

SCOOP acceptance review Ph2 RDSAR DS

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Overview

- Introducing 2nd phase RDSAR processing
- RDSAR data specification
- Preliminary assessment
- Conclusions
- Outlook to finalize product

2nd phase RDSAR processing

- As 1st phase RDSAR evaluation did not reveal much difference in waveforms and re-tracked heights, and as the procedure followed RADS RDSAR methodology (apart from updated CAL1 and CAL2 values, which are not applied in RADS), it was decided to leave the procedure as is (see: ATBD, RDSAR section)
- We did apply though the latest (default RADS values) corrections and models including Uporto wet tropo
- RADS data description can be found in the RADS 4 data manual ([github/RADS4](https://github.com/RADS4))

RDSAR processing continued

- :original = "L1R (2.06) from L1B (SIR1SAR/4.5) data of 2015-09-28 01:23:50\n",
- "CS_LTA__SIR_SAJ_1B_20120507T010741_20120507T011344_C001.nc" ;
- :log01 = "2018-11-26 | rads_gen_c2_l1r -Sc2 -m -w: RAW data from L1R (2.06) from L1B (SIR1SAR/4.5) data of 2015-09-28 01:23:50" ;
- :history = "2018-11-26 23:36:49 : rads_gen_c2_l1r -Sc2 -m -w\n",
- "2018-11-27 01:52:18 : rads_add_ncep -Sc2 -gs\n",
- "2018-11-27 08:52:04 : rads_fix_c2 -Sc2 --all\n",
- "2018-11-27 13:51:32 : rads_add_ssb -Sc2 --all\n",
- "2018-11-27 17:28:06 : rads_add_orbit -Sc2 -Valt_gdre --equator --loc7-7 --rate\n",
- "2018-11-27 18:38:35 : rads_add_orbit -Sc2 -Valt_eig6c\n",
- "2018-11-27 18:53:07 : rads_add_grid -Sc2 -Vdist_coast,inv_bar_mog2d_mean,gia,mss_cnescls11,basin\n",
- "2018-11-27 18:57:03 : rads_add_grid -Sc2 -Vgeoid_egm2008,mss_cnescls15\n",
- "2018-11-27 20:33:10 : rads_add_grid -Sc2 -Vtopo_dtu10,mss_dtu13,mss_dtu15,mss_dtu18\n",
- "2018-11-27 20:38:37 : rads_add_grid -Sc2 -Vgeoid_eigen6,topo_srtm30plus\n",
- "2018-11-27 20:41:55 : rads_add_grid -Sc2 -Vgeoid_xgm2016\n",
- "2018-11-27 20:52:03 : rads_add_grid -Sc2 -Vtopo_srtm15plus\n",
- "2018-11-27 23:41:45 : rads_add_grid -Sc2 -Vprox_coast\n",
- "2018-11-28 00:34:34 : rads_add_surface -Sc2\n",
- "2018-11-28 00:39:42 : rads_add_surface -Sc2 -s\n",
- "2018-11-28 00:41:27 : rads_add_tide -Sc2 --models=stide,ptide,fes04,got48,got410,annual\n",
- "2018-11-28 00:49:29 : rads_add_tide -Sc2 --models=fes14,lptide\n",
- "2018-11-28 04:10:21 : rads_add_refframe -Sc2\n",
- "2018-11-28 06:37:26 : rads_add_sst -Sc2 --all\n",
- "2018-11-28 06:58:30 : rads_add_ncep -Sc2 --dry --wet --air\n",
- "2018-11-28 07:00:52 : rads_add_era -Sc2 --dry --wet\n",
- "2018-11-28 07:07:44 : rads_add_ecmwf -Sc2 --all\n",
- "2018-11-28 07:50:32 : rads_add_iono -Sc2 --all\n",
- "2018-11-28 07:51:41 : rads_add_mog2d -Sc2\n",
- "2018-11-28 07:59:24 : rads_add_ww3_222 -Sc2 --all\n",
- "2018-11-28 09:23:26 : rads_add_sla -Sc2\n",
- "2018-11-28 12:23:31 : rads_add_sla -Sc2 --multi-hz" ;

Assessment

- Arbitrarily picked re-tracked uncorrected altimeter range compare very well with original RADS product (all $< 10\text{mm}$ and average difference 3 mm). Differences must be due to differences in CAL# values.
- Dual-satellite crossover difference statistics for ROI_03_East_Pacific show again close comparison to RADS Cryosat-2, GOP 2 Cryosat-2, and Jason-2.
- Collinear tracks analyses subtracting per cycle the RADS Cryosat data from the SCOOP data shows again close agreement in SLA and SM0, a difference of approximately 7 cm in SWH was found for cycle 33.

