National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

SATOC
SATELLITE OCEANOGRAPHIC CONSULTANTS

SKYMAT

SCOOP WP6200/6600

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With contributions from Paolo Cipollini

Aim

- The aim of this work package is to characterize the performance of CryoSat-2 SAR mode altimeter product by assessing the uncorrected sea surface height (USSH, Altitude minus Range) and significant wave height (SWH) from new datasets as part of Phase 2 in nine regions of interest (ROIs)

Data

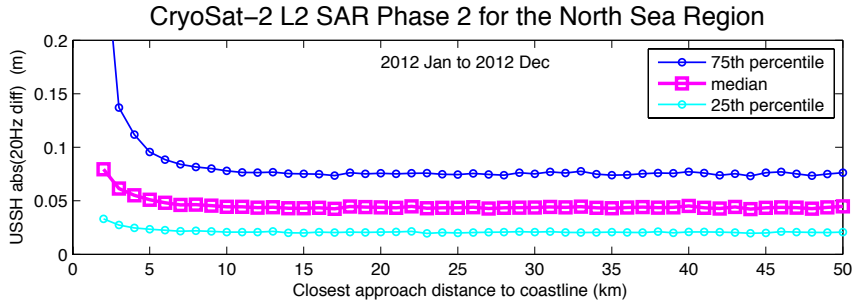
- CryoSat-2 SAR Level-2 geophysical dataset G-POD
- CryoSat-2 SAR Level-2 Phase 2 geophysical dataset
- CryoSat-2 SAR Level-2 Phase 2 coastal L1B proc (only 6 regions)
- Please note, the Flag "Flag_validity_L1B_wvfm_20_ku" was not applied to this analysis.
  However, if applied the difference in the first 5km for USSH noise was approx. 0.1 mm and the SWH approx. 3-5 mm for the first 10 km.

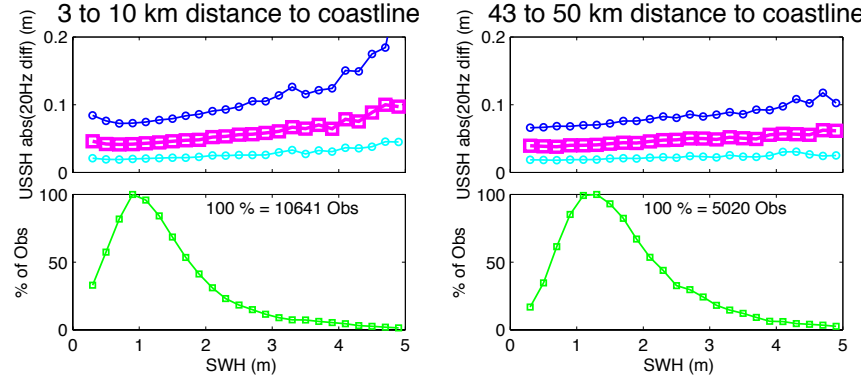
Methodology to Assess the Performance

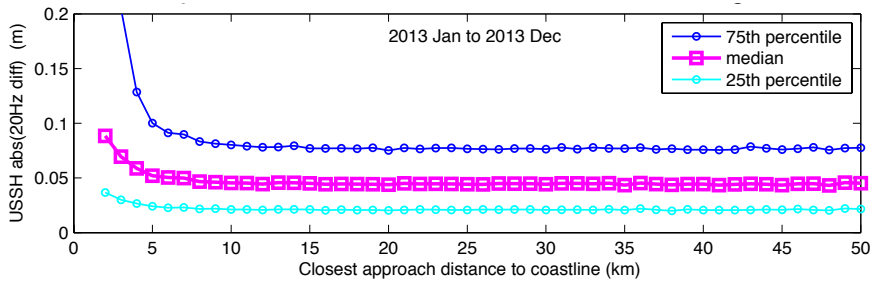
- We investigate the USSH noise and SWH along track data as a function of distance to the coastline. The noise is defined by calculating successive differences along the altimeter track that enables the observations to behave statistically like white noise.
- We compare the L2 Phase 2 dataset with the corresponding G-POD dataset for each region of the USSH Noise and SWH as a function of distance to the coast. In addition, we also compare these results to Phase 2 coastal L1B Proc (L2) dataset (USSH Noise only over 6 regions).
- *As part of the analysis we examine the noise of USSH as a function of SWH for the inshore region (3km to 10 km) and an offshore region (43km to 50 km). The aim here is to determine whether the SWH is influenced by the USSH noise close to the coast. The SWH data are binned in 0.2m intervals between 0.3 and 4.9 m to produce the median USSH noise value, but this is only mentioned briefly during this presentation due to time constraints.*

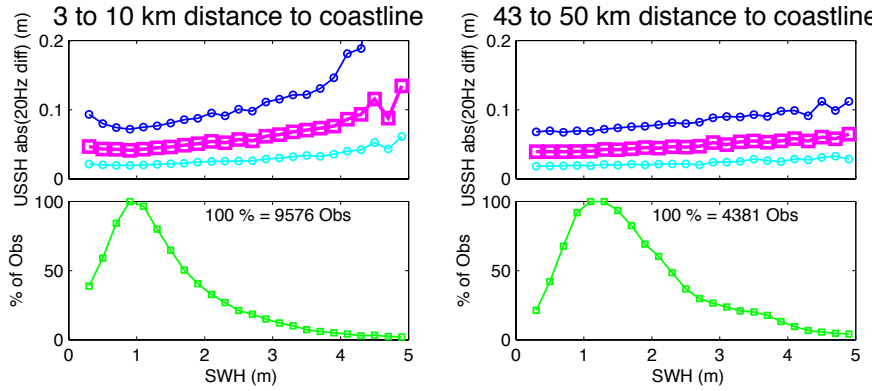
Regions of Interest

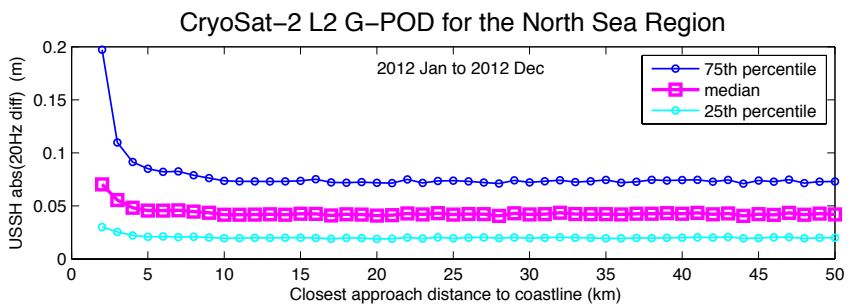
- North Sea (2012 to 2013)
- Central Pacific (Oct 2012 to Dec 2013)
- Agulhas 2012 to 2013
- Harvest (Dec 2015 to May 2016)
- East Pacific Region (May 2012 Dec 2013)
- Indonesia (2013 to 2013)
- North Indian Coast Region Oct 2012 to Dec 2013
- Northeast Atlantic Region 2012 to 2013
- West Pacific Region (Oct 2013 to Dec 2013)

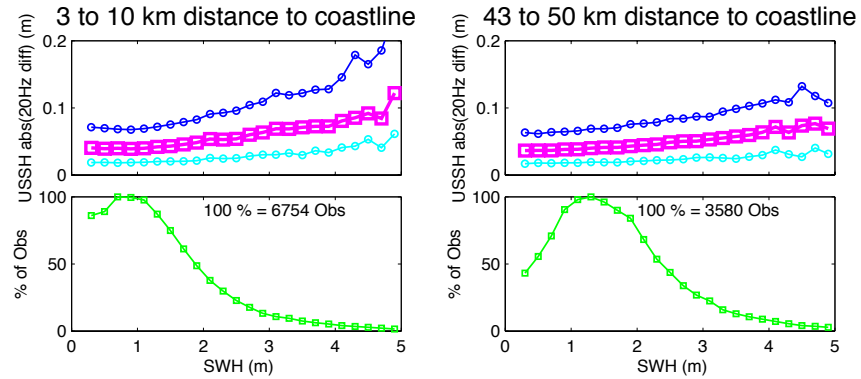

CryoSat−2 L2 SAR Phase 2 for the North Sea Region
2012 Jan to 2012 Dec
75th percentile
median
25th percentile
USSH abs(20Hz diff) (m)
Closest approach distance to coastline (km)

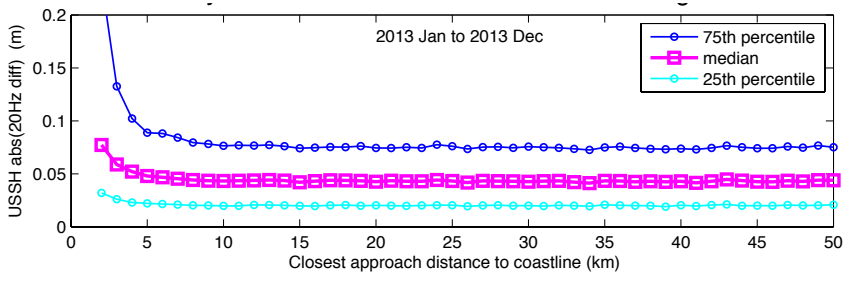

3 to 10 km distance to coastline
43 to 50 km distance to coastline
USSH abs(20Hz diff) (m)
% of Obs
100 % = 10641 Obs
100 % = 5020 Obs
SWH (m)

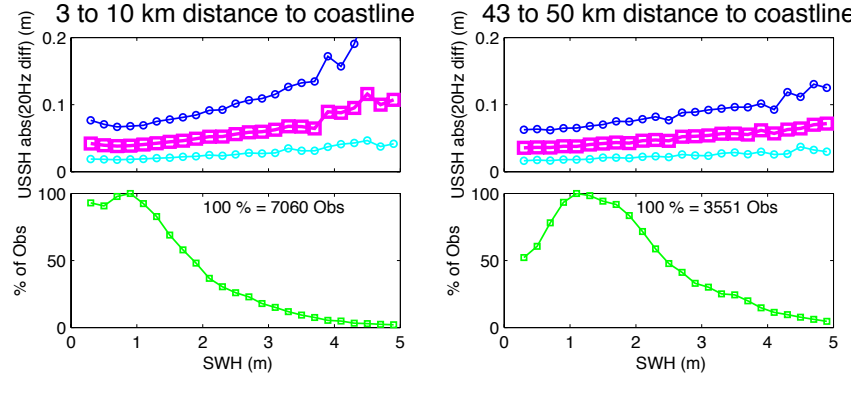

2013 Jan to 2013 Dec
75th percentile
median
25th percentile
USSH abs(20Hz diff) (m)
Closest approach distance to coastline (km)


