

Annexe : Validation du modèle HYWAT par comparaison aux mesures de bouées houlographes du réseau CANDHIS sur la période 1979-2025

1 Statistiques de validation pour la hauteur significative H_s

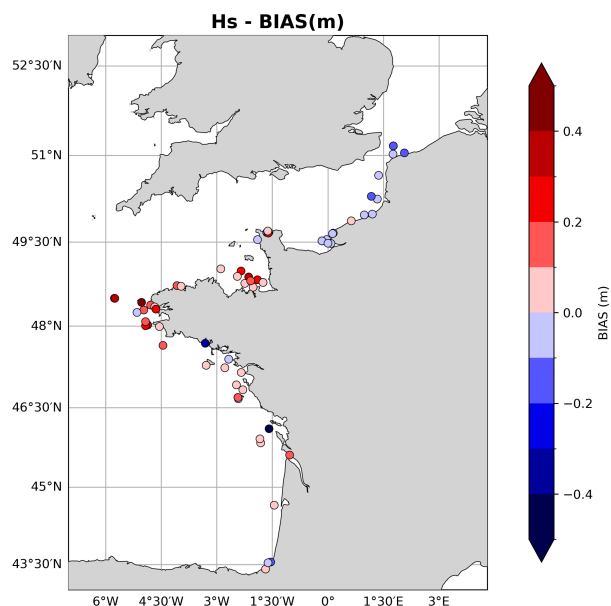


Figure 1 – Carte du biais du modèle par rapport aux observations CANDHIS pour H_s .

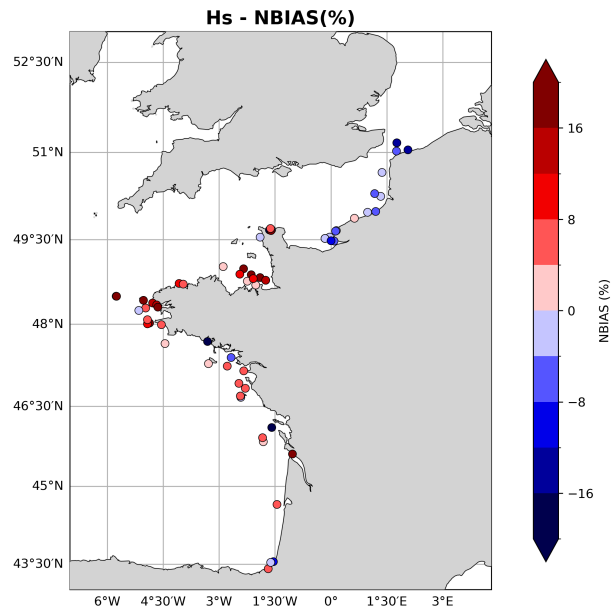


Figure 2 – Carte du biais normalisé du modèle par rapport aux observations CANDHIS pour H_s .

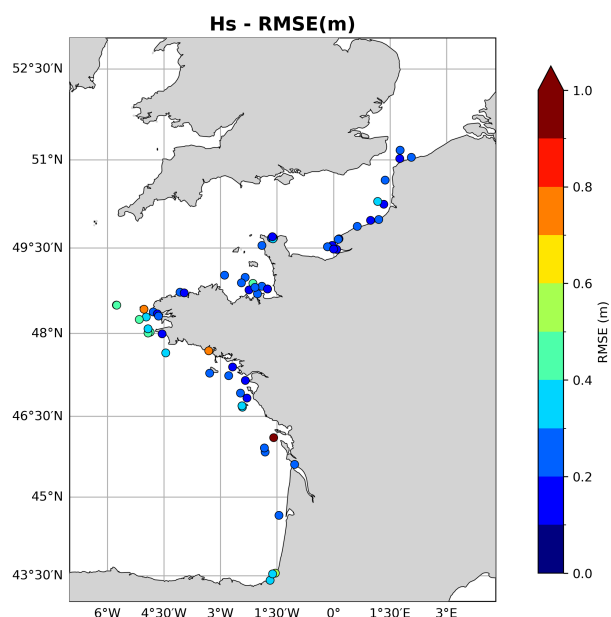


Figure 3 – Carte de RMSE du modèle par rapport aux observations CANDHIS pour H_s .

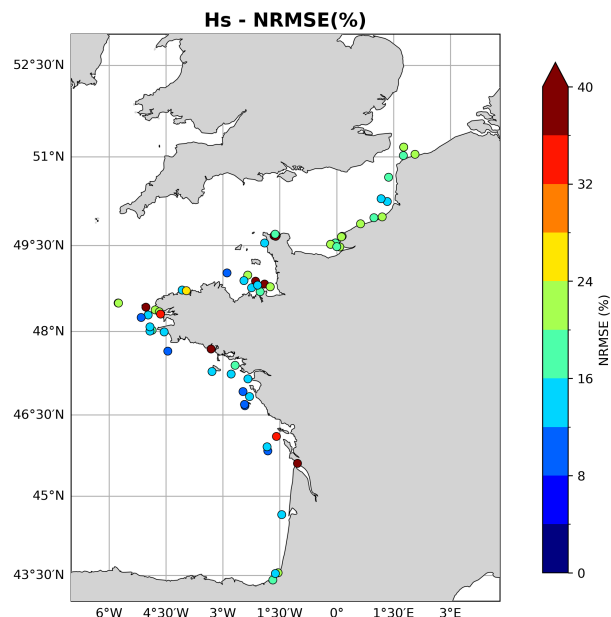


Figure 4 – Carte de RMSE normalisée du modèle par rapport aux observations CANDHIS pour H_s .

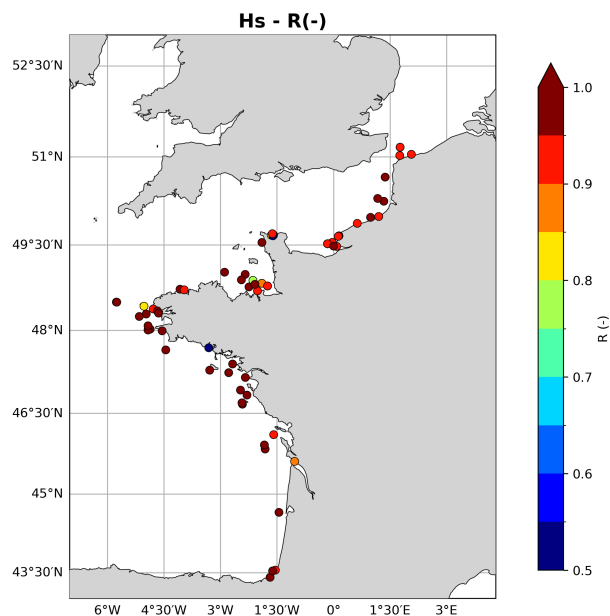


Figure 5 – Carte de corrélation du modèle par rapport aux observations CANDHIS pour H_s .

Table 1 – Scores du rejeu HYWAT pour la hauteur significative H_s sur la période de mesure de chaque bouée du réseau CANDHIS considérée pour la validation.