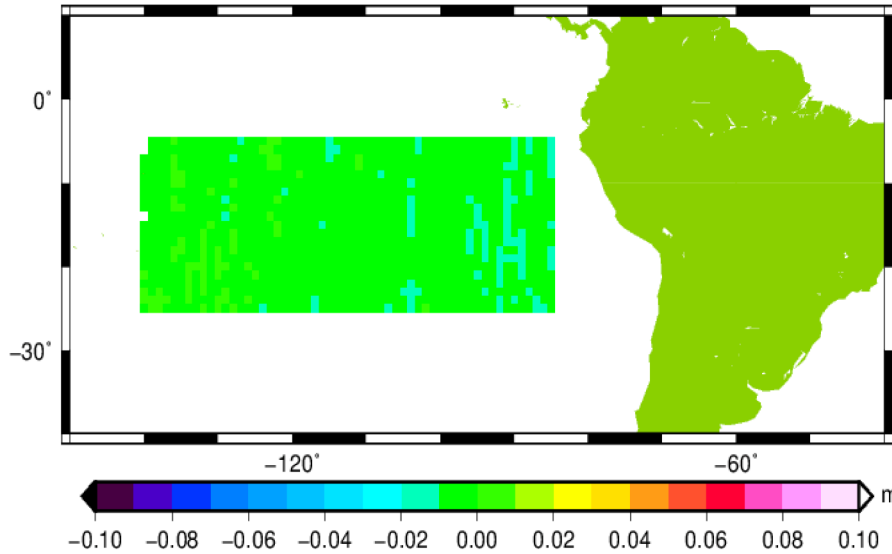
DUAL XO statistics ROI_03: edit 2σ & $\Delta t > 5$ days

	SCOOP – RADS CS2		SCOOP – GOP CS2		SCOOP – Jason-2	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
SLA (m)	−0.0025	0.0422	0.0306	0.0450	0.0033	0.0334
SWH (m)	−0.0764	0.8307	0.1769	0.8251	0.1413	0.5579
Sig0 (dB)	−0.0655	2.0312	0.4529	2.0928	−0.4087	1.2084

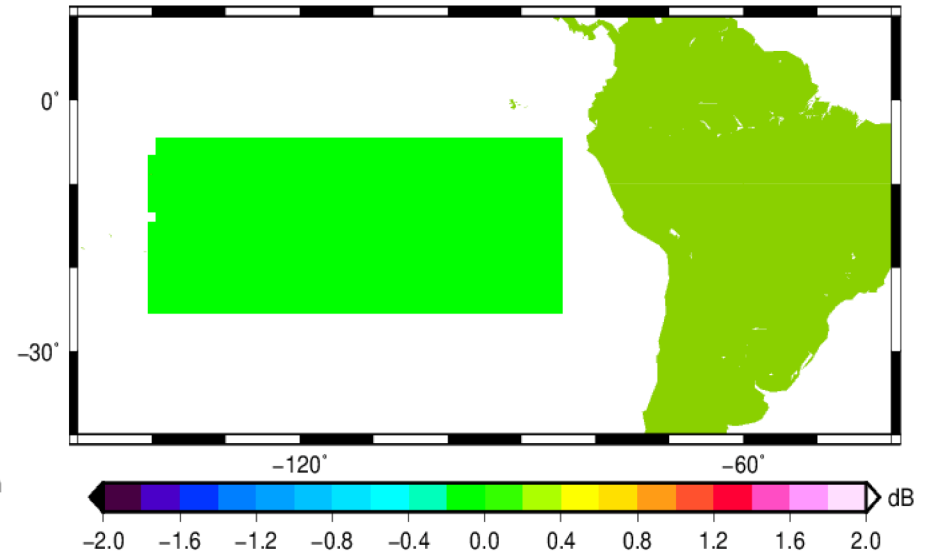
	GOP CS2 – Jason-2		RADS CS2 – Jason-2	
	Mean	St. dev.	Mean	St. dev.
SLA (m)	−0.0374	0.0369	0.0070	0.0335
SWH (m)	−0.0367	0.5481	0.1837	0.5487
Sig0 (dB)	−0.8580	1.3894	−0.3178	1.2958