3 to 10 km distance to coastline
43 to 50 km distance to coastline
USSH abs(20Hz diff) (m)
% of Obs
100 % = 9576 Obs
100 % = 4381 Obs
SWH (m)


CryoSat−2 L2 G−POD for the North Sea Region
2012 Jan to 2012 Dec
75th percentile
median
25th percentile
USSH abs(20Hz diff) (m)
Closest approach distance to coastline (km)


3 to 10 km distance to coastline
43 to 50 km distance to coastline
USSH abs(20Hz diff) (m)
% of Obs
100 % = 6754 Obs
100 % = 3580 Obs
SWH (m)

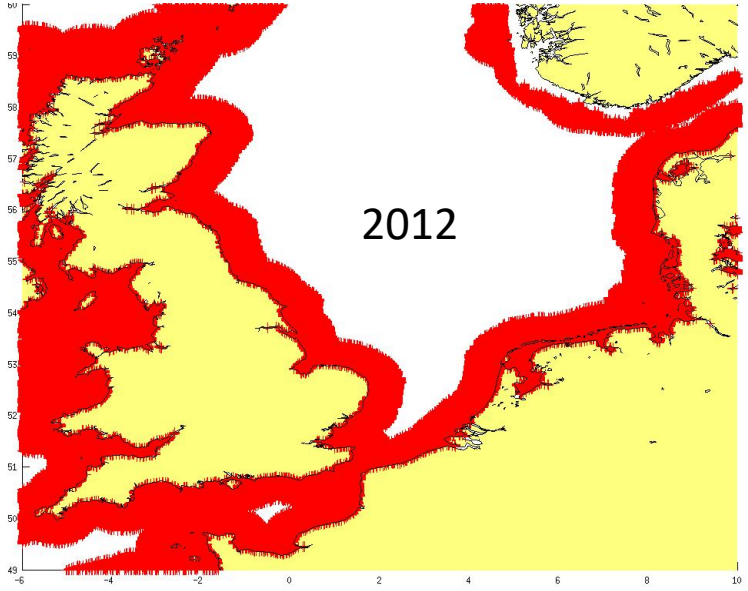

2013 Jan to 2013 Dec
75th percentile
median
25th percentile
USSH abs(20Hz diff) (m)
Closest approach distance to coastline (km)

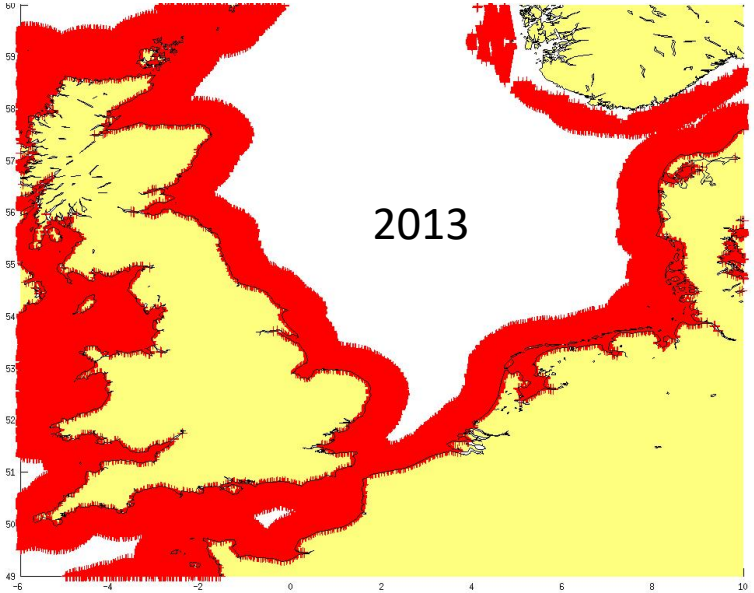

3 to 10 km distance to coastline
43 to 50 km distance to coastline
USSH abs(20Hz diff) (m)
% of Obs
100 % = 7060 Obs
100 % = 3551 Obs
SWH (m)

North Sea USSH Noise

	1	2	3	5	10	20	30	40
North Sea 2012								
SAR Phase2 No. of Observations		16200	15557	13730	11558	9815	8522	7230
G-POD No. of Observations		12970	12592	11182	9635	8312	7213	6157
SAR Phase2 Median Noise value		0.080	0.061	0.051	0.044	0.044	0.044	0.045
G-POD Median Noise value		0.070	0.055	0.046	0.042	0.041	0.042	0.043
Difference		0.009	0.006	0.005	0.003	0.003	0.002	0.003
North Sea 2013								
SAR Phase2 No. of Observations		15449	15030	13120	10278	9206	8245	7431
G-POD No. of Observations		14416	13990	12178	9615	8934	7953	7267
SAR Phase2 Median Noise value		0.088	0.070	0.052	0.046	0.044	0.044	0.044
G-POD Median Noise value		0.077	0.059	0.048	0.043	0.043	0.043	0.043
Difference		0.011	0.011	0.004	0.002	0.001	0.002	0.001

SAR Phase2 consistent +ve difference



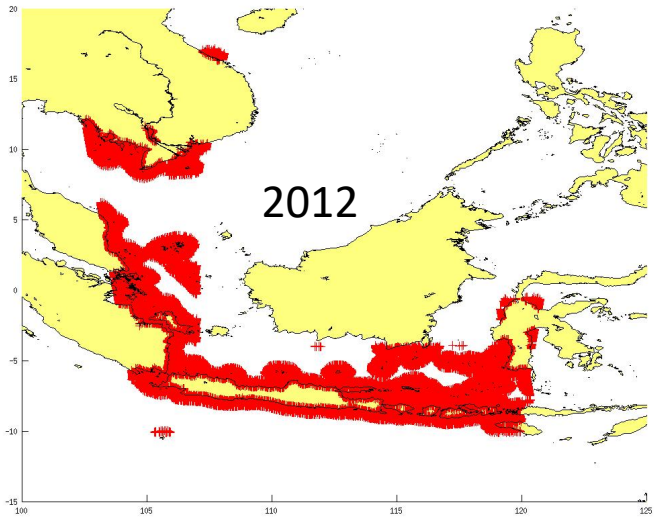


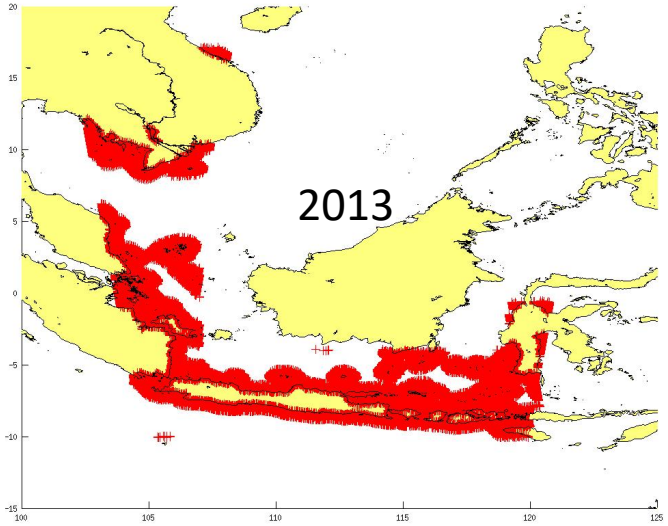
Shallow Basin

Indonesia USSH Noise

	1	2	3	5	10	20	30	40
Indonesia 2012								
SAR Phase2 No. of Observations		13956	14849	13978	12175	10904	9723	8413
G-POD No. of Observations		13454	14264	13442	11796	10557	9307	8116
SAR Phase2 Median Noise value		0.073	0.057	0.048	0.045	0.044	0.044	0.045
G-POD Median Noise value		0.065	0.051	0.044	0.042	0.043	0.041	0.043
Difference		0.008	0.005	0.004	0.003	0.001	0.002	0.002
Indonesia 2013								
SAR Phase2 No. of Observations		13588	14583	13497	12037	10150	9444	7839
G-POD No. of Observations		13404	14386	13367	11906	10013	9245	7716
SAR Phase2 Median Noise value		0.074	0.061	0.048	0.044	0.044	0.045	0.045
G-POD Median Noise value		0.066	0.052	0.045	0.043	0.043	0.042	0.043
Difference		0.008	0.009	0.003	0.001	0.001	0.002	0.002