Bouée	$\overline{X_{obs}}(m)$	$\overline{X_{mod}}(m)$	$Bias(m)$	$RMSE(m)$	$NRMSE$	$SI(\%)$	a	$b(m)$	R
06201	1.0	0.99	-0.02	0.2	0.17	16.67	0.85	0.13	0.96
02911	2.02	2.18	0.15	0.32	0.13	11.8	0.96	0.23	0.98
04401	0.99	1.06	0.07	0.18	0.15	14.09	1.04	0.03	0.97
06401	1.9	1.72	-0.18	0.55	0.24	22.61	0.7	0.4	0.94
07609	0.51	0.48	-0.02	0.15	0.23	22.74	0.88	0.04	0.93
07607	0.82	0.84	0.02	0.22	0.22	21.64	0.84	0.15	0.93
02907	0.74	0.85	0.11	0.21	0.23	19.71	1.02	0.09	0.94
06403	1.51	1.57	0.06	0.3	0.17	16.35	0.88	0.25	0.95
05902	1.16	1.07	-0.09	0.28	0.2	19.41	0.74	0.21	0.93
06402	1.72	1.71	-0.01	0.31	0.15	14.95	0.83	0.28	0.97
01705	0.42	0.58	0.16	0.21	0.42	27.58	1.04	0.14	0.89
02908	0.51	0.58	0.07	0.15	0.23	20.08	1.18	-0.02	0.97
08002	0.94	0.92	-0.02	0.18	0.16	15.58	0.89	0.08	0.97
03302	1.76	1.84	0.08	0.28	0.13	12.75	0.89	0.27	0.97
07606	0.75	0.73	-0.02	0.17	0.18	18.35	0.9	0.05	0.95
07603	0.74	0.76	0.02	0.17	0.18	18.16	0.88	0.11	0.95
07602	0.72	0.7	-0.02	0.21	0.22	22.1	0.81	0.11	0.94
02903	0.68	0.89	0.21	0.27	0.33	21.05	1.15	0.1	0.96
06202	0.82	0.78	-0.04	0.17	0.18	17.27	0.82	0.11	0.95
02922	1.27	1.37	0.1	0.23	0.15	13.57	0.91	0.22	0.97
07610	0.44	0.43	-0.01	0.12	0.21	20.79	0.88	0.04	0.95
08505	1.6	1.7	0.1	0.22	0.12	10.52	0.97	0.14	0.98
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Bouée	$\overline{X_{obs}}(m)$	$\overline{X_{mod}}(m)$	$Bias(m)$	$RMSE(m)$	$NRMSE$	$SI(\%)$	a	$b(m)$	R
03501	0.97	1.0	0.02	0.22	0.19	19.02	0.99	0.04	0.94
05006	0.68	1.07	0.38	0.44	0.59	28.6	0.94	0.42	0.79
02920	2.25	2.63	0.38	0.49	0.19	12.2	1.03	0.31	0.97
02915	2.5	2.76	0.26	0.41	0.15	11.36	1.0	0.26	0.97
04403	1.28	1.34	0.06	0.22	0.14	13.6	1.05	-0.01	0.97
02906	2.56	2.71	0.15	0.5	0.17	16.6	0.94	0.29	0.93
08001	1.87	1.73	-0.13	0.31	0.14	13.06	0.87	0.12	0.97
08502	1.33	1.44	0.11	0.2	0.14	11.76	0.94	0.18	0.96
02919	1.74	2.16	0.42	0.75	0.37	30.55	0.94	0.52	0.85
02916	2.45	2.6	0.14	0.38	0.14	12.84	0.88	0.43	0.96
02910	0.42	0.45	0.03	0.13	0.24	23.37	0.85	0.09	0.92
05003	0.61	0.46	-0.15	0.28	0.38	31.51	0.61	0.08	0.84
05901	0.99	0.86	-0.13	0.25	0.21	18.47	0.79	0.08	0.94
05009	1.37	1.34	-0.03	0.21	0.13	12.7	0.94	0.05	0.97
05004	0.61	0.61	-0.0	0.14	0.2	20.36	0.86	0.09	0.91
02203	0.98	1.19	0.21	0.26	0.24	14.94	1.04	0.17	0.96
05007	0.57	0.66	0.09	0.15	0.23	18.34	0.99	0.1	0.93
05601	1.2	0.89	-0.31	0.7	0.53	47.88	0.29	0.54	0.32
01703	1.67	1.73	0.06	0.23	0.12	11.24	0.93	0.18	0.98
04402	0.61	0.58	-0.03	0.12	0.17	16.38	0.92	0.02	0.95
02914	2.93	3.04	0.11	0.35	0.1	9.9	0.95	0.25	0.98
07604	0.92	0.91	-0.01	0.2	0.17	17.29	0.89	0.1	0.96
02902	1.99	2.32	0.32	0.48	0.21	15.4	1.1	0.13	0.96
05903	0.79	0.68	-0.12	0.21	0.23	18.82	0.75	0.08	0.95
02921	0.98	1.04	0.06	0.17	0.14	12.91	0.93	0.13	0.98
07601	0.67	0.64	-0.03	0.21	0.23	22.51	0.87	0.06	0.94
02202	1.11	1.2	0.09	0.2	0.16	14.16	0.96	0.14	0.96
08501	2.68	2.64	-0.04	0.34	0.11	11.34	0.95	0.1	0.97
07608	0.77	0.73	-0.04	0.2	0.21	20.86	0.8	0.12	0.94
05005	0.62	0.83	0.21	0.24	0.36	19.79	0.95	0.24	0.87
08504	1.22	1.31	0.09	0.18	0.13	11.2	0.98	0.11	0.97
07611	0.61	0.54	-0.06	0.15	0.2	17.87	0.87	0.01	0.95
01704	1.74	1.83	0.09	0.26	0.13	12.13	0.94	0.18	0.97
05001	0.62	0.69	0.08	0.16	0.22	19.47	1.02	0.06	0.94
02206	1.12	1.15	0.02	0.17	0.13	12.77	0.97	0.05	0.97
02204	1.75	1.8	0.06	0.24	0.12	11.48	0.93	0.19	0.98
05602	1.86	1.92	0.06	0.27	0.12	11.76	0.94	0.18	0.98
02917	3.51	3.5	-0.01	0.45	0.11	10.84	0.89	0.39	0.98
01702	2.81	1.89	-0.92	1.09	0.36	18.93	0.58	0.25	0.93
05002	0.24	0.45	0.22	0.32	1.19	88.75	1.13	0.18	0.53
08503	2.39	2.51	0.11	0.32	0.12	11.11	1.01	0.1	0.97
05008	0.67	0.7	0.03	0.16	0.19	19.11	0.91	0.09	0.94
03502	1.11	1.22	0.11	0.21	0.16	13.24	1.03	0.08	0.97

2 Statistiques de validation pour la période moyenne T_{02}

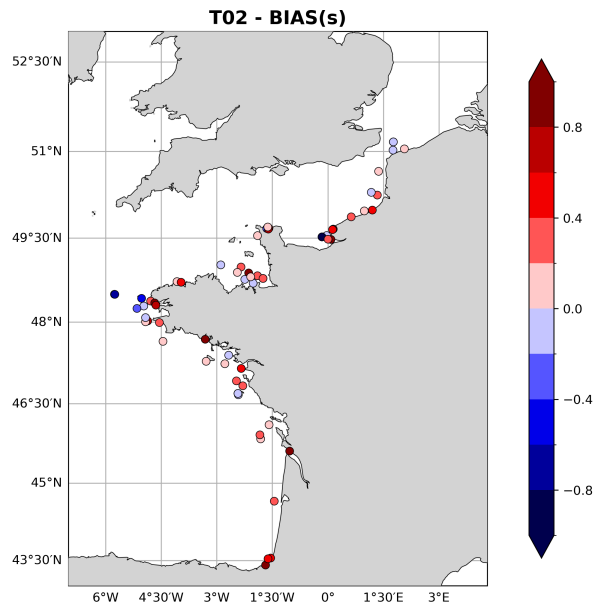


Figure 6 – Carte du biais du modèle par rapport aux observations CANDHIS pour T_{02} .

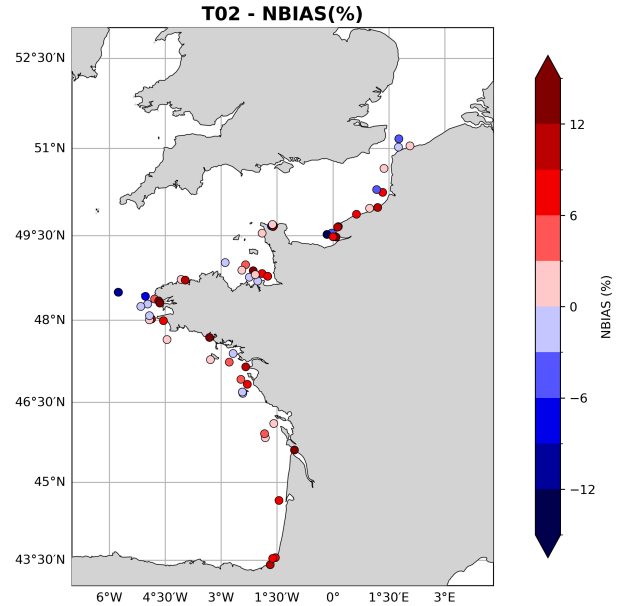


Figure 7 – Carte du biais normalisé du modèle par rapport aux observations CANDHIS pour T_{02} .

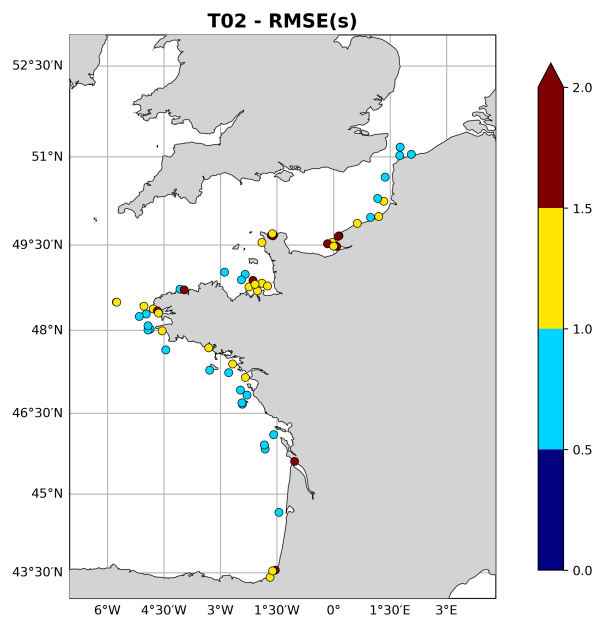


Figure 8 – Carte de RMSE du modèle par rapport aux observations CANDHIS pour T_{02} .