Collinear tracks analyses: direct difference SCOOP and RADS CryoSat

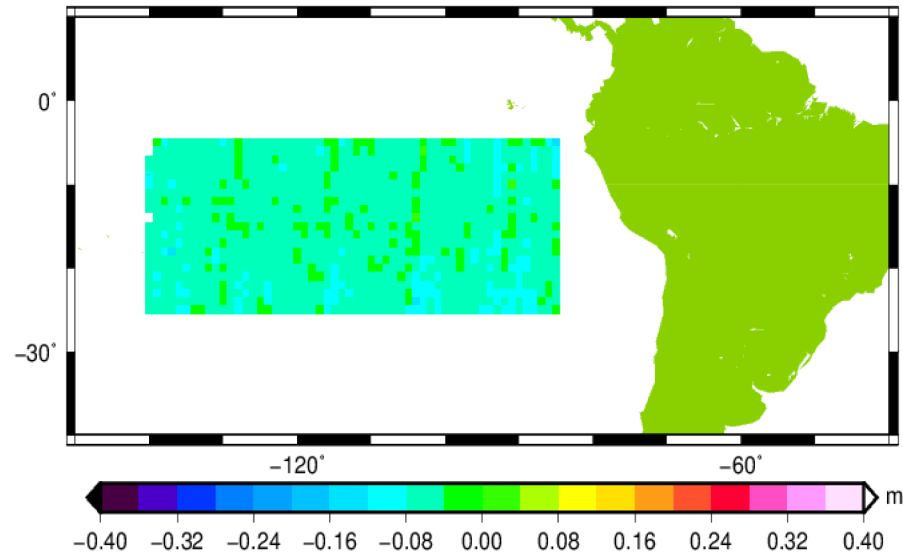
SLA collinear difference (33)