SAR Phase2 consistent +ve difference



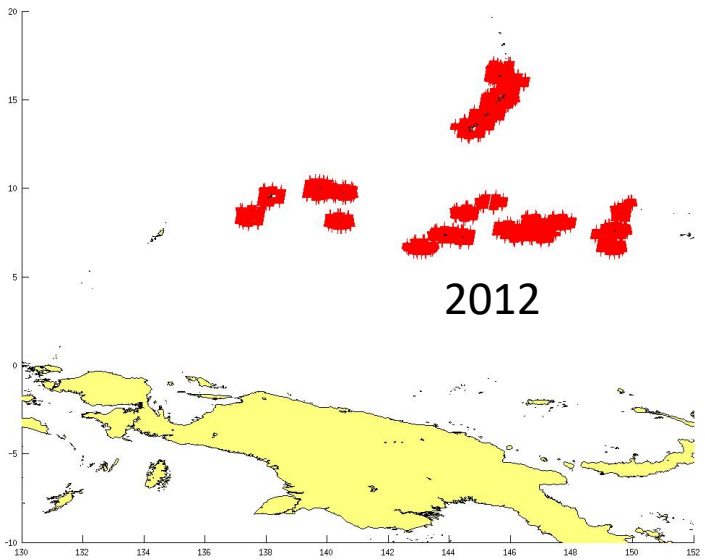


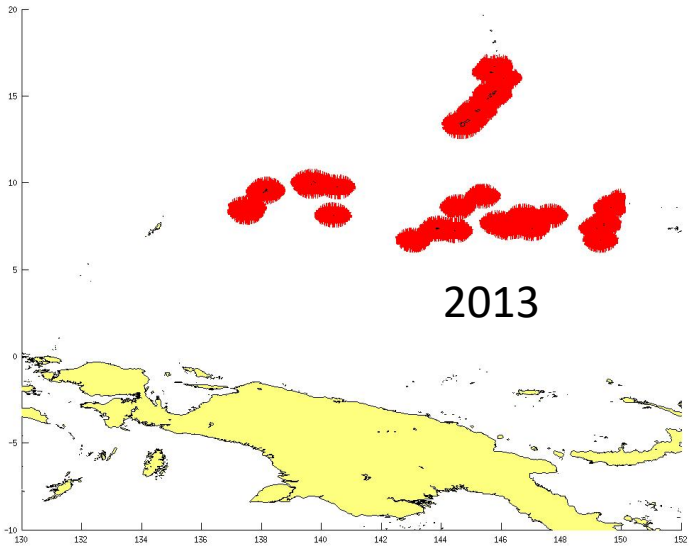
Shallow Basin

West Pacific USSH Noise

	1	2	3	5	10	20	30	40
			West Pacific 2012					
SAR Phase2 No. of Observations		275	343	370	456	658	1044	1043
G-POD No. of Observations		241	323	353	424	629	985	1001
SAR Phase2 Median Noise value		0.069	0.048	0.056	0.048	0.051	0.049	0.048
G-POD Median Noise value		0.064	0.048	0.049	0.042	0.050	0.048	0.051
Difference		0.005	0.000	0.007	0.006	0.001	0.001	-0.003
			West Pacific 2013					
SAR Phase2 No. of Observations		822	1158	1397	1885	2922	3599	4128
G-POD No. of Observations		805	1120	1357	1856	2861	3471	4030
SAR Phase2 Median Noise value		0.061	0.054	0.044	0.046	0.046	0.046	0.048
G-POD Median Noise value		0.054	0.051	0.046	0.046	0.046	0.044	0.047
Difference		0.007	0.003	-0.003	0.001	0.001	0.002	0.001

SAR Phase2 overall +ve difference



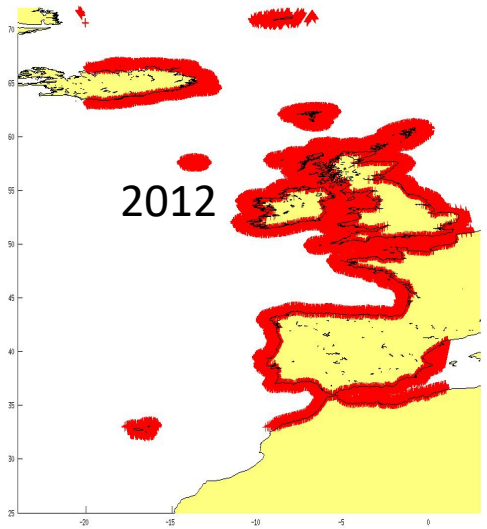


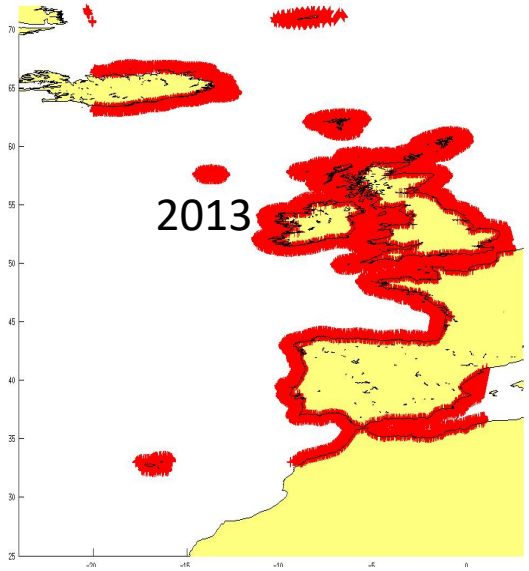
Shallow Basin

North East Atlantic USSH Noise

	1	2	3	5	10	20	30	40
Northeast Atlantic 2012								
SAR Phase2 No. of Observations		26032	25059	23800	21397	19721	18235	16813
G-POD No. of Observations		23347	22527	21328	18915	17628	16389	14809
SAR Phase2 Median Noise value		0.071	0.059	0.051	0.047	0.047	0.047	0.047
G-POD Median Noise value		0.064	0.054	0.047	0.045	0.045	0.047	0.048
Difference		0.007	0.005	0.003	0.002	0.002	0.001	0.000
Northeast Atlantic 2013								
SAR Phase2 No. of Observations		24665	24659	22273	19591	18334	17163	16513
G-POD No. of Observations		23500	23405	21135	18411	17235	16203	15493
SAR Phase2 Median Noise value		0.075	0.062	0.051	0.048	0.048	0.048	0.049
G-POD Median Noise value		0.066	0.054	0.049	0.047	0.048	0.049	0.049
Difference		0.008	0.008	0.003	0.001	0.000	-0.001	-0.001

SAR Phase2 +ve difference inshore and varied offshore



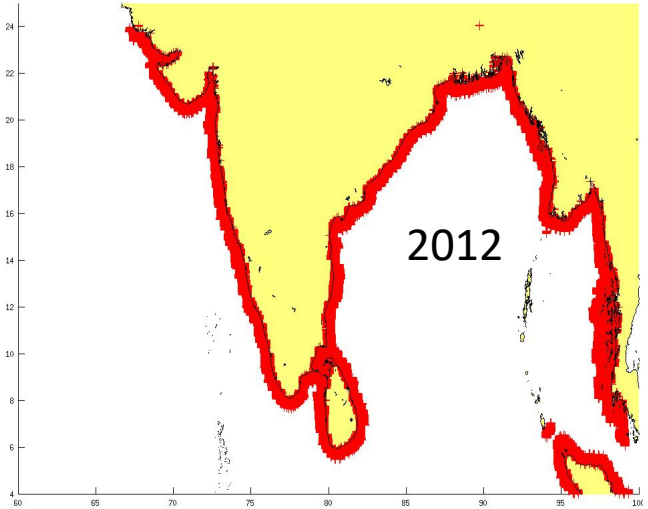


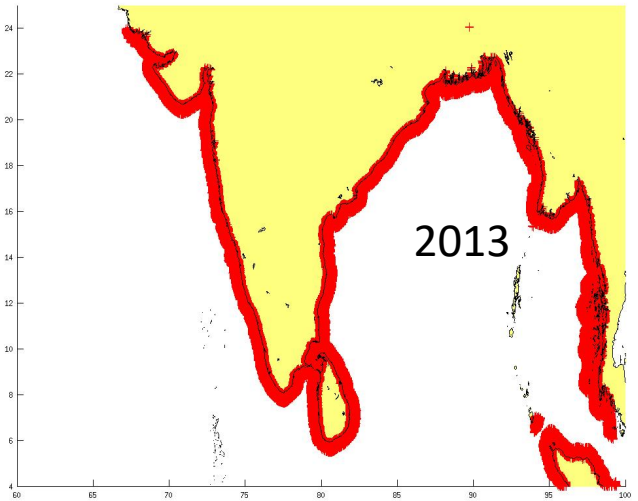
Deep and Shallow parts of the Basin

North Indian Coast USSH Noise

	1	2	3	5	10	20	30	40
North Indian Coast 2012								
SAR Phase2 No. of Observations		4239	4582	4115	2979	2572	2442	2283
G-POD No. of Observations		3044	3478	3127	2445	2200	2192	2029
SAR Phase2 Median Noise value		0.084	0.065	0.052	0.042	0.042	0.044	0.043
G-POD Median Noise value		0.072	0.057	0.046	0.038	0.039	0.041	0.044
Difference		0.012	0.008	0.007	0.004	0.002	0.003	0.000
North Indian Coast 2013								
SAR Phase2 No. of Observations		16537	16386	13856	11220	9327	8902	7869
G-POD No. of Observations		13030	13003	11423	9727	8495	8162	7226
SAR Phase2 Median Noise value		0.081	0.063	0.049	0.043	0.044	0.044	0.045
G-POD Median Noise value		0.072	0.054	0.046	0.041	0.042	0.044	0.043
Difference		0.009	0.009	0.003	0.001	0.002	0.000	0.002

SAR Phase2 overall +ve difference



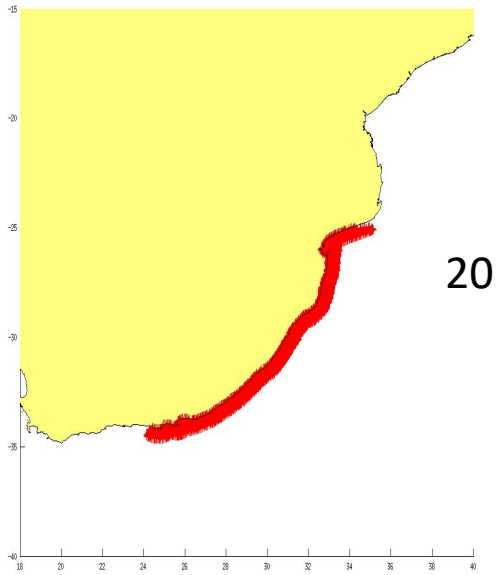


Deep and Shallow parts of the Basin

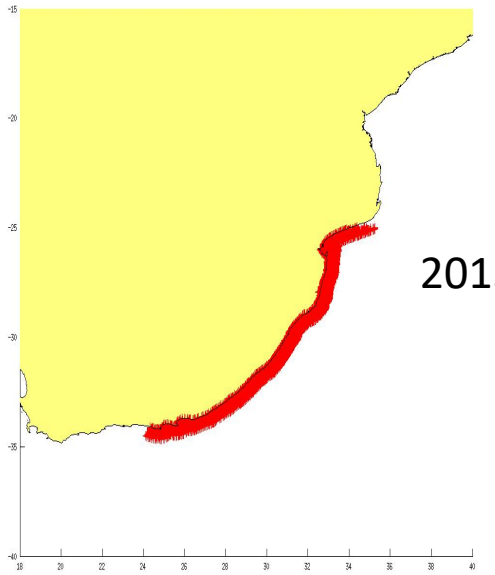
Agulhas USSH Noise

	1	2	3	5	10	20	30	40
				Agulhas 2012				
SAR Phase2 No. of Observations		1361	1701	1598	1540	1624	1507	1475
G-POD No. of Observations		1330	1666	1570	1508	1600	1488	1468
SAR Phase2 Median Noise value		0.082	0.063	0.053	0.051	0.055	0.052	0.052
G-POD Median Noise value		0.079	0.058	0.050	0.048	0.051	0.054	0.056
Difference		0.003	0.006	0.003	0.003	0.003	-0.002	-0.004
				Agulhas 2013				
SAR Phase2 No. of Observations		1328	1671	1699	1431	1538	1334	1550
G-POD No. of Observations		1327	1667	1707	1430	1538	1331	1549
SAR Phase2 Median Noise value		0.083	0.059	0.051	0.047	0.052	0.049	0.054
G-POD Median Noise value		0.074	0.056	0.047	0.049	0.053	0.050	0.054
Difference		0.010	0.003	0.004	-0.001	-0.002	-0.001	0.001