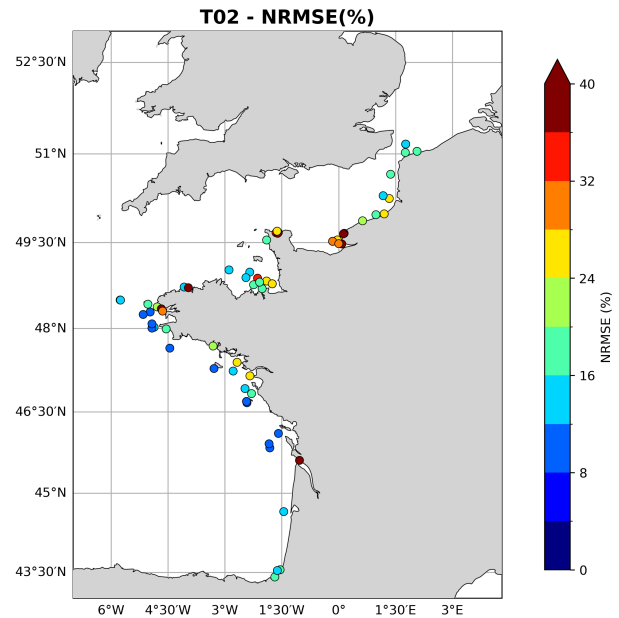


Figure 9 – Carte de RMSE normalisée du modèle par rapport aux observations CANDHIS pour T_{02} .

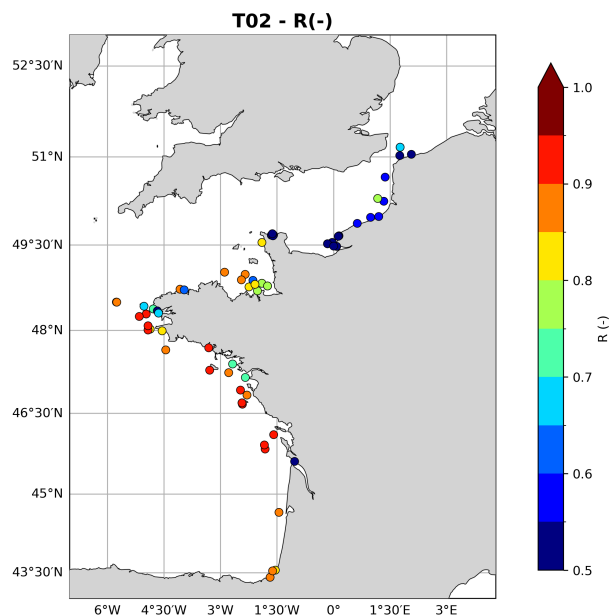


Figure 10 – Carte de corrélation du modèle par rapport aux observations CANDHIS pour T_{02} .

Table 2 – Scores du rejeu HYWAT pour la période moyenne T_{02} sur la période de mesure de chaque bouée du réseau CANDHIS considérée pour la validation.

Bouée	$\overline{X_{obs}}(s)$	$\overline{X_{mod}}(s)$	$Bias(s)$	$RMSE(s)$	$NRMSE$	$SI(\%)$	a	$b(s)$	R
06201	4.38	4.48	0.1	0.86	0.19	19.04	0.66	1.59	0.59
02911	6.72	6.67	-0.05	0.7	0.1	10.11	0.93	0.4	0.9
04401	4.9	5.38	0.49	1.22	0.24	22.01	0.98	0.59	0.75
06401	7.19	7.77	0.58	1.51	0.2	18.44	0.78	2.17	0.81
07609	3.42	4.33	0.91	1.99	0.58	51.26	0.72	1.86	0.2
07607	4.39	4.7	0.31	1.01	0.22	21.33	0.73	1.48	0.59
02907	5.53	5.82	0.29	1.2	0.21	20.48	0.9	0.84	0.73
06403	7.11	7.96	0.85	1.33	0.18	13.76	1.01	0.78	0.9
05902	4.47	4.18	-0.28	0.59	0.13	11.36	0.66	1.25	0.79
06402	6.96	7.5	0.54	1.07	0.15	12.77	0.9	1.25	0.89
01705	4.23	6.66	2.44	3.17	0.73	46.87	1.16	1.75	0.5
02908	5.62	7.31	1.69	2.82	0.49	39.45	0.8	2.83	0.37
08002	4.11	4.47	0.36	1.13	0.27	25.46	0.79	1.22	0.56
03302	6.54	6.94	0.4	0.95	0.14	12.79	0.85	1.36	0.88
07606	4.05	3.92	-0.13	1.15	0.28	27.4	0.36	2.45	0.34
07603	5.05	3.77	-1.27	1.46	0.29	14.08	0.71	0.21	0.58
07602	5.08	3.81	-1.27	1.51	0.29	15.87	0.69	0.32	0.53
02903	4.79	5.46	0.67	1.44	0.29	26.08	1.17	-0.15	0.7
06202	4.1	4.06	-0.03	0.67	0.16	16.25	0.49	2.07	0.46
02922	6.11	6.25	0.14	0.81	0.13	12.71	0.97	0.32	0.88
07610	3.57	4.77	1.21	2.4	0.66	57.11	0.4	3.35	0.13
08505	6.07	6.3	0.23	0.78	0.12	11.75	0.91	0.77	0.91
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Bouée	$\overline{X_{obs}}(s)$	$\overline{X_{mod}}(s)$	$Bias(s)$	$RMSE(s)$	$NRMSE$	$SI(\%)$	a	$b(s)$	R
03501	5.22	5.1	-0.12	1.08	0.2	19.87	0.91	0.35	0.77
05006	4.3	5.28	0.97	1.5	0.34	25.85	0.99	1.0	0.65
02920	6.42	7.05	0.63	0.96	0.15	11.11	0.98	0.73	0.83
02915	6.75	6.87	0.13	0.64	0.09	9.04	0.94	0.54	0.9
04403	5.29	5.49	0.19	0.85	0.16	15.11	0.97	0.36	0.85
02906	6.81	6.74	-0.07	0.56	0.08	7.94	0.99	0.02	0.94
08001	4.96	4.76	-0.2	0.68	0.13	12.9	0.75	1.06	0.79
08502	5.62	5.85	0.23	0.66	0.11	10.74	0.95	0.51	0.89
02919	6.48	6.0	-0.49	1.15	0.17	15.74	0.73	1.27	0.69
02916	6.83	6.79	-0.04	0.65	0.09	9.32	0.85	0.96	0.91
02910	4.61	5.09	0.48	1.91	0.4	38.93	1.34	-1.1	0.65
05003	4.34	4.0	-0.35	1.59	0.35	34.42	0.23	2.99	0.22
05901	4.1	3.96	-0.14	0.61	0.15	14.22	0.65	1.31	0.65
05009	5.76	5.9	0.14	1.02	0.17	17.15	1.05	-0.16	0.82
05004	4.24	4.65	0.41	1.56	0.36	35.01	0.67	1.8	0.34
02203	5.05	5.26	0.21	0.78	0.15	14.31	0.94	0.5	0.86
05007	4.71	5.1	0.39	1.6	0.32	30.61	0.78	1.43	0.69
05601	6.18	7.18	1.0	1.49	0.23	17.39	1.37	-1.31	0.92
01703	6.04	6.19	0.14	0.71	0.11	10.99	0.9	0.78	0.92
04402	4.4	4.38	-0.01	1.22	0.26	26.11	0.86	0.61	0.75
02914	6.97	7.01	0.04	0.79	0.11	10.97	0.83	1.25	0.88
07604	4.29	4.41	0.11	0.85	0.19	19.08	0.58	1.9	0.59
02902	7.09	6.3	-0.79	1.02	0.14	8.9	0.99	-0.7	0.89
05903	3.91	3.92	0.01	0.66	0.17	16.57	0.59	1.62	0.54
02921	5.97	6.33	0.36	1.06	0.17	16.14	0.98	0.46	0.84
07601	4.12	4.6	0.48	1.6	0.38	36.31	0.67	1.83	0.36
02202	5.33	5.34	0.01	0.82	0.15	14.75	0.91	0.5	0.86
08501	7.05	6.87	-0.17	0.67	0.09	9.02	0.84	0.98	0.92
07608	4.2	4.66	0.46	1.19	0.28	25.39	0.82	1.22	0.59
05005	4.68	5.06	0.38	1.2	0.24	23.13	0.88	0.96	0.75
08504	5.58	5.96	0.38	0.94	0.16	14.78	0.91	0.86	0.86
07611	3.58	3.8	0.22	1.05	0.29	28.2	0.75	1.1	0.43
01704	6.17	6.38	0.21	0.75	0.12	11.24	0.91	0.76	0.91
05001	4.57	4.92	0.35	1.31	0.27	26.14	0.98	0.43	0.78
02206	5.53	5.49	-0.04	1.12	0.19	19.47	1.0	-0.04	0.82
02204	6.22	6.09	-0.13	0.8	0.12	12.34	0.87	0.69	0.88
05602	6.23	6.39	0.15	0.7	0.11	10.65	0.94	0.51	0.91
02917	7.85	7.63	-0.22	0.72	0.09	8.55	0.83	1.1	0.91
01702	6.67	6.71	0.03	0.74	0.11	10.75	0.95	0.39	0.9
05002	3.31	4.02	0.71	2.04	0.6	56.26	0.14	3.57	0.06
08503	6.92	6.91	-0.02	0.62	0.09	8.7	0.9	0.68	0.92
05008	4.07	4.18	0.11	1.06	0.26	25.62	0.86	0.67	0.49
03502	5.53	5.68	0.15	1.08	0.19	18.64	0.98	0.25	0.83

3 Statistiques de validation pour la direction moyenne D_m

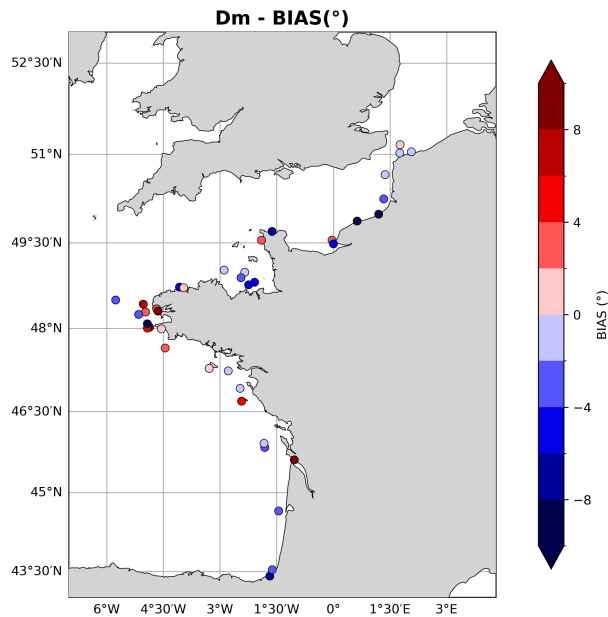


Figure 11 – Carte du biais du modèle par rapport aux observations CANDHIS pour D_m .