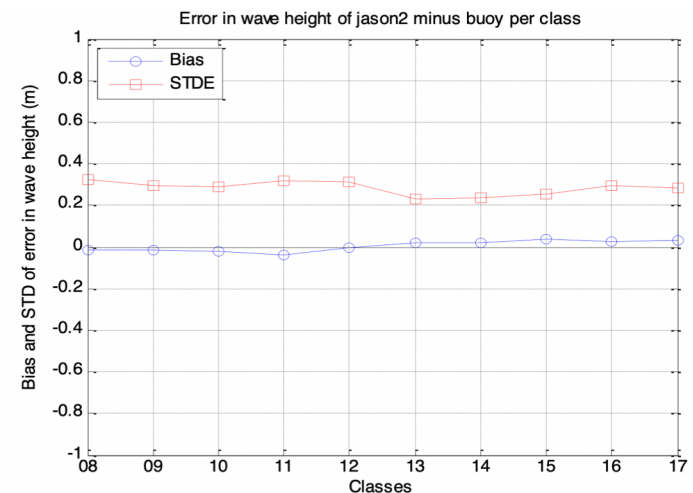
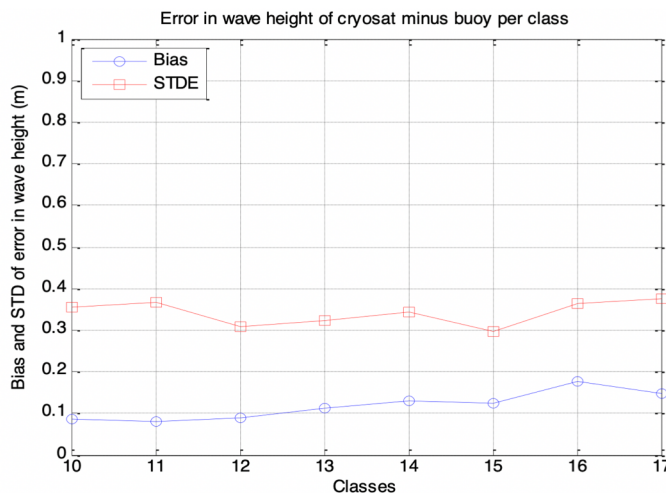
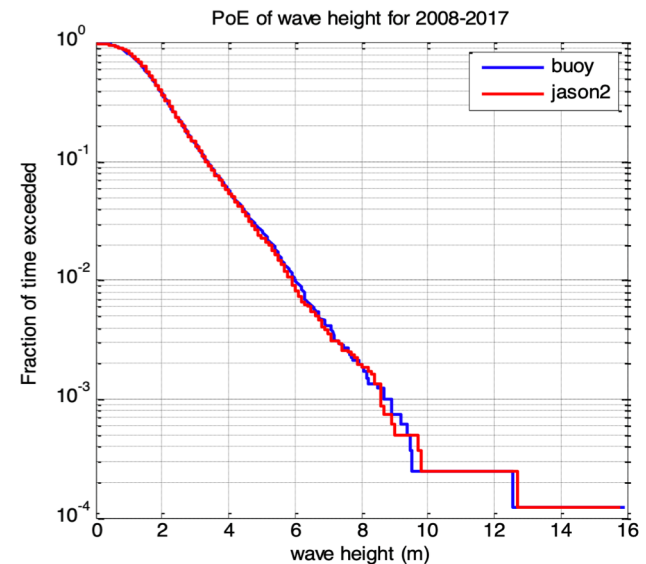
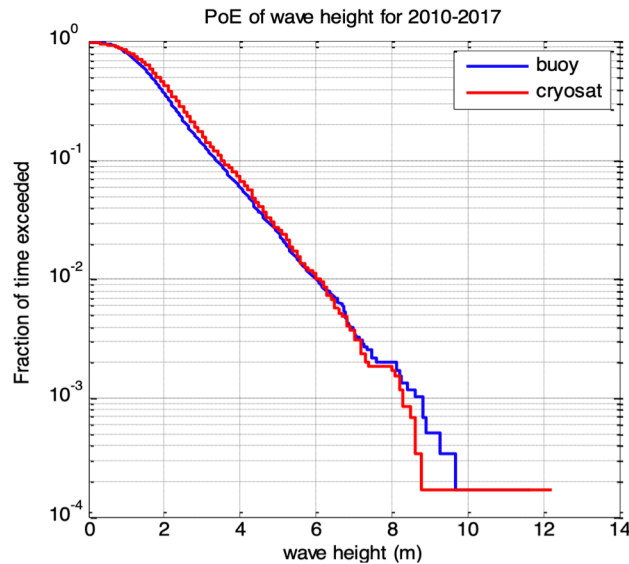
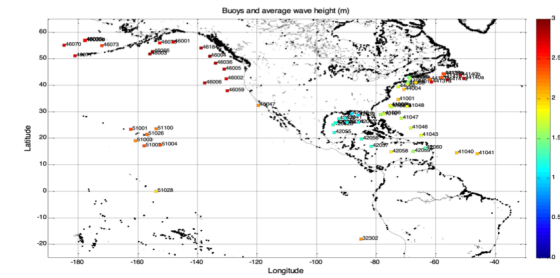
SMO collinear difference (33)



SWH collinear difference (33)



SWH Calibration: RADS has >12cm bias



Conclusions

- Concerning SLA and sigma0, SCOOP 2nd phase RDSAR product is close to (current) RADS CryoSat product. Differences can be explained by differences in applied CAL1 and CAL2
- Concerning SWH, there is a difference of approx. 7 cm making the SCOOP product closer to Jason-2 than the RADS product.
- The collinear analyses show similar results as the crossover analyses. The values are not the same as for the crossovers we evaluated the total time span whereas for the collinear analyses only 1 cycle was investigated.

Outlook to finalize product

- For the final product the swh issue has to be solved: it seems that the SCOOP RDSAR overestimates the SWH
- If the consensus is that for CryoSat MLE4 is better than MLE3 for open-ocean re-tracking we can reprocess. The question is how reliable is the info from the star trackers
- The issue of geographical correlated orbit error as raised by Thomas Moreau is dealt with by using the latest gdr_e orbits instead of the original orbits.
- In the final issue of the dataset the Uporto WTC will be added (availability issue made it not possible for the current set)