SAR Phase2 +ve difference inshore and –ve difference offshore



2012



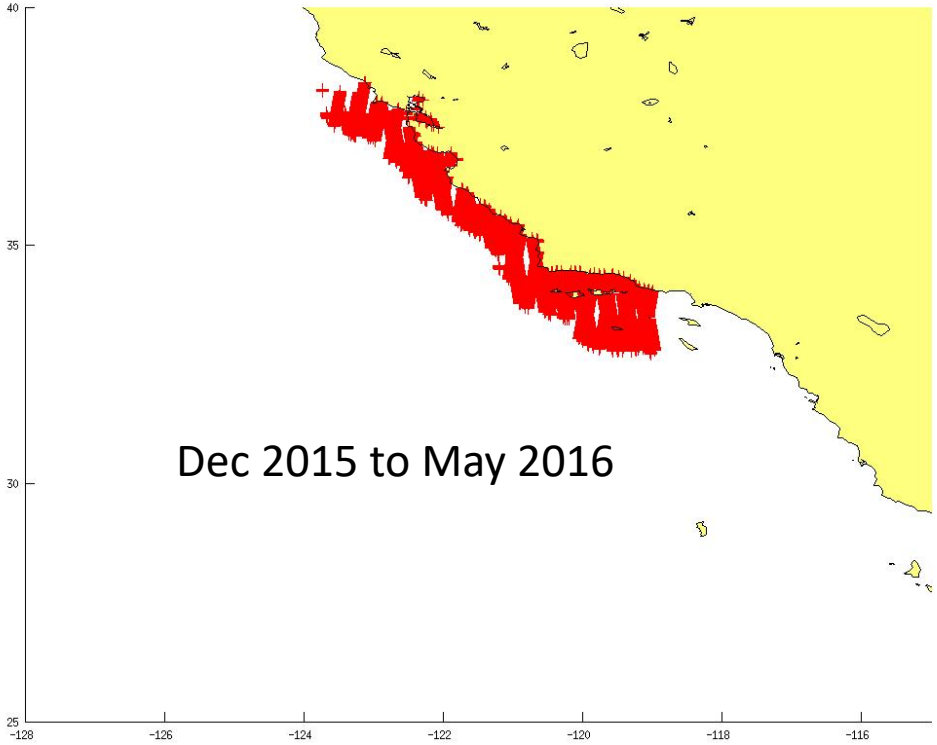
2013

Deeper Basin

Harvest USSH Noise

	1	2	3	5	10	20	30	40
Harvest 2015-2016								
SAR Phase2 No. of Observations		629	619	611	548	459	444	416
G-POD No. of Observations		630	655	647	566	466	447	419
SAR Phase2 Median Noise value		0.066	0.057	0.056	0.060	0.051	0.056	0.053
G-POD Median Noise value		0.070	0.060	0.054	0.059	0.057	0.053	0.063
Difference		-0.004	-0.002	0.002	0.002	-0.006	0.002	-0.010

Variable differences inshore and offshore



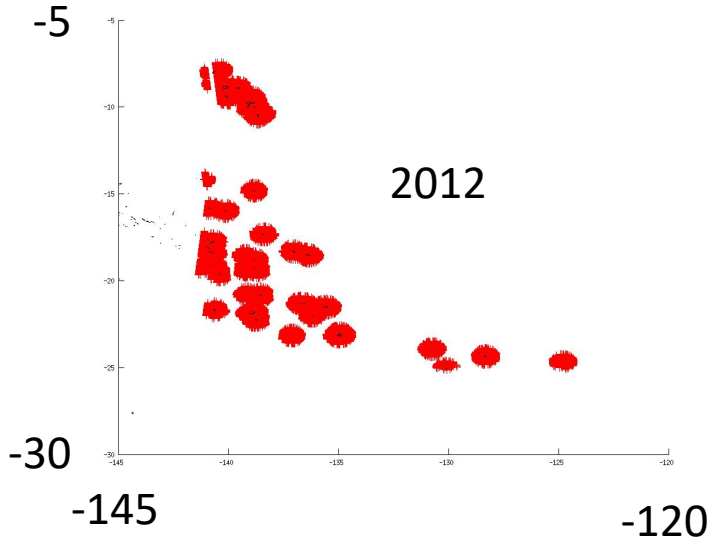
Dec 2015 to May 2016

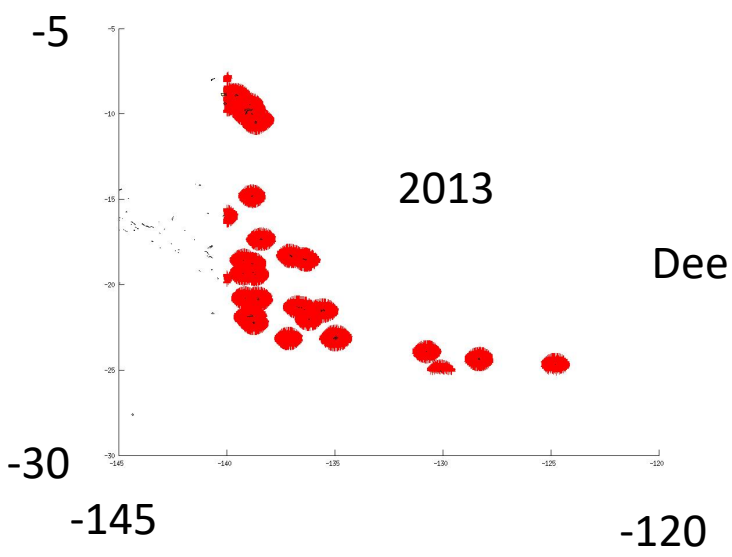
Deeper Basin

East Pacific USSH Noise

	1	2	3	5	10	20	30	40
East Pacific 2012								
SAR Phase2 No. of Observations		926	1107	1277	1549	2658	2989	3651
G-POD No. of Observations		644	729	940	1219	1981	2343	2843
SAR Phase2 Median Noise value		0.075	0.059	0.052	0.049	0.050	0.049	0.050
G-POD Median Noise value		0.072	0.054	0.050	0.056	0.052	0.053	0.051
Difference		0.003	0.005	0.003	-0.007	-0.002	-0.004	-0.001
East Pacific 2013								
SAR Phase2 No. of Observations		973	1223	1597	2132	3298	3971	4760
G-POD No. of Observations		965	1226	1599	2124	3288	3948	4742
SAR Phase2 Median Noise value		0.074	0.058	0.053	0.051	0.050	0.050	0.051
G-POD Median Noise value		0.072	0.059	0.053	0.054	0.052	0.053	0.053
Difference		0.002	-0.001	0.000	-0.004	-0.002	-0.003	-0.002