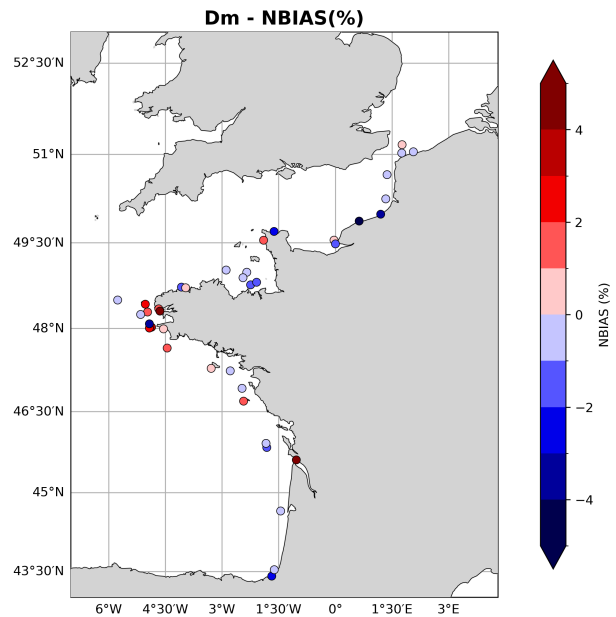


Figure 12 – Carte du biais normalisé du modèle par rapport aux observations CANDHIS pour D_m .

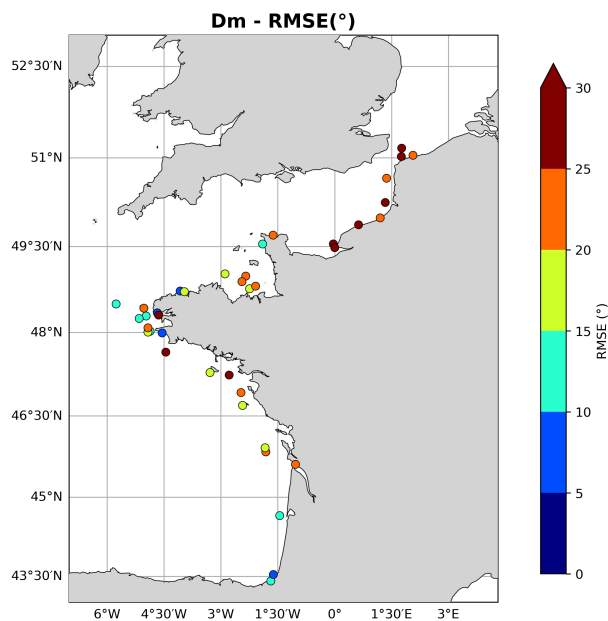


Figure 13 – Carte de RMSE du modèle par rapport aux observations CANDHIS pour D_m .

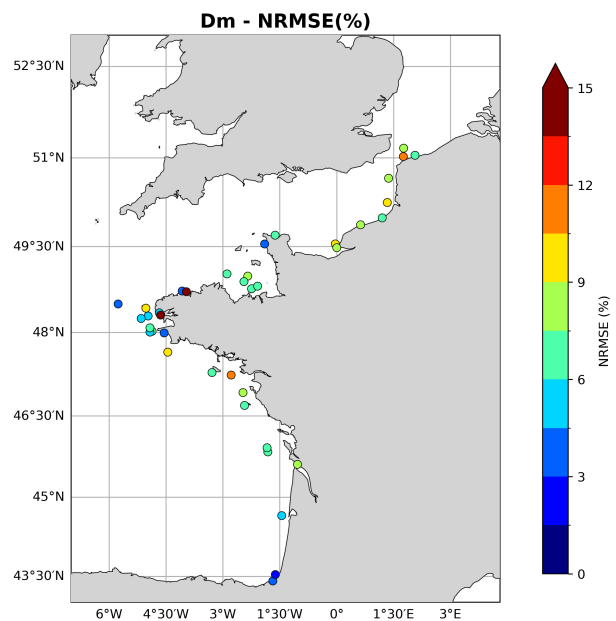


Figure 14 – Carte de RMSE normalisée du modèle par rapport aux observations CANDHIS pour D_m .

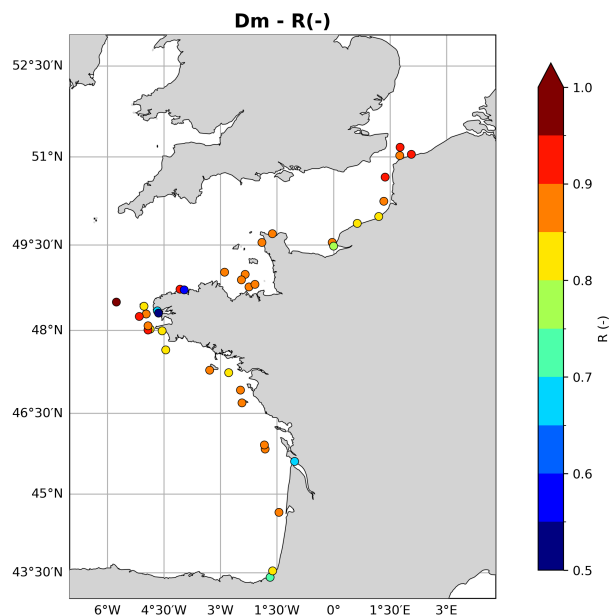


Figure 15 – Carte de corrélation du modèle par rapport aux observations CANDHIS pour D_m .

Table 3 – Scores du rejeu HYWAT pour la direction moyenne D_m sur la période de mesure de chaque bouée du réseau CANDHIS considérée pour la validation.

Bouée	$\overline{X_{obs}}(^{\circ})$	$\overline{X_{mod}}(^{\circ})$	$Bias(^{\circ})$	$RMSE(^{\circ})$	$NRMSE$	$SI(\%)$	a	$b(^{\circ})$	R
06201	274.8	273.85	-0.31	23.73	0.09	8.63	0.99	0.92	0.91
02911	268.86	271.96	2.75	14.52	0.05	5.4	1.04	-8.27	0.89
07607	319.06	300.77	-17.0	26.33	0.08	8.25	1.01	-18.29	0.85
06403	314.31	307.9	-6.4	10.74	0.03	3.42	0.66	99.14	0.7
05902	348.87	354.3	1.34	27.15	0.08	7.78	0.99	2.74	0.91
06402	305.64	303.49	-2.18	9.13	0.03	2.99	0.86	40.17	0.82
01705	258.92	269.87	11.49	20.36	0.08	7.86	0.21	214.74	0.68
02908	196.02	198.32	2.27	9.94	0.05	5.07	1.2	-37.72	0.68
08002	285.58	281.7	-2.25	29.91	0.1	10.47	1.0	-1.48	0.87
03302	294.97	292.36	-2.43	13.8	0.05	4.68	0.9	26.09	0.86
07606	309.83	311.12	2.63	31.11	0.1	10.04	1.01	0.73	0.85
02903	233.91	246.82	10.09	40.03	0.17	17.12	1.09	-8.75	0.33
06202	287.15	286.88	-0.01	30.3	0.11	10.55	1.05	-10.1	0.86
02922	305.79	300.92	-4.74	9.99	0.03	3.27	0.99	-3.05	0.93
08505	268.78	270.06	-0.08	20.28	0.08	7.55	1.08	-19.98	0.88
02920	236.94	246.12	9.45	14.96	0.06	6.32	0.79	58.36	0.8
02915	260.13	265.86	6.0	15.09	0.06	5.8	0.96	16.42	0.93
04403	259.74	259.8	-1.08	27.58	0.11	10.62	1.04	-10.64	0.85
02906	293.82	290.25	-2.36	11.88	0.04	4.04	1.0	-2.34	0.98
08502	274.4	277.9	4.25	18.62	0.07	6.78	0.94	21.28	0.88
02919	253.9	259.0	6.12	23.88	0.09	9.4	0.99	9.0	0.81
02916	284.13	273.85	-8.74	20.52	0.07	7.22	1.02	-13.89	0.86
...									

