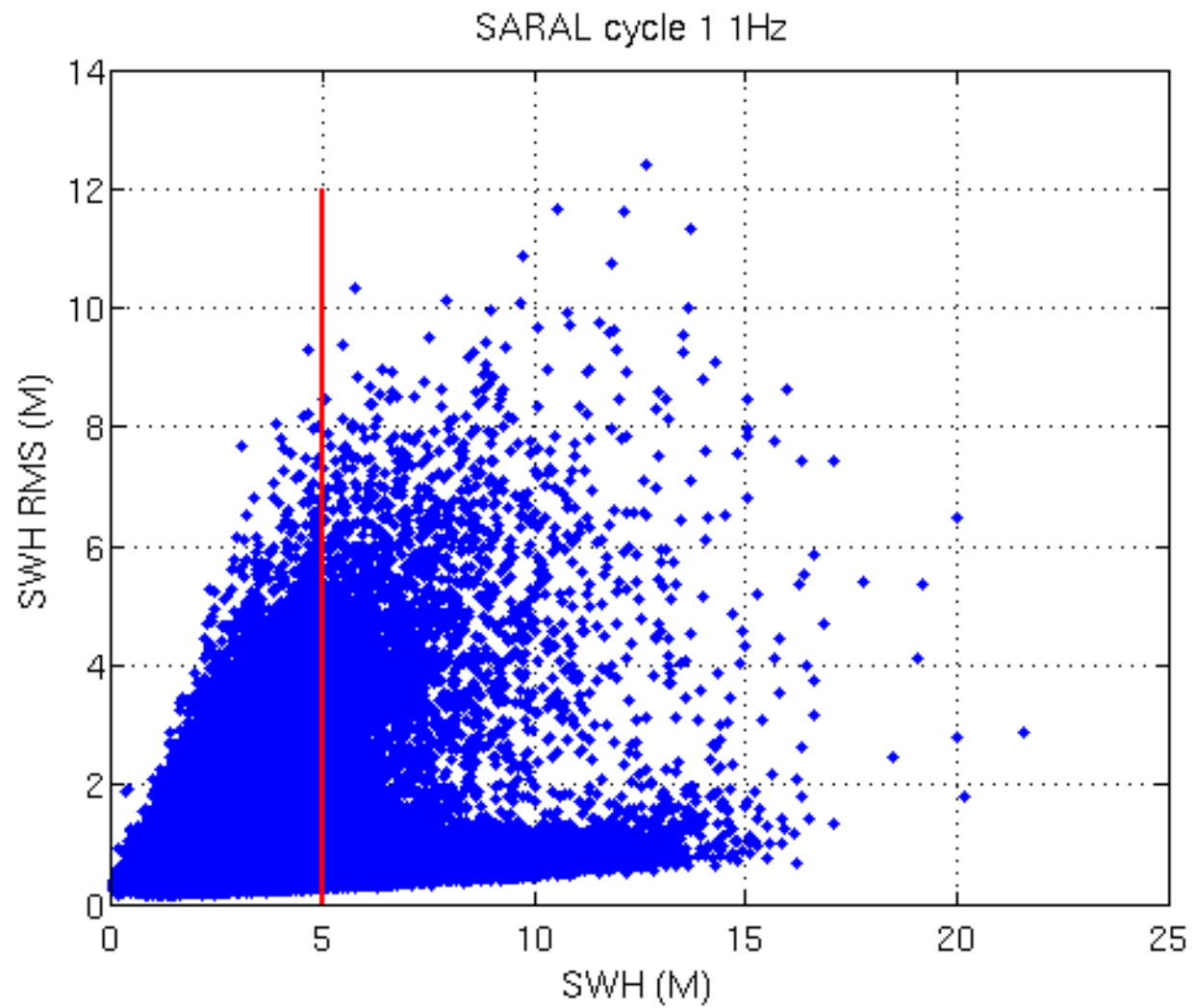
# SARAL SWH anomalies



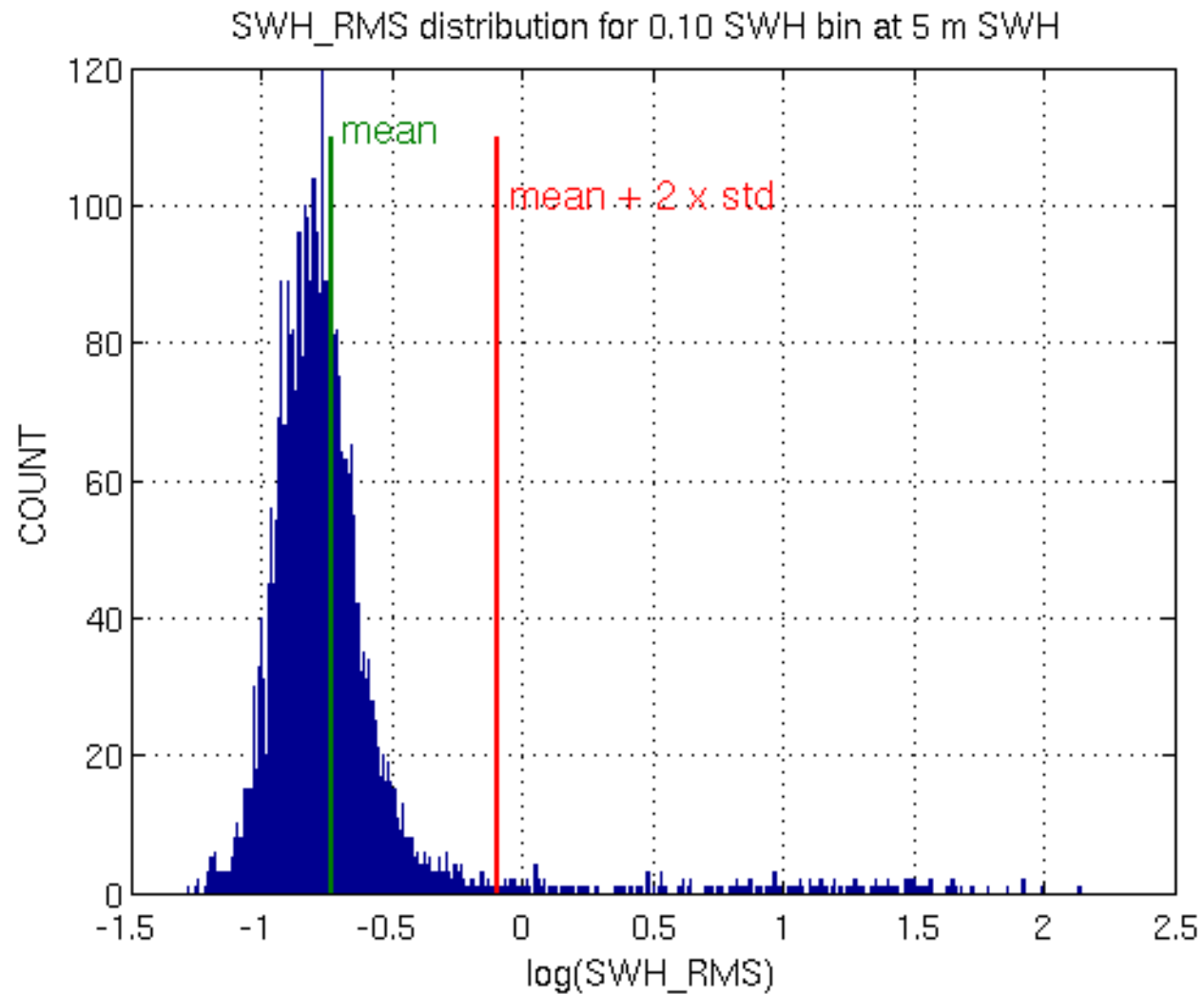
# SARAL WF anomalies



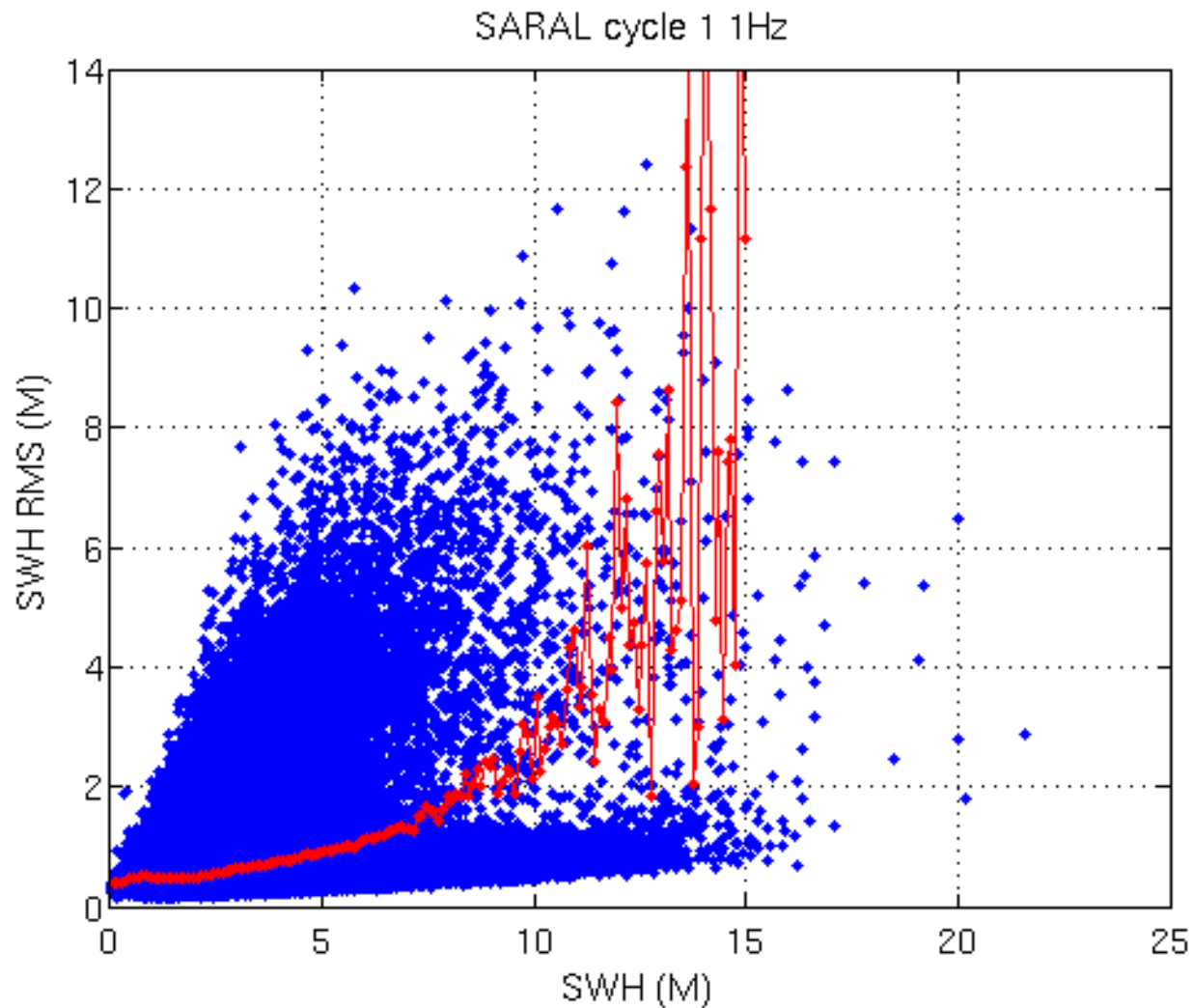