SAR Phase2 +ve difference inshore and –ve difference offshore





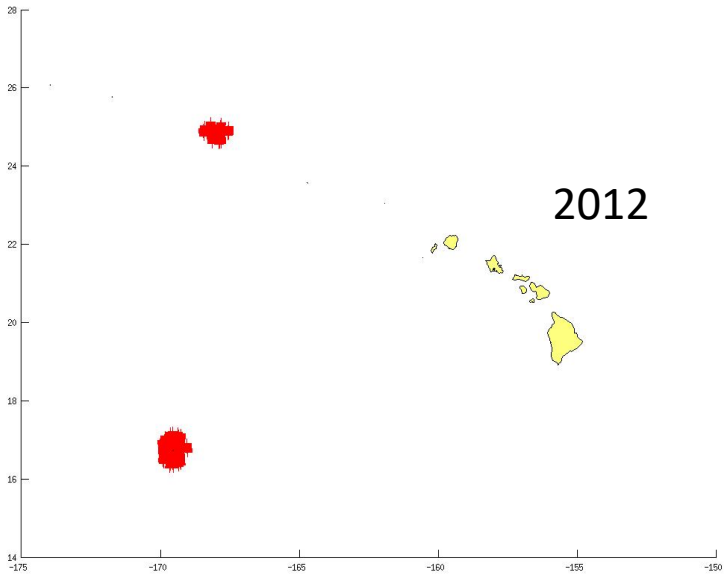
Deep Basin

Central Pacific USSH Noise

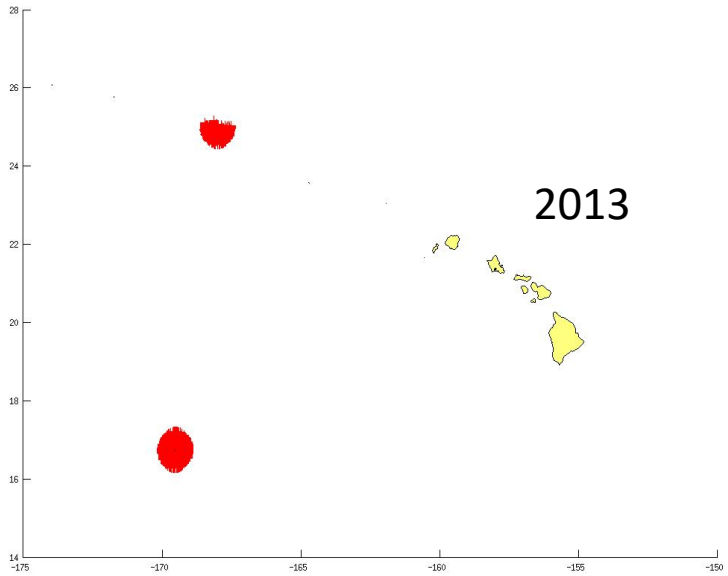
Not many observations

	1	2	3	5	10	20	30	40
Central Pacific 2012								
SAR Phase2 No. of Observations		0	9	9	35	110	45	73
G-POD No. of Observations		0	9	9	34	109	45	73
SAR Phase2 Median Noise value			0.026	0.110	0.039	0.054	0.063	0.047
G-POD Median Noise value			0.039	0.115	0.067	0.054	0.035	0.049
Difference			-0.013	-0.005	-0.028	0.000	0.028	-0.002
Central Pacific 2013								
SAR Phase2 No. of Observations		47	56	65	121	182	249	360
G-POD No. of Observations		47	56	65	123	183	249	364
SAR Phase2 Median Noise value		0.080	0.042	0.051	0.058	0.054	0.049	0.045
G-POD Median Noise value		0.075	0.048	0.046	0.054	0.043	0.050	0.048
Difference		0.005	-0.006	0.005	0.004	0.011	-0.001	-0.003

Variable differences inshore and offshore



2012



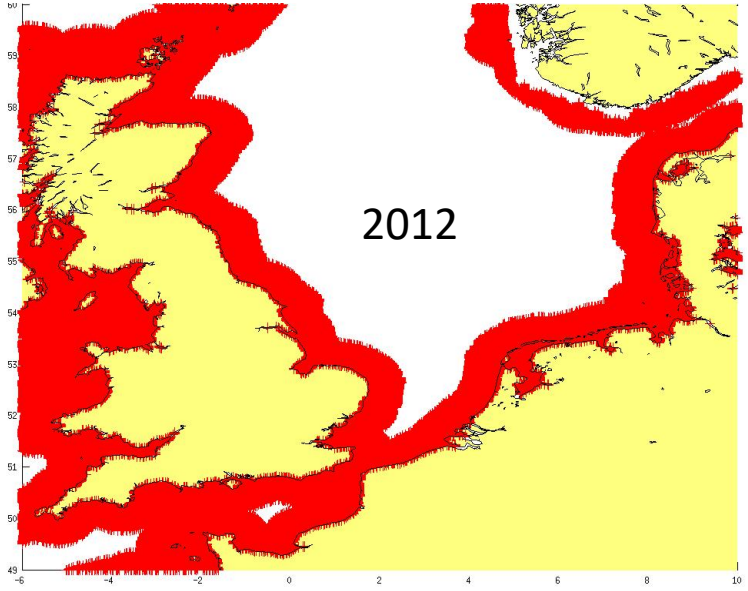
2013

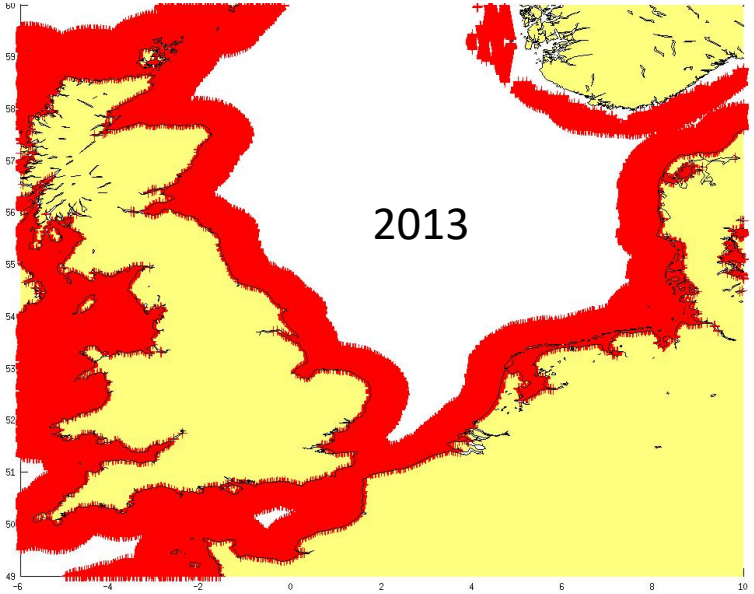
Deep Basin

North Sea SWH

	1	2	3	5	10	20	30	40
			North Sea 2012					
SAR Phase2 No. of Observations		16200	15557	13730	11558	9815	8522	7230
G-POD No. of Observations		12970	12592	11182	9635	8312	7213	6157
SAR Phase2 Median SWH value		1.108	1.152	1.173	1.310	1.380	1.473	1.464
G-POD Median SWH value		0.901	0.950	1.002	1.220	1.335	1.399	1.437
difference		0.207	0.202	0.171	0.090	0.045	0.074	0.027
			North Sea 2013					
SAR Phase2 No. of Observations		15449	15030	13120	10278	9206	8245	7431
G-POD No. of Observations		14417	13990	12178	9615	8934	7953	7267
SAR Phase2 Median SWH value		1.049	1.176	1.152	1.303	1.422	1.482	1.520
G-POD Median SWH value		0.826	0.937	0.974	1.223	1.398	1.461	1.531
difference		0.223	0.239	0.178	0.080	0.024	0.021	-0.011

SAR Phase2 Mostly consistent +ve difference



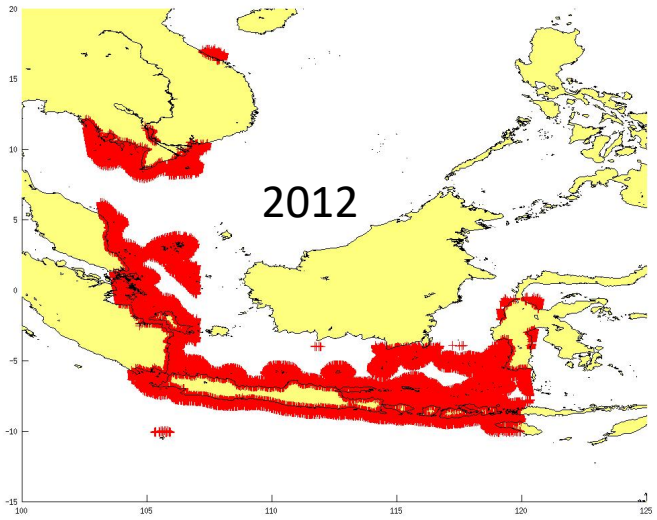


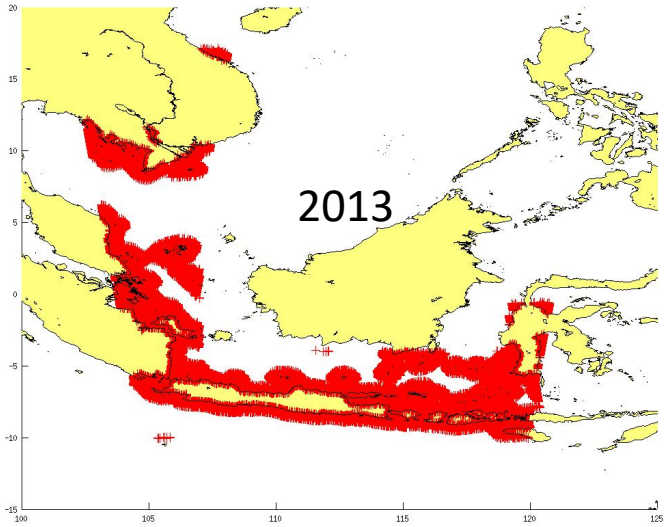
Shallow Basin

Indonesia SWH

	1	2	3	5	10	20	30	40
Indonesia 2012								
SAR Phase2 No. of Observations		13956	14849	13978	12175	10904	9723	8413
G-POD No. of Observations		13454	14264	13443	11797	10557	9307	8116
SAR Phase2 Median SWH value		1.096	1.090	0.994	0.958	0.982	1.024	1.061
G-POD Median SWH value		0.924	0.895	0.806	0.788	0.861	0.924	0.950
difference		0.172	0.195	0.188	0.170	0.121	0.100	0.111
Indonesia 2013								
SAR Phase2 No. of Observations		13588	14583	13497	12037	10150	9444	7839
G-POD No. of Observations		13405	14386	13367	11906	10013	9245	7716
SAR Phase2 Median SWH value		1.092	1.098	1.019	0.964	1.010	1.062	1.097
G-POD Median SWH value		0.940	0.897	0.812	0.815	0.887	0.956	0.999
difference		0.152	0.201	0.207	0.149	0.123	0.106	0.098