...									
Bouée	$\overline{X_{obs}}(^{\circ})$	$\overline{X_{mod}}(^{\circ})$	$Bias(^{\circ})$	$RMSE(^{\circ})$	$NRMSE$	$SI(\%)$	a	$b(^{\circ})$	R
02910	30.74	30.51	0.25	18.66	0.61	60.71	0.8	6.77	0.6
05009	269.84	272.43	2.84	10.67	0.04	3.96	0.91	25.98	0.9
02203	288.44	288.3	-1.71	22.49	0.08	7.8	1.07	-19.89	0.86
01703	289.43	286.4	-3.77	21.5	0.07	7.43	1.07	-22.04	0.9
02914	260.95	262.87	3.08	25.71	0.1	9.85	0.87	36.1	0.84
05903	321.82	321.13	-0.9	21.01	0.07	6.53	1.01	-3.41	0.91
02921	232.45	233.82	1.35	7.81	0.03	3.36	0.84	39.57	0.84
02202	300.31	297.4	-2.13	21.75	0.07	7.24	1.02	-7.13	0.88
07608	308.31	296.79	-11.45	21.63	0.07	7.02	1.02	-15.75	0.83
07611	315.87	310.04	-4.03	27.51	0.09	8.71	1.01	-7.96	0.79
01704	284.26	283.07	-1.86	18.24	0.06	6.42	1.07	-19.96	0.89
02206	313.3	306.98	-5.4	19.78	0.06	6.31	1.02	-12.03	0.87
02204	285.0	285.16	-0.19	18.46	0.06	6.48	1.02	-5.1	0.87
05602	268.93	268.27	0.32	16.18	0.06	6.02	0.91	23.53	0.89
02917	273.17	271.25	-2.1	12.84	0.05	4.7	1.01	-5.76	0.94
05008	337.23	326.29	-7.76	24.21	0.07	7.18	0.96	1.35	0.88
03502	300.29	295.3	-4.01	22.06	0.07	7.35	1.04	-14.66	0.88

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4.1 Bouée 05901 : Dunkerque

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
26-12-1987	04-09-1996	30.0 m	51.16	1.77	Non

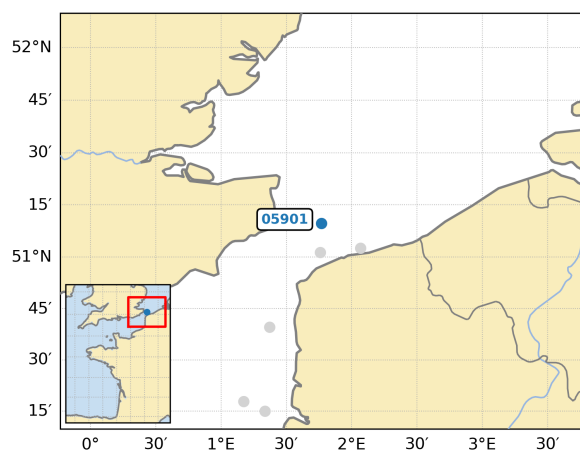
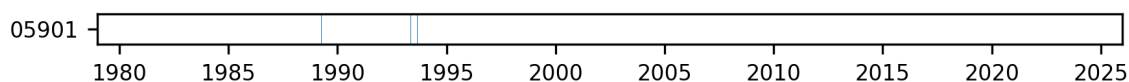


Figure 16 – Position géographique de la bouée 05901.

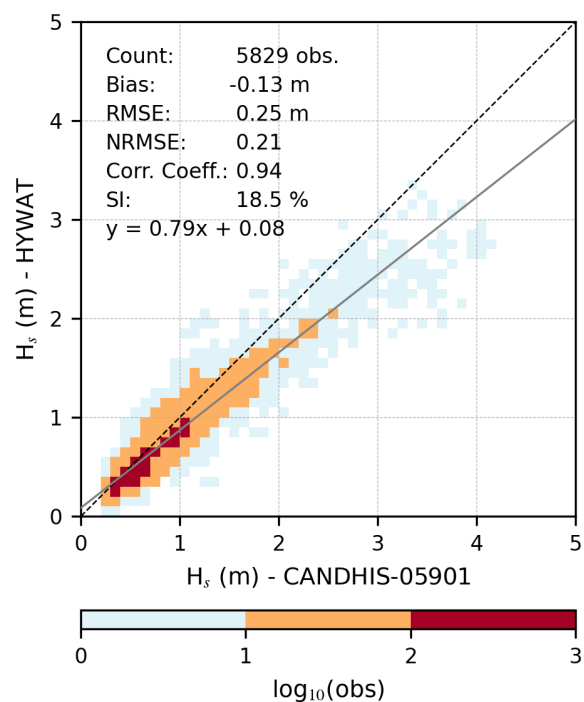


Figure 17 – Diagramme de dispersion pour H_s .

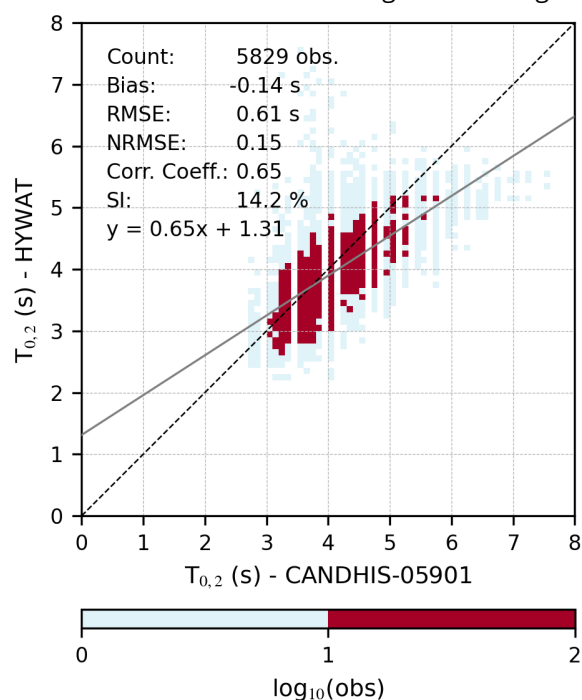


Figure 18 – Diagramme de dispersion pour $T_{0.2}$.

4.2 Bouée 05902 : Ruytingen

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
16-12-2009	15-02-2010	31.0 m	51.16	1.77	Oui

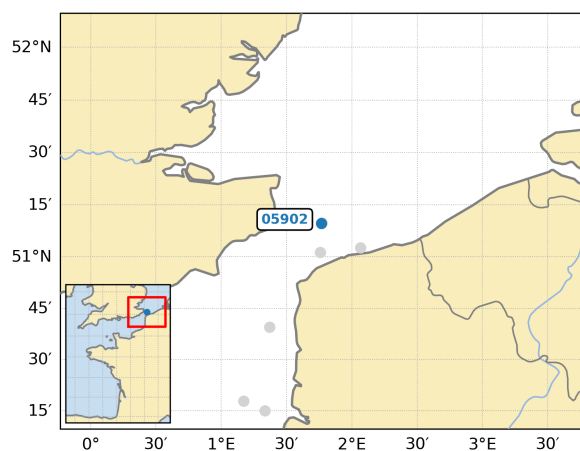
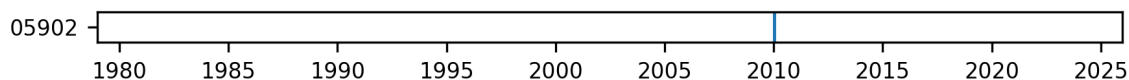


Figure 19 – Position géographique de la bouée 05902.

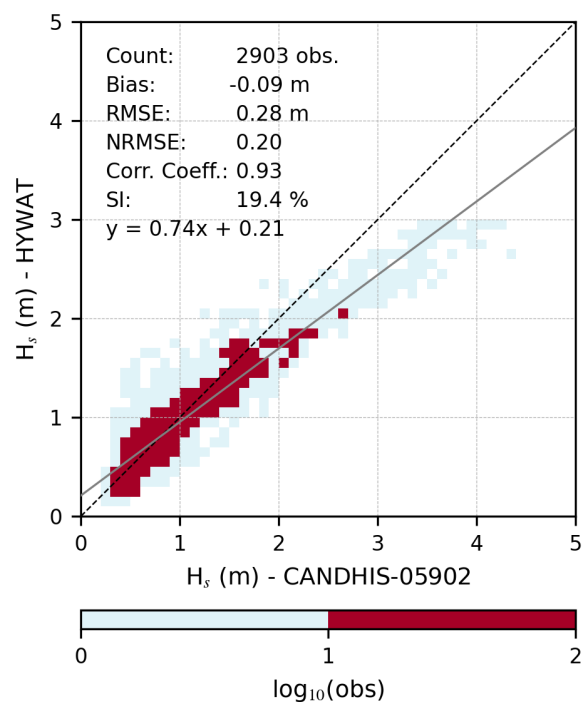


Figure 20 – Diagramme de dispersion pour H_s .