# SARAL SWH / SWH\_RMS



# SARAL SWH / SWH\_RMS

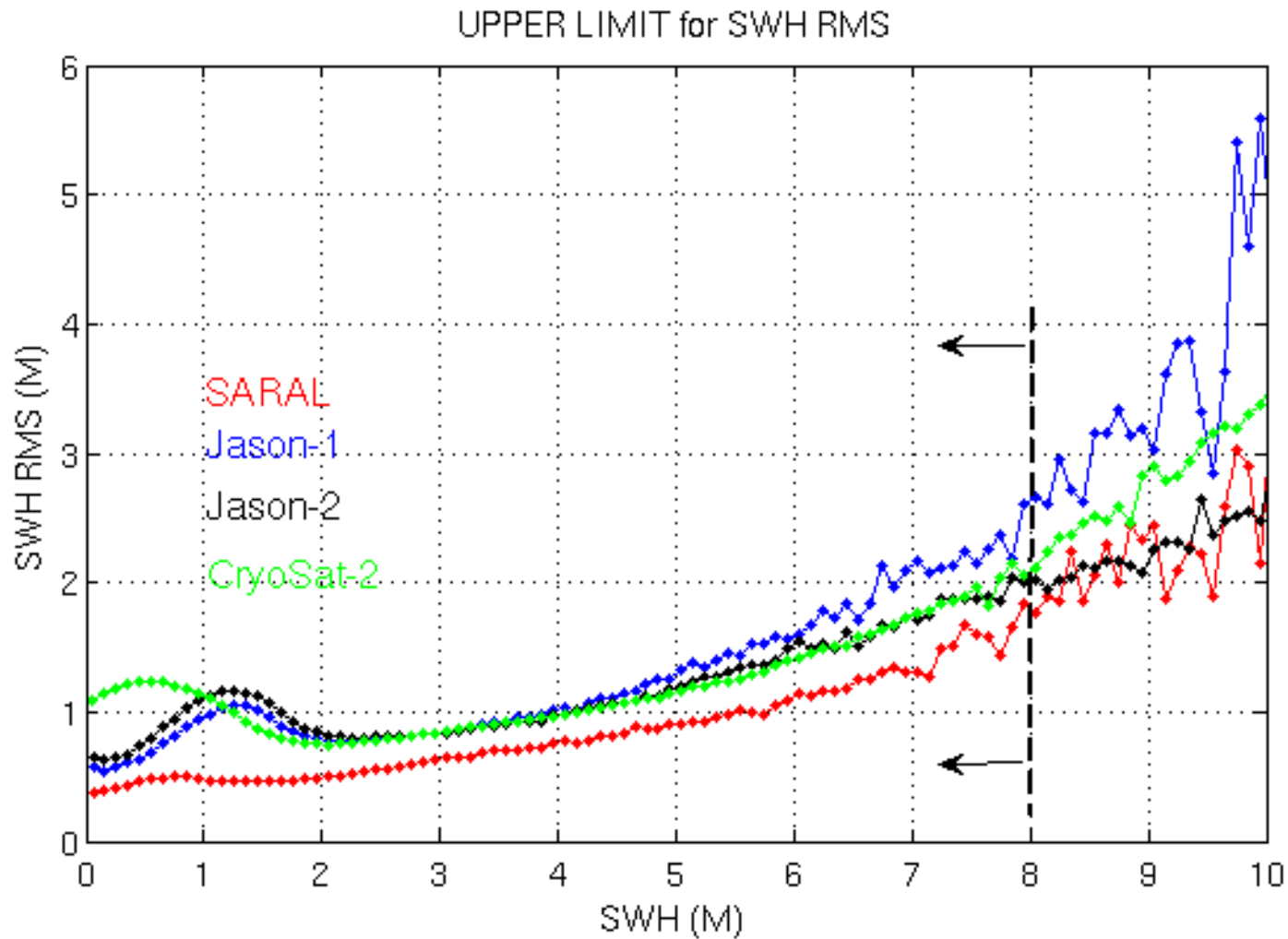


# SARAL upper limit for SWH\_RMS

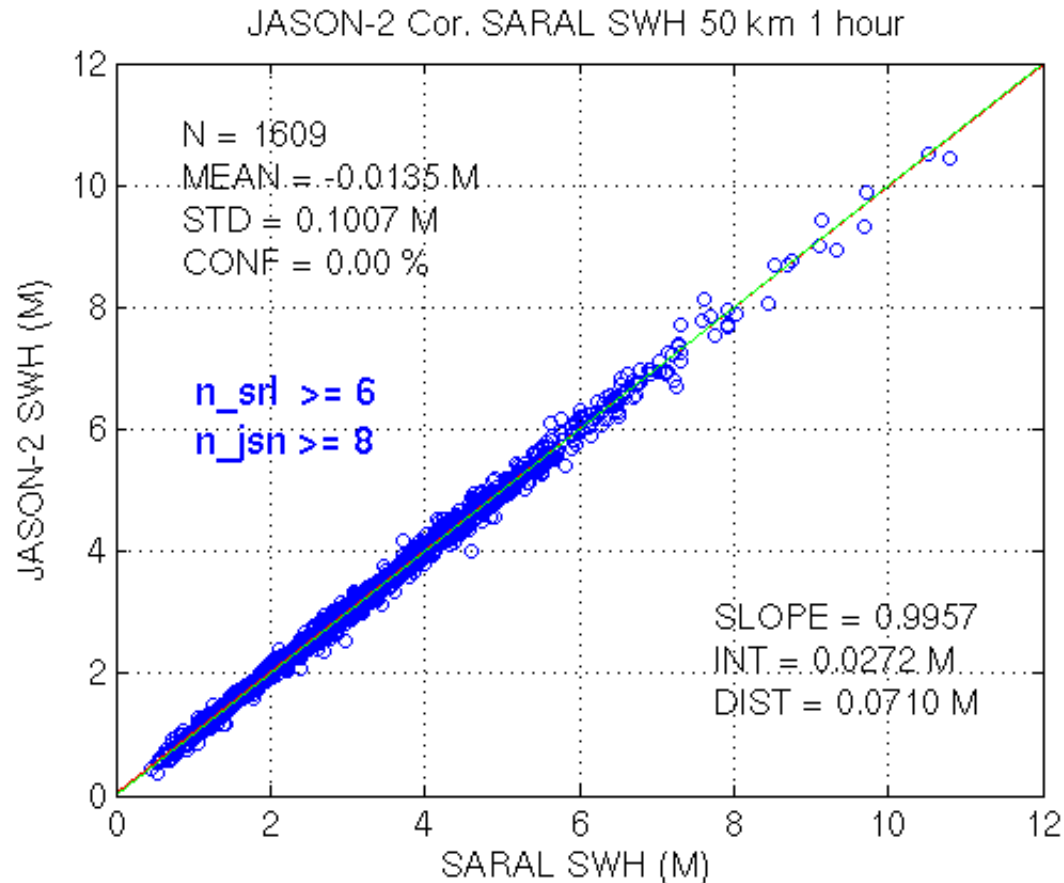