SAR Phase2 overall +ve difference



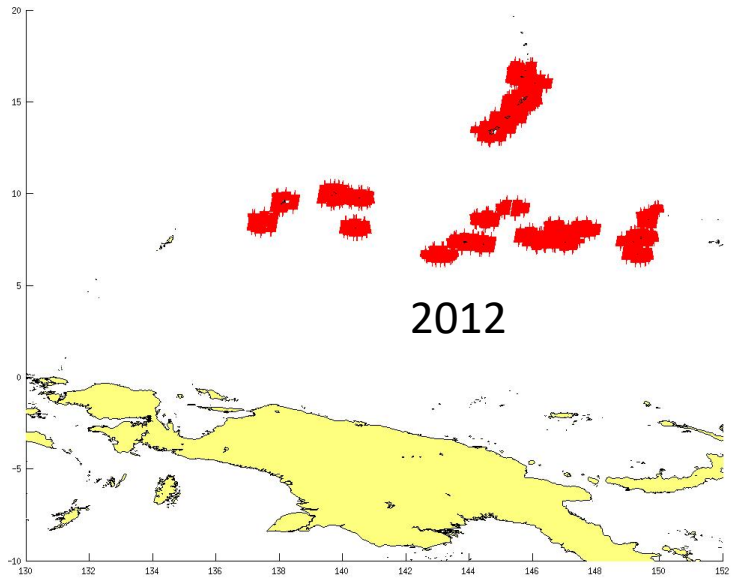


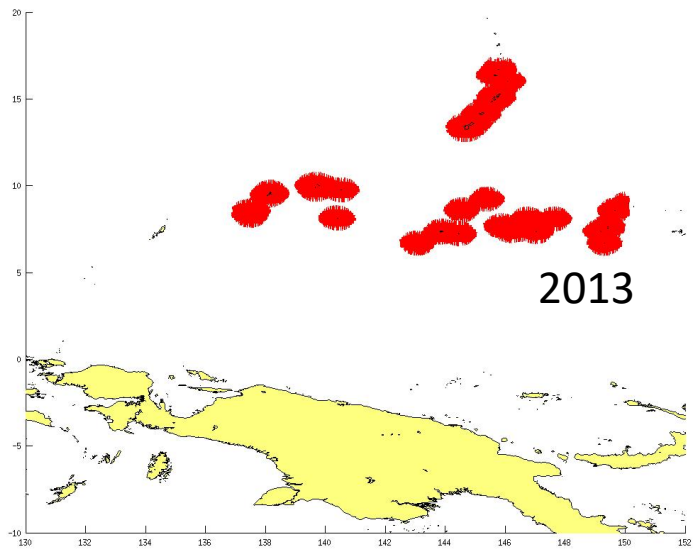
Shallow Basin

West Pacific SWH

	1	2	3	5	10	20	30	40
			West Pacific 2012					
SAR Phase2 No. of Observations		275	343	370	456	658	1044	1043
G-POD No. of Observations		241	323	353	424	629	985	1001
SAR Phase2 Median SWH value		1.661	1.622	1.743	1.793	1.881	1.924	2.014
G-POD Median SWH value		1.487	1.557	1.695	1.758	1.889	1.882	1.998
difference		0.174	0.065	0.048	0.034	-0.008	0.042	0.016
			West Pacific 2013					
SAR Phase2 No. of Observations		822	1158	1397	1885	2922	3599	4128
G-POD No. of Observations		805	1120	1357	1856	2861	3471	4030
SAR Phase2 Median SWH value		1.463	1.658	1.650	1.632	1.751	1.740	1.753
G-POD Median SWH value		1.408	1.557	1.617	1.606	1.729	1.709	1.750
difference		0.054	0.100	0.033	0.026	0.022	0.031	0.003

SAR Phase2 overall +ve difference



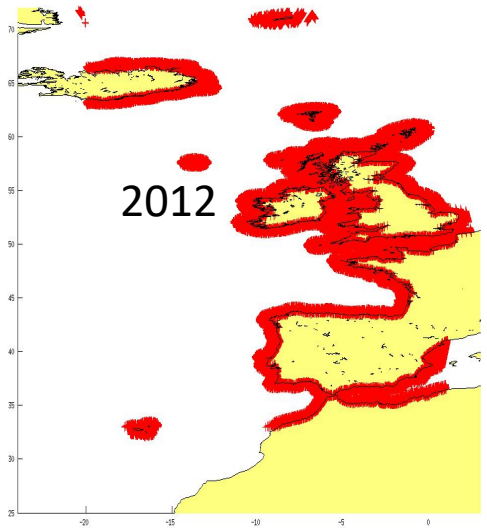


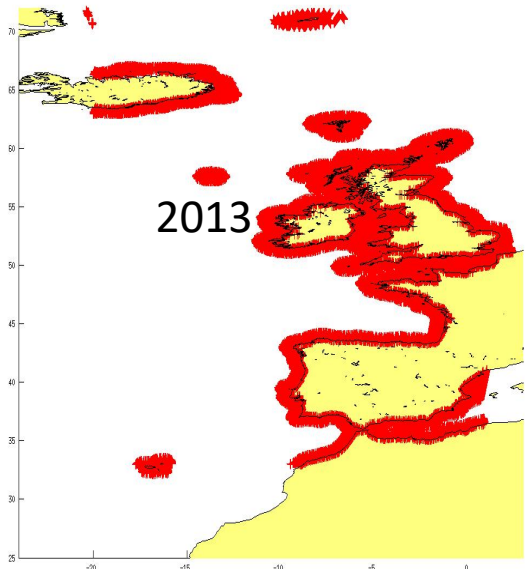
Shallow Basin

North East Atlantic SWH

	1	2	3	5	10	20	30	40
Northeast Atlantic 2012								
SAR Phase2 No. of Observations		26032	25059	23800	21397	19721	18235	16813
G-POD No. of Observations		23347	22527	21329	18915	17628	16389	14809
SAR Phase2 Median SWH value		1.380	1.450	1.435	1.519	1.644	1.799	1.816
G-POD Median SWH value		1.193	1.292	1.339	1.512	1.690	1.864	1.897
difference		0.187	0.158	0.096	0.007	-0.046	-0.065	-0.081
Northeast Atlantic 2013								
SAR Phase2 No. of Observations		24665	24659	22273	19591	18334	17163	16513
G-POD No. of Observations		23501	23406	21136	18411	17235	16203	15493
SAR Phase2 Median SWH value		1.439	1.495	1.475	1.624	1.811	1.968	1.990
G-POD Median SWH value		1.244	1.331	1.357	1.599	1.852	2.030	2.048
difference		0.195	0.164	0.118	0.025	-0.041	-0.062	-0.058

SAR Phase2 +ve difference inshore and –ve difference offshore



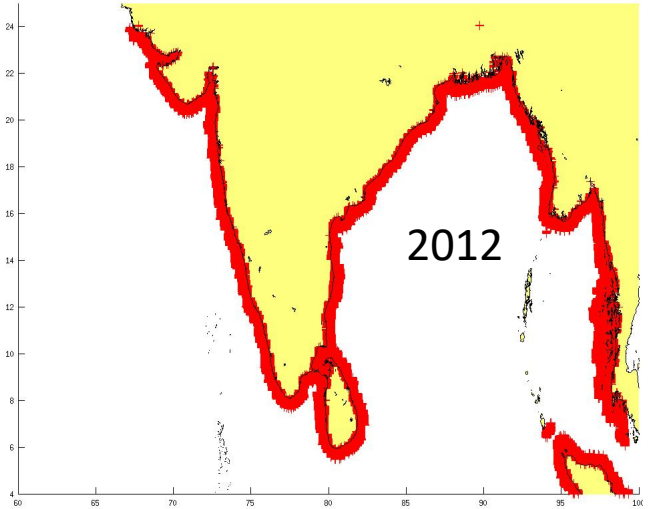


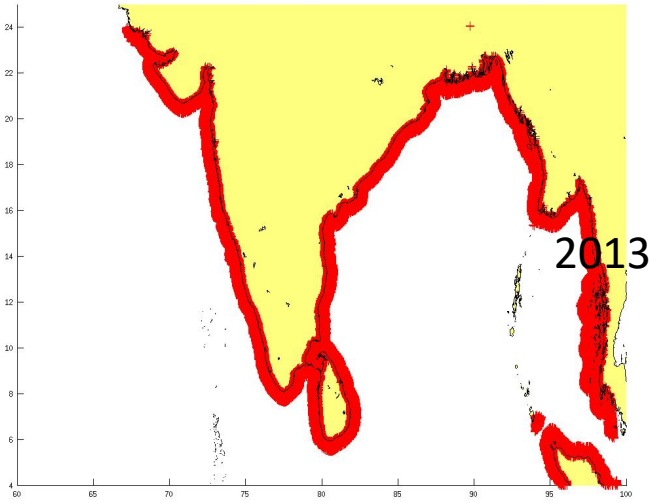
Deep and Shallow parts of the Basin

North Indian Coast SWH

	1	2	3	5	10	20	30	40
North Indian Coast 2012								
SAR Phase2 No. of Observations		4239	4582	4115	2979	2572	2442	2283
G-POD No. of Observations		3044	3478	3127	2445	2200	2192	2029
SAR Phase2 Median SWH value		0.924	0.960	0.946	0.876	0.937	0.974	1.050
G-POD Median SWH value		0.758	0.798	0.737	0.736	0.802	0.854	0.951
difference		0.166	0.162	0.209	0.140	0.135	0.119	0.099
North Indian Coast 2013								
SAR Phase2 No. of Observations		16537	16386	13856	11220	9327	8902	7869
G-POD No. of Observations		13030	13003	11423	9727	8495	8162	7226
SAR Phase2 Median SWH value		1.008	1.059	1.006	1.039	1.137	1.217	1.257
G-POD Median SWH value		0.908	0.927	0.876	0.937	1.080	1.166	1.215
difference		0.100	0.132	0.130	0.102	0.057	0.051	0.042