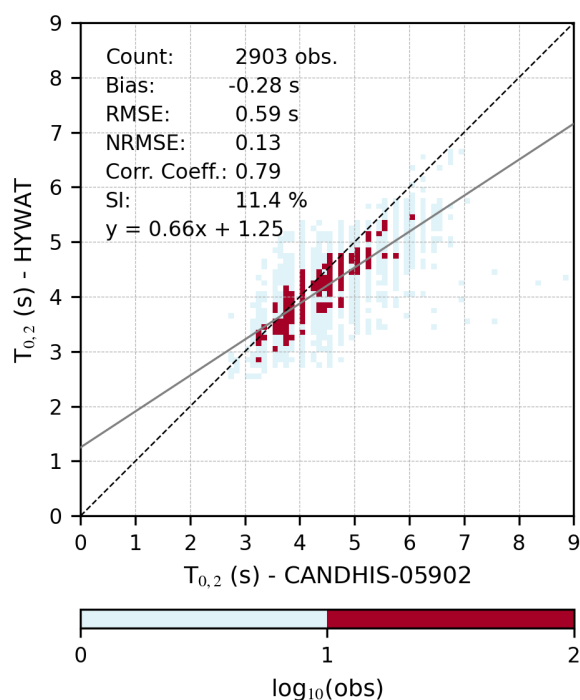


Figure 21 – Diagramme de dispersion pour $T_{0,2}$.

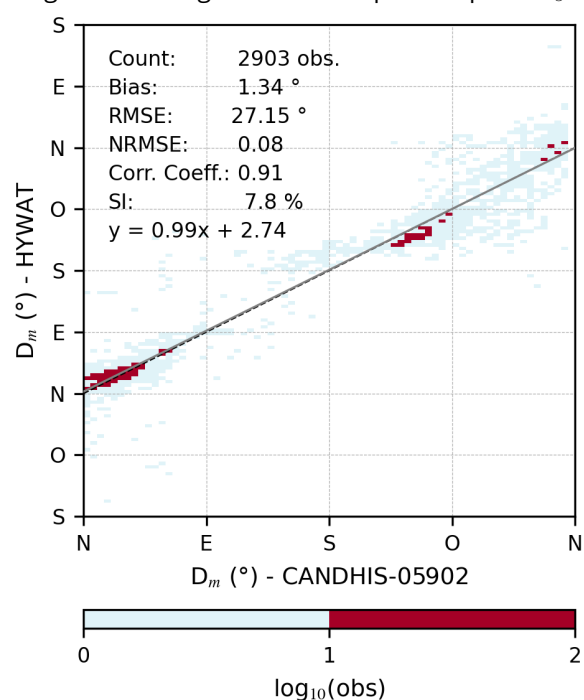


Figure 22 – Diagramme de dispersion pour D_m .

4.3 Bouée 05903 : Gravelines

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
29-09-2020	30-12-2025	15.0 m	51.04	2.07	Oui

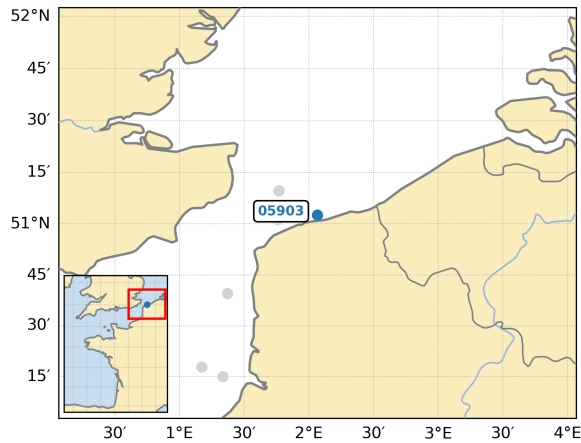
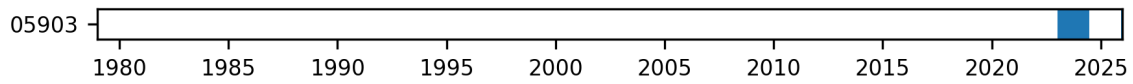


Figure 23 – Position géographique de la bouée 05903.

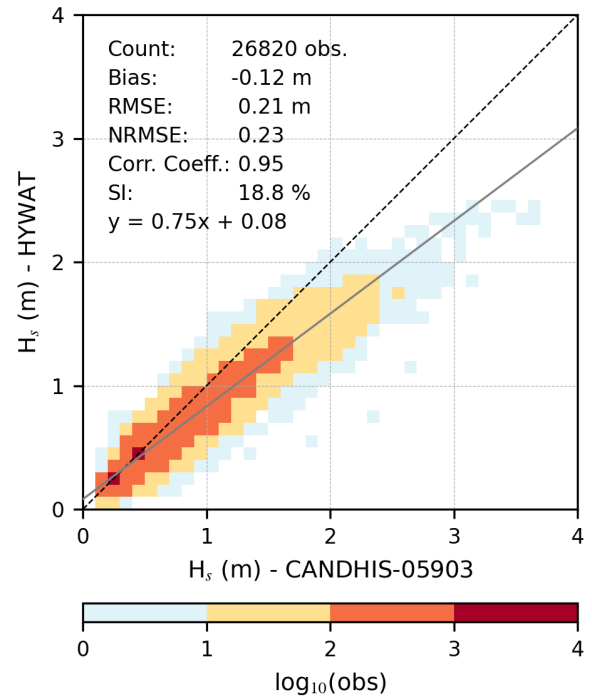


Figure 24 – Diagramme de dispersion pour H_s .

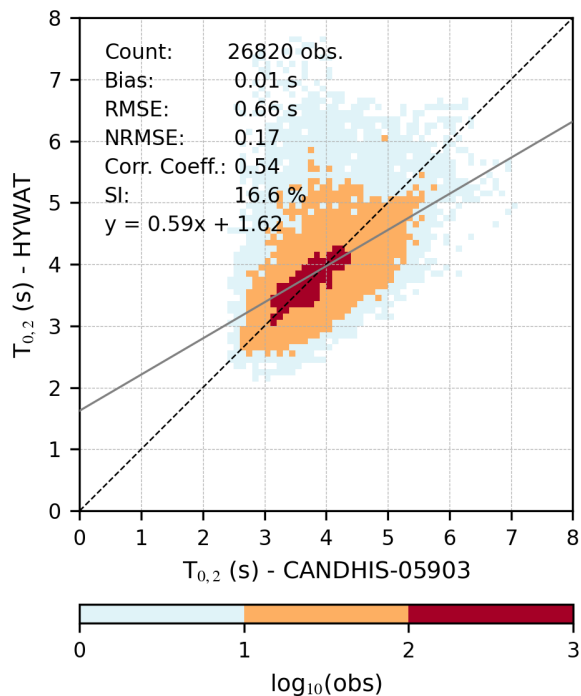


Figure 25 – Diagramme de dispersion pour $T_{0,2}$.

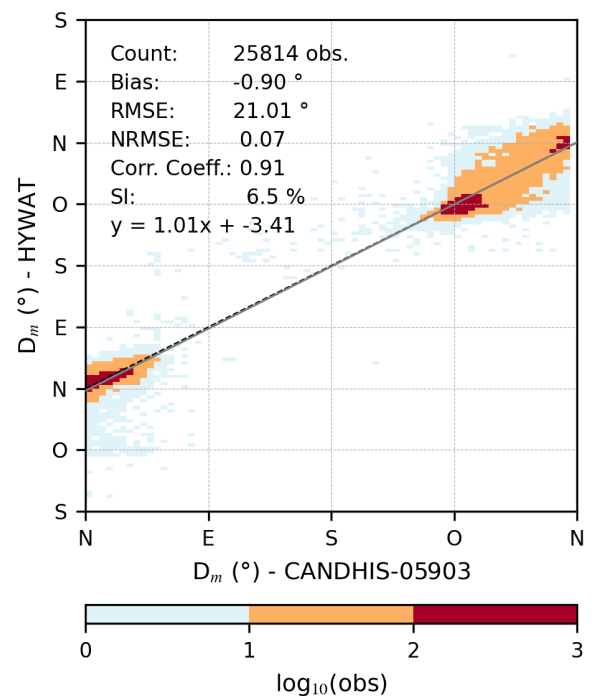


Figure 26 – Diagramme de dispersion pour D_m .

4.4 Bouée 06202 : Calais

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
23-05-2012	11-10-2012	30.0 m	51.02	1.76	Oui

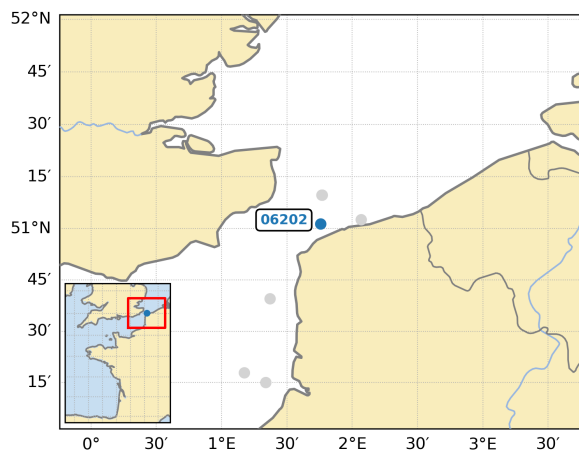
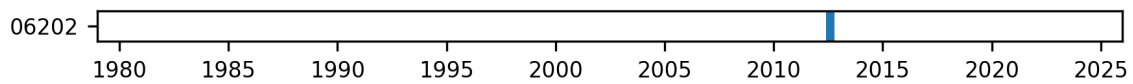


Figure 27 – Position géographique de la bouée 06202.