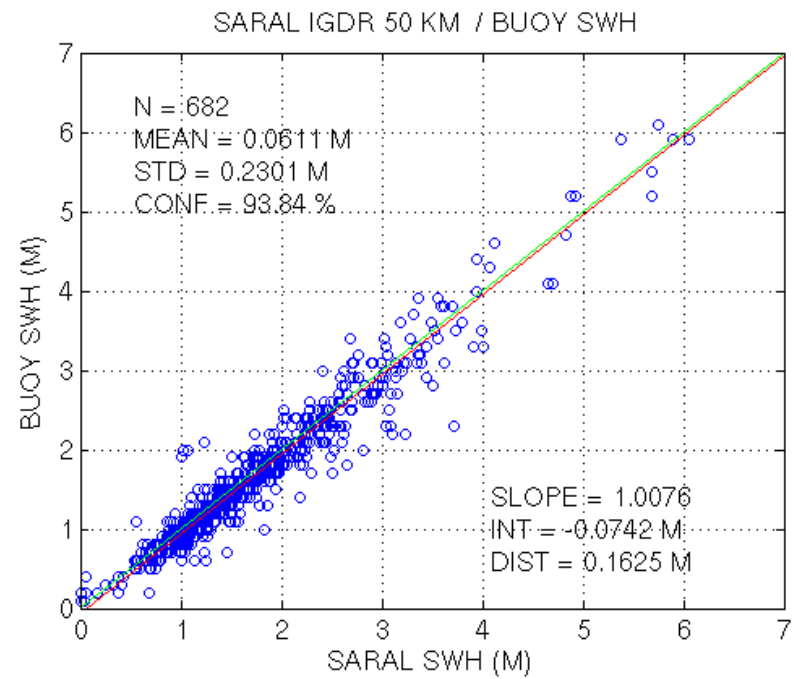
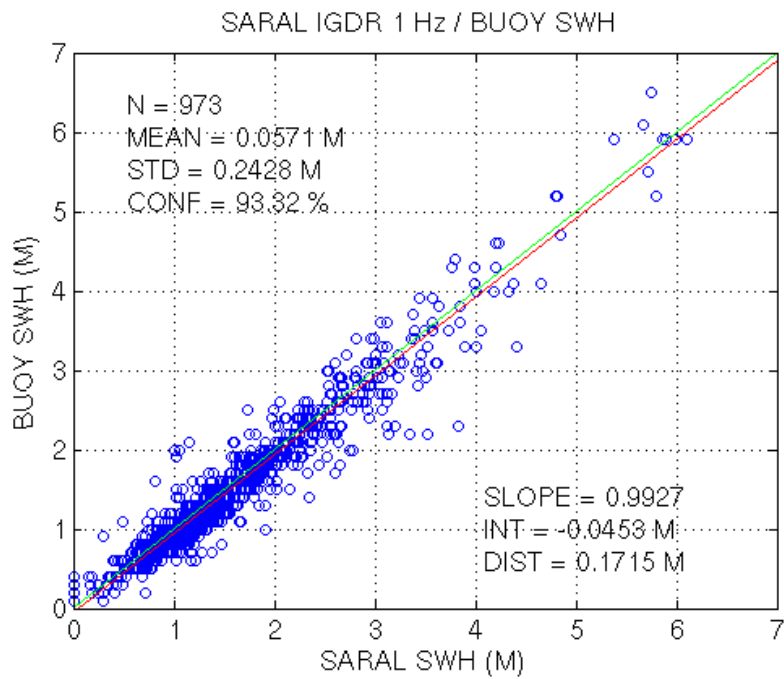
# UPPER LIMIT for SWH\_RMS



# SARAL / Jason-2 SWH 50 km 1 h updated data set & upper swh\_rms test



# SARAL / NDBC buoy SWH preliminary results



# Conclusion

- Very good accuracy of SARAL 1 Hz SWH
- Seems to be better than Jason-1&2
- More results from Cryosat-2 and NDBC buoy comparisons soon...
- Flagging rain contaminated SWH?
- For SWH we recommend to define a test based on upper limits for the off nadir angle wave form and for swh\_rms