SAR Phase2 overall +ve difference



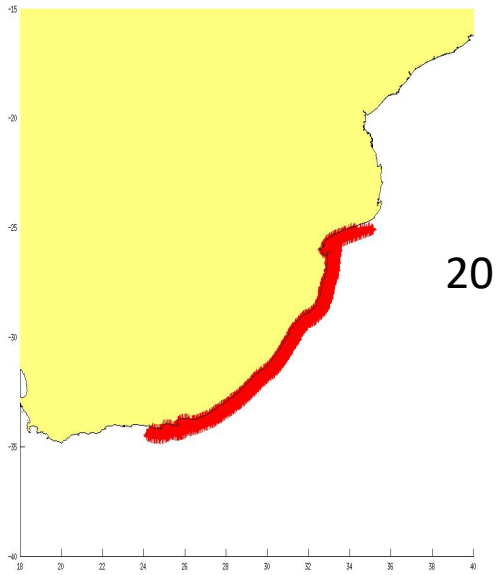


Deep and Shallow parts of the Basin

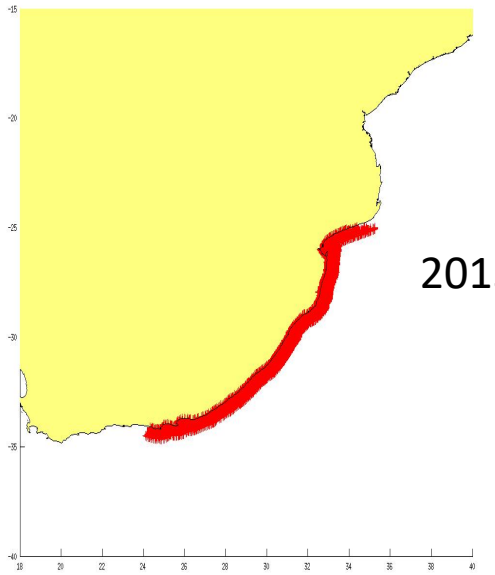
Agulhas SWH

	1	2	3	5	10	20	30	40
Agulhas 2012								
SAR Phase2 No. of Observations		1361	1701	1598	1540	1624	1507	1475
G-POD No. of Observations		1330	1666	1570	1508	1600	1488	1468
SAR Phase2 Median SWH value		1.682	1.641	2.020	2.096	2.264	2.443	2.535
G-POD Median SWH value		1.599	1.626	1.924	2.102	2.305	2.455	2.616
difference		0.083	0.015	0.096	-0.007	-0.041	-0.012	-0.081
Agulhas 2013								
SAR Phase2 No. of Observations		1328	1671	1699	1431	1538	1334	1550
G-POD No. of Observations		1327	1667	1707	1430	1538	1331	1549
SAR Phase2 Median SWH value		1.650	1.734	1.902	1.995	2.234	2.391	2.708
G-POD Median SWH value		1.558	1.668	1.902	1.964	2.311	2.409	2.716
difference		0.091	0.067	0.000	0.031	-0.077	-0.019	-0.008

SAR Phase2 +ve difference inshore and –ve difference offshore



2012



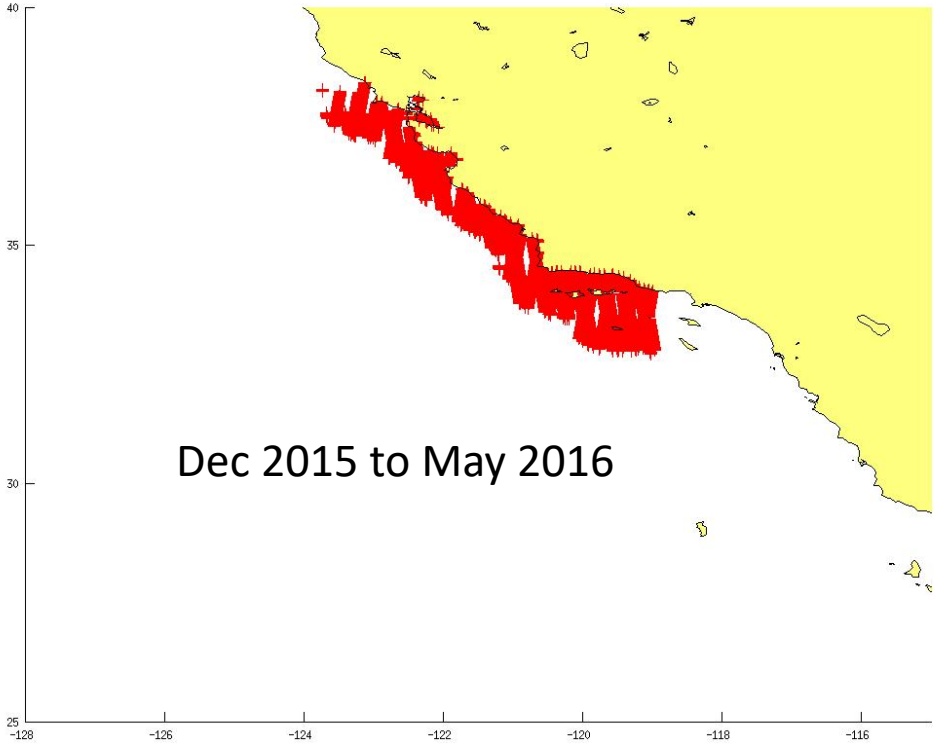
2013

Deeper Basin

Harvest SWH

	1	2	3	5	10	20	30	40
Harvest 2015-2016								
SAR Phase2 No. of Observations		629	619	611	548	459	444	416
G-POD No. of Observations		630	655	647	566	466	447	419
SAR Phase2 Median SWH value		1.691	1.622	2.163	2.163	2.381	2.711	2.699
G-POD Median SWH value		1.479	1.682	2.229	2.156	2.302	2.645	2.835
difference		0.212	-0.060	-0.066	0.006	0.079	0.066	-0.137

Variable differences inshore and offshore



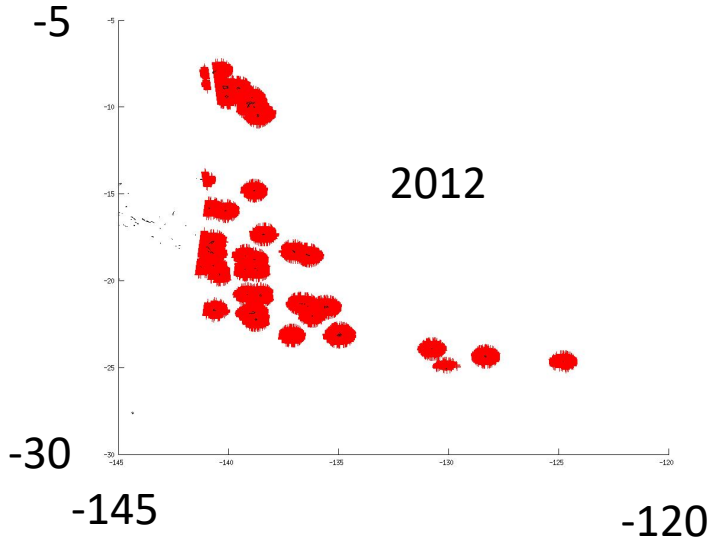
Dec 2015 to May 2016

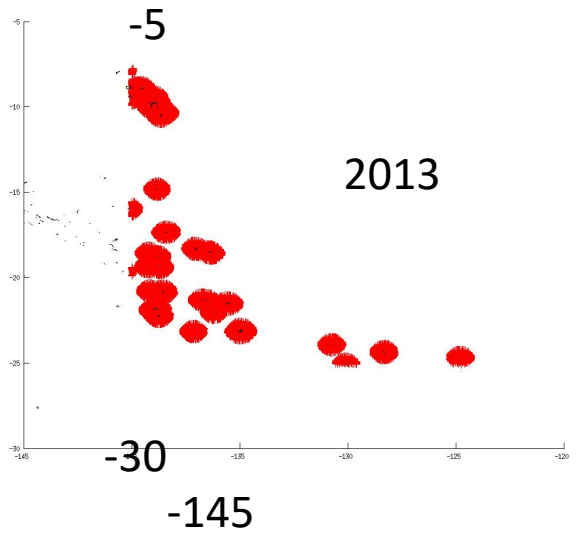
Deeper Basin

East Pacific SWH

	1	2	3	5	10	20	30	40
East Pacific 2012								
SAR Phase2 No. of Observations		926	1107	1277	1549	2658	2989	3651
G-POD No. of Observations		644	729	940	1219	1981	2343	2843
SAR Phase2 Median SWH value		1.784	1.863	2.048	2.048	2.092	2.159	2.162
G-POD Median SWH value		1.777	1.829	2.072	2.087	2.156	2.172	2.185
difference		0.007	0.034	-0.024	-0.039	-0.064	-0.013	-0.023
East Pacific 2013								
SAR Phase2 No. of Observations		973	1223	1597	2132	3298	3971	4760
G-POD No. of Observations		965	1226	1599	2124	3288	3948	4742
SAR Phase2 Median SWH value		1.832	1.947	2.035	2.169	2.183	2.218	2.183
G-POD Median SWH value		1.859	1.998	2.070	2.177	2.209	2.245	2.210
difference		-0.027	-0.051	-0.035	-0.007	-0.026	-0.027	-0.027