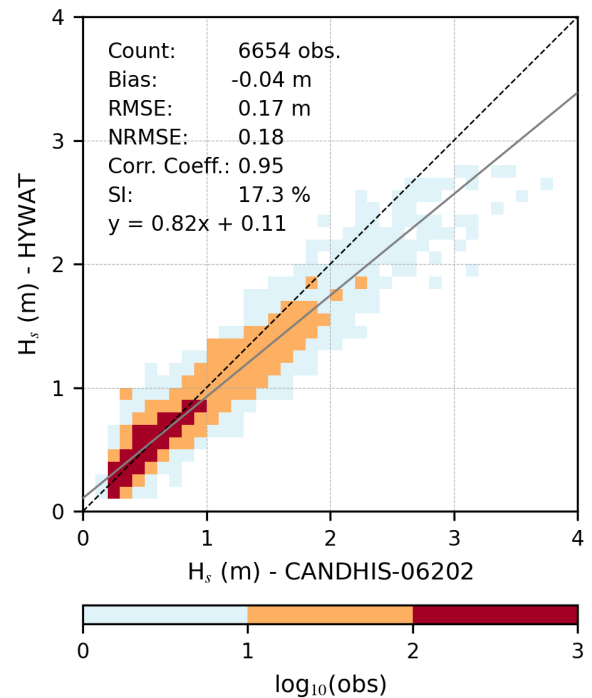


Figure 28 – Diagramme de dispersion pour H_s .

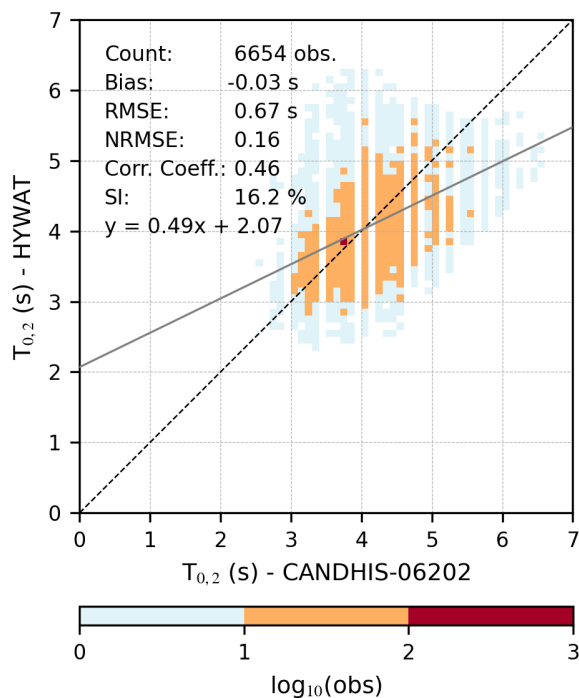


Figure 29 – Diagramme de dispersion pour $T_{0,2}$.

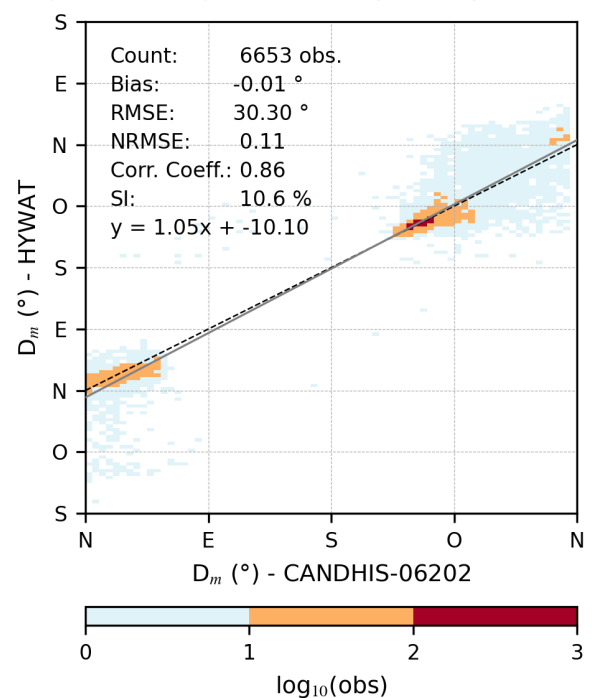


Figure 30 – Diagramme de dispersion pour D_m .

4.5 Bouée 06201 : Vergoyer

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-01-2010	27-05-2013	30.0 m	50.66	1.37	Oui

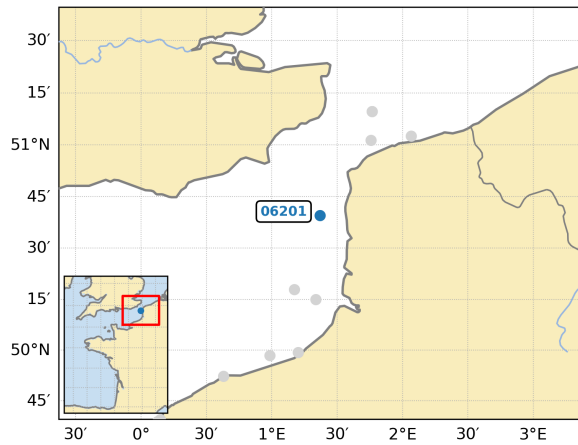
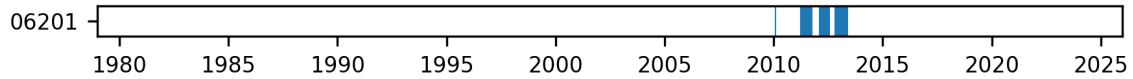


Figure 31 – Position géographique de la bouée 06201.

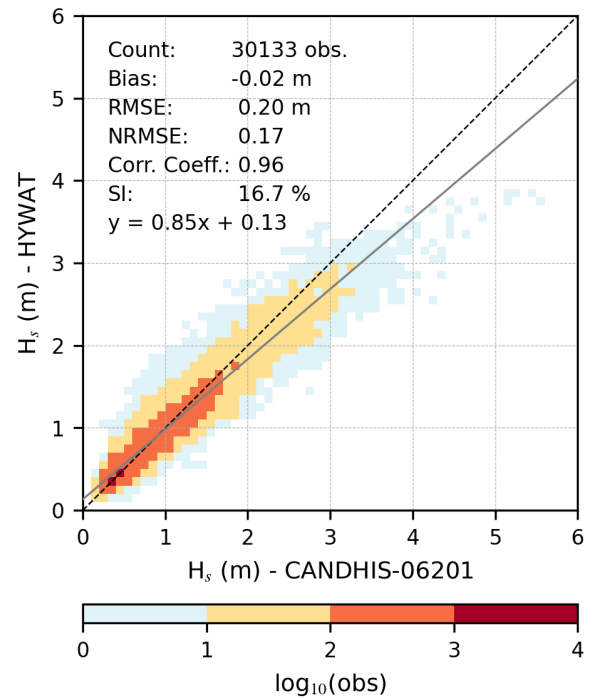


Figure 32 – Diagramme de dispersion pour H_s .

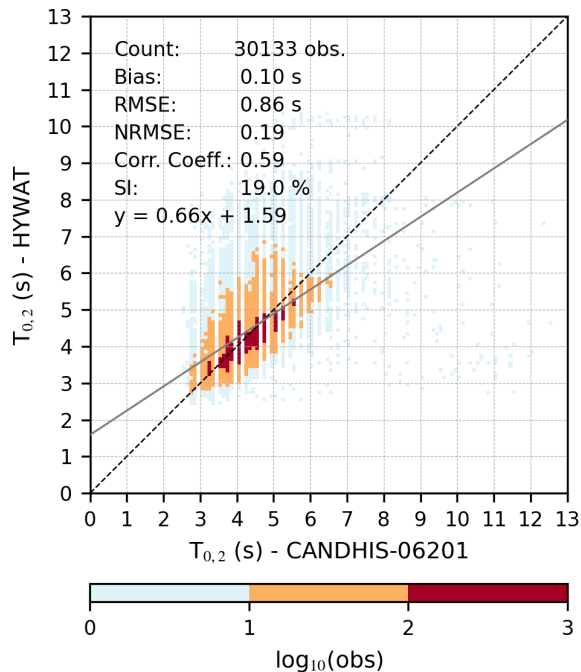


Figure 33 – Diagramme de dispersion pour $T_{0.2}$.