SAR Phase 2 mostly -ve differences





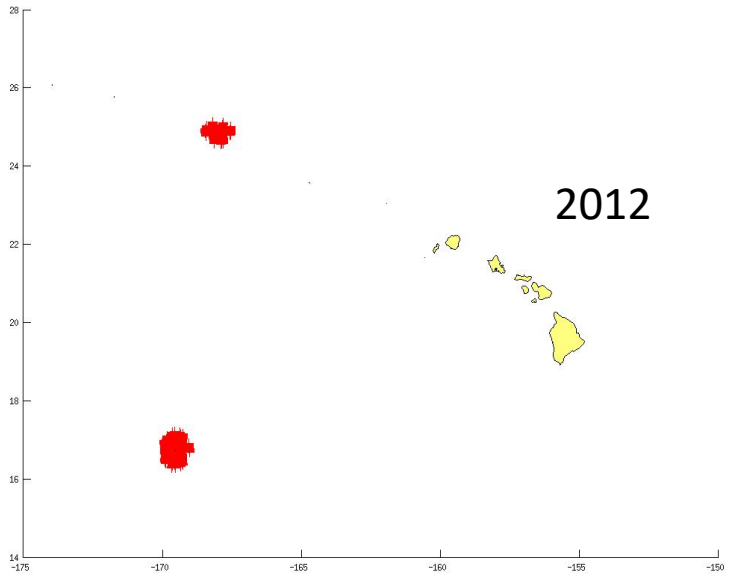
Deep Basin

Central Pacific SWH

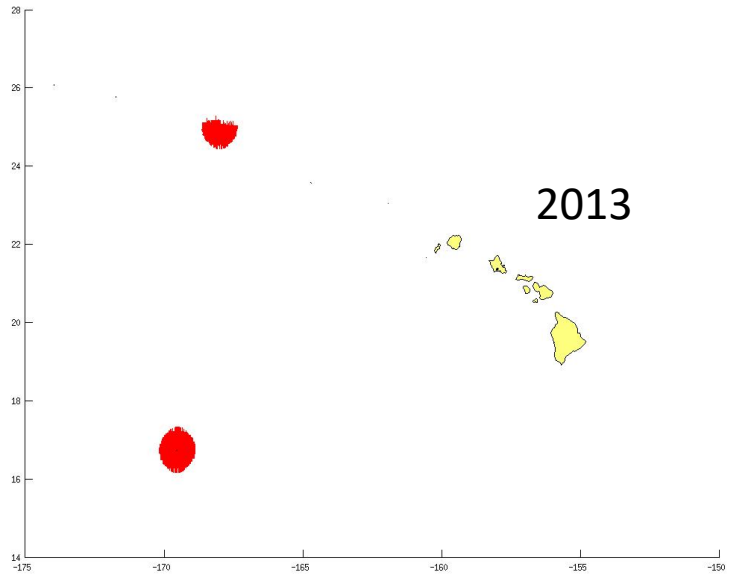
Not many observations

	1	2	3	5	10	20	30	40
Central Pacific 2012								
SAR Phase2 No. of Observations		0	9	9	35	110	45	73
G-POD No. of Observations		0	9	9	34	109	45	73
SAR Phase2 Median SWH value			2.334	2.663	2.191	2.839	2.597	2.189
G-POD Median SWH value			2.250	2.357	2.311	2.756	2.569	2.266
difference			0.084	0.306	-0.120	0.083	0.028	-0.077
Central Pacific 2013								
SAR Phase2 No. of Observations		47	56	65	121	182	249	360
G-POD No. of Observations		47	56	65	123	183	249	364
SAR Phase2 Median SWH value		2.005	2.492	2.441	1.862	1.938	2.045	2.013
G-POD Median SWH value		2.113	2.424	2.360	1.958	2.004	2.182	2.065
difference		-0.108	0.067	0.081	-0.096	-0.066	-0.137	-0.052

SAR Phase2 mostly +ve difference inshore and –ve difference offshore



2012



2013

Deep Basin

Comparison with L1B proc (L2) six regions

North Sea 2012							
SAR Phase2 No. of Observations	16200	15557	13730	11558	9815	8522	7230
G-POD No. of Observations	12970	12592	11182	9635	8312	7213	6157
SAR Phase 2 Coastal L1B proc. No. of Observations	7512	7277	6145	5185	4750	4701	4315
SAR Phase2 Median Noise value	0.080	0.061	0.051	0.044	0.044	0.044	0.045
G-POD Median Noise value	0.070	0.055	0.046	0.042	0.041	0.042	0.043
SAR Phase 2 Coastal L1B proc. Median Noise value	0.089	0.064	0.051	0.045	0.045	0.044	0.045
North Sea 2013							
SAR Phase2 No. of Observations	15449	15030	13120	10278	9206	8245	7431
G-POD No. of Observations	14416	13990	12178	9615	8934	7953	7267
SAR Phase 2 Coastal L1B proc. No. of Observations	7345	7114	5894	4682	4885	4683	4613
SAR Phase2 Median Noise value	0.088	0.070	0.052	0.046	0.044	0.044	0.044
G-POD Median Noise value	0.077	0.059	0.048	0.043	0.043	0.043	0.043
SAR Phase 2 Coastal L1B proc. Median Noise value	0.104	0.081	0.056	0.046	0.044	0.044	0.044
Northeast Atlantic 2012							
SAR Phase2 No. of Observations	26032	25059	23800	21397	19721	18235	16813
G-POD No. of Observations	23347	22527	21328	18915	17628	16389	14809
SAR Phase 2 Coastal L1B proc. No. of Observations	19203	18552	17447	15501	13995	12737	11510
SAR Phase2 Median Noise value	0.071	0.059	0.051	0.047	0.047	0.047	0.047
G-POD Median Noise value	0.064	0.054	0.047	0.045	0.045	0.047	0.048
SAR Phase 2 Coastal L1B proc. Median Noise value	0.068	0.057	0.050	0.047	0.047	0.048	0.048
Northeast Atlantic 2013							
SAR Phase2 No. of Observations	24665	24659	22273	19591	18334	17163	16513
G-POD No. of Observations	23500	23405	21135	18411	17235	16203	15493
SAR Phase 2 Coastal L1B proc. No. of Observations	18683	18569	16654	14342	13019	12281	11555
SAR Phase2 Median Noise value	0.075	0.062	0.051	0.048	0.048	0.048	0.049
G-POD Median Noise value	0.066	0.054	0.049	0.047	0.048	0.049	0.049
SAR Phase 2 Coastal L1B proc. Median Noise value	0.074	0.061	0.052	0.049	0.048	0.049	0.049

Shallow Basin

Similar values to SAR Phase 2

Shallow Basin

North Indian Coast 2012							
SAR Phase2 No. of Observations	4239	4582	4115	2979	2572	2442	2283
G-POD No. of Observations	3044	3478	3127	2445	2200	2192	2029
SAR Phase 2 Coastal L1B proc. No. of Observations	4239	4582	4115	2979	2572	2442	2283
SAR Phase2 Median Noise value	0.084	0.065	0.052	0.042	0.042	0.044	0.043
G-POD Median Noise value	0.072	0.057	0.046	0.038	0.039	0.041	0.044
SAR Phase 2 Coastal L1B proc. Median Noise value	0.087	0.065	0.052	0.042	0.042	0.044	0.043
North Indian Coast 2013							
SAR Phase2 No. of Observations	16537	16386	13856	11220	9327	8902	7869
G-POD No. of Observations	13030	13003	11423	9727	8495	8162	7226
SAR Phase 2 Coastal L1B proc. No. of Observations	16553	16418	13860	11225	9331	8908	7874
SAR Phase2 Median Noise value	0.081	0.063	0.049	0.043	0.044	0.044	0.045
G-POD Median Noise value	0.072	0.054	0.046	0.041	0.042	0.044	0.043
SAR Phase 2 Coastal L1B proc. Median Noise value	0.081	0.064	0.049	0.043	0.044	0.044	0.045
Indonesia 2012							
SAR Phase2 No. of Observations	13956	14849	13978	12175	10904	9723	8413
G-POD No. of Observations	13454	14264	13442	11796	10557	9307	8116
SAR Phase 2 Coastal L1B proc. No. of Observations	13556	14434	13548	11745	10613	9365	8160
SAR Phase2 Median Noise value	0.073	0.057	0.048	0.045	0.044	0.044	0.045
G-POD Median Noise value	0.065	0.051	0.044	0.042	0.043	0.041	0.043
SAR Phase 2 Coastal L1B proc. Median Noise value	0.072	0.057	0.048	0.044	0.044	0.044	0.045
Indonesia 2013							
SAR Phase2 No. of Observations	13588	14583	13497	12037	10150	9444	7839
G-POD No. of Observations	13404	14386	13367	11906	10013	9245	7716
SAR Phase 2 Coastal L1B proc. No. of Observations	13588	14583	13497	12037	10150	9444	7839
SAR Phase2 Median Noise value	0.074	0.061	0.048	0.044	0.044	0.045	0.045
G-POD Median Noise value	0.066	0.052	0.045	0.043	0.043	0.042	0.043
SAR Phase 2 Coastal L1B proc. Median Noise value	0.073	0.060	0.049	0.044	0.044	0.045	0.045

Deep and Shallow parts of the Basin

Similar values to SAR Phase 2

Shallow Basin

Agulhas 2012							
SAR Phase2 No. of Observations	1361	1701	1598	1540	1624	1507	1475
G-POD No. of Observations	1330	1666	1570	1508	1600	1488	1468
SAR Phase 2 Coastal L1B proc. No. of Observations	1337	1684	1568	1519	1599	1484	1456
SAR Phase2 Median Noise value	0.082	0.063	0.053	0.051	0.055	0.052	0.052
G-POD Median Noise value	0.079	0.058	0.050	0.048	0.051	0.054	0.056
SAR Phase 2 Coastal L1B proc. Median Noise value	0.082	0.060	0.052	0.052	0.053	0.052	0.053
Agulhas 2013							
SAR Phase2 No. of Observations	1328	1671	1699	1431	1538	1334	1550
G-POD No. of Observations	1327	1667	1707	1430	1538	1331	1549
SAR Phase 2 Coastal L1B proc. No. of Observations	1328	1671	1699	1431	1538	1334	1550
SAR Phase2 Median Noise value	0.083	0.059	0.051	0.047	0.052	0.049	0.054
G-POD Median Noise value	0.074	0.056	0.047	0.049	0.053	0.050	0.054
SAR Phase 2 Coastal L1B proc. Median Noise value	0.083	0.059	0.049	0.048	0.052	0.049	0.052
Harvest 2015-2016							
SAR Phase2 No. of Observations	629	619	611	548	459	444	416
G-POD No. of Observations	630	655	647	566	466	447	419
SAR Phase 2 Coastal L1B proc. No. of Observations	629	619	611	548	459	444	416
SAR Phase2 Median Noise value	0.066	0.057	0.056	0.060	0.051	0.056	0.053
G-POD Median Noise value	0.070	0.060	0.054	0.059	0.057	0.053	0.063
SAR Phase 2 Coastal L1B proc. Median Noise value	0.073	0.059	0.054	0.058	0.051	0.053	0.053

Deeper Basin

Similar values to SAR Phase 2

Deeper Basin

Summary

- Shallow Basins (3 Regions)
  - SAR Phase 2 data has a consistent +ve difference for USSH Noise and generally for SWH.
- Deep and Shallow parts of the Basin (2 Regions)
  - SAR Phase 2 data has a consistent +ve difference for USSH Noise, and SWH has a +ve difference inshore but both +ve and –ve difference offshore
- Deeper Basin (2 Regions)
  - Generally SAR Phase 2 data has a +ve difference for USSH Noise and SWH inshore and –ve difference offshore.
- Deep Regions(2 Regions)
  - Generally SAR Phase 2 +ve difference for USSH Noise and SWH inshore and –ve difference offshore (Please Note, observations are relatively low)
- Phase 2 L1B proc (L2) dataset USSH Noise behaves in a similar manner in the six regions to SAR Phase 2 dataset