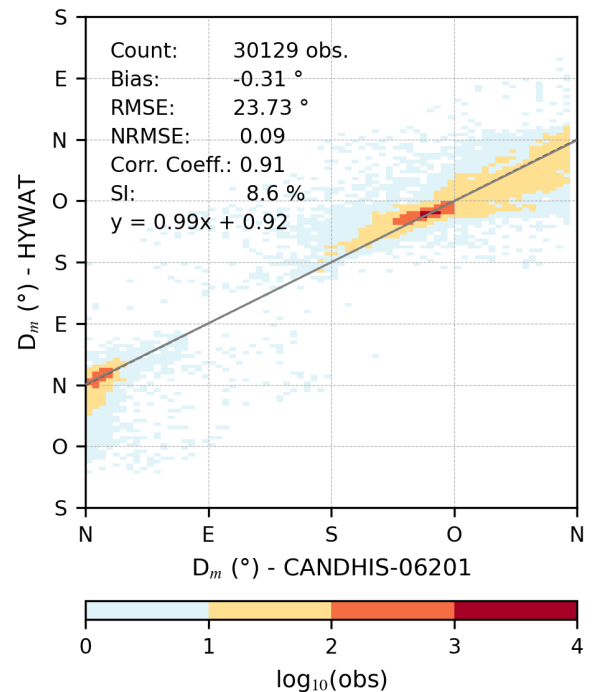


Figure 34 – Diagramme de dispersion pour D_m .

4.6 Bouée 08001 : Cayeux

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-08-1999	05-02-2001	25.0 m	50.30	1.17	Non

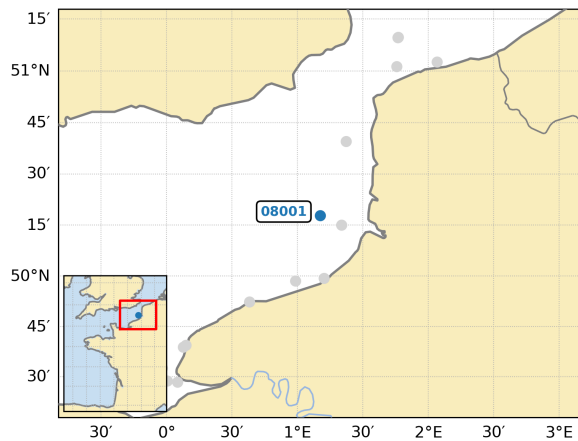
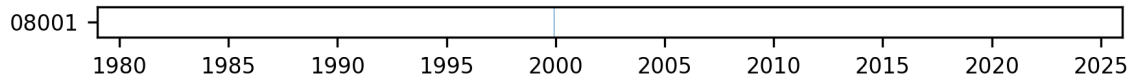


Figure 35 – Position géographique de la bouée 08001.

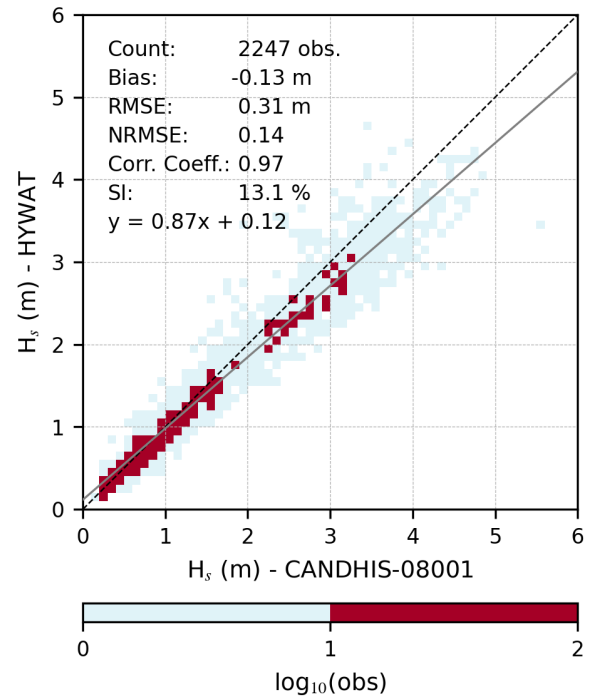


Figure 36 – Diagramme de dispersion pour H_s .

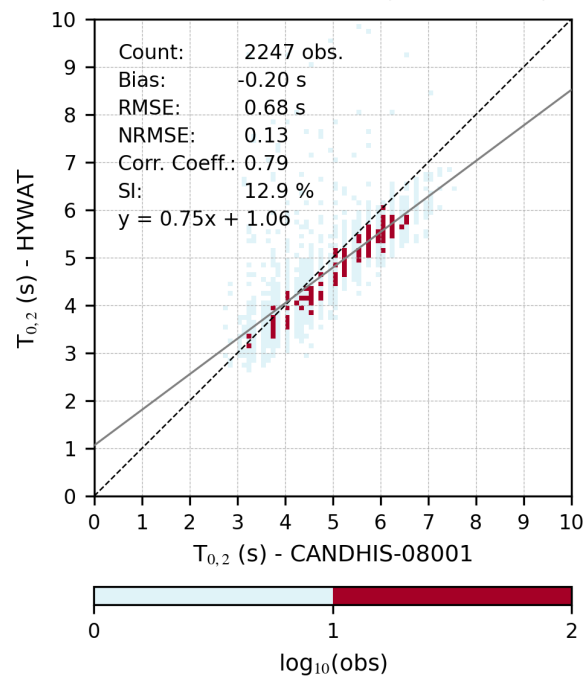


Figure 37 – Diagramme de dispersion pour $T_{0.2}$.

4.7 Bouée 08002 : Baie de Somme

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
29-09-2022	29-06-2025	15.0 m	50.25	1.34	Oui

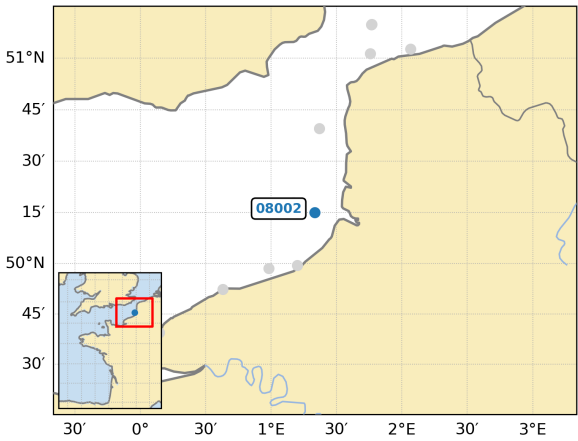
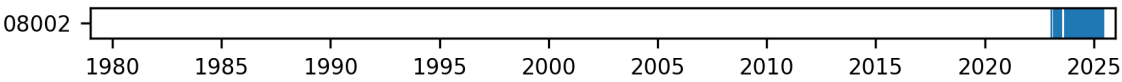


Figure 38 – Position géographique de la bouée 08002.

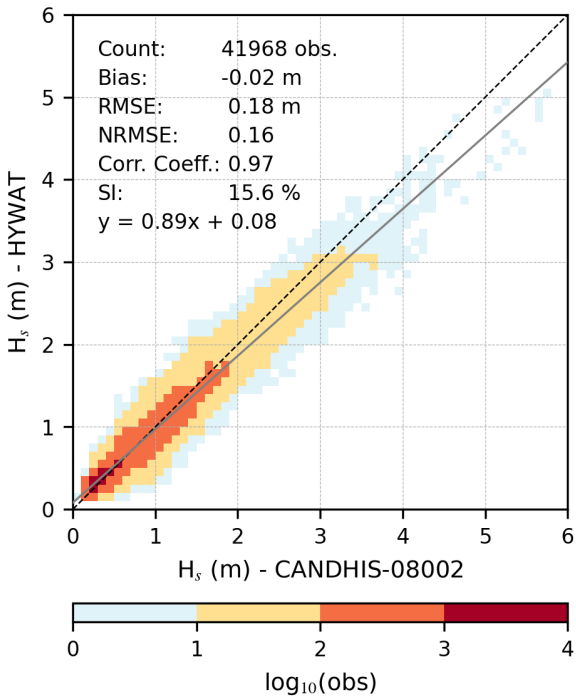


Figure 39 – Diagramme de dispersion pour H_s .

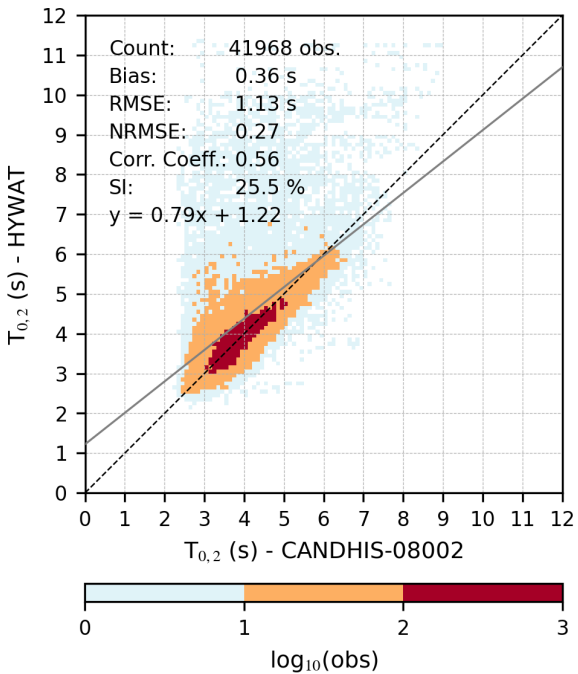


Figure 40 – Diagramme de dispersion pour $T_{0.2}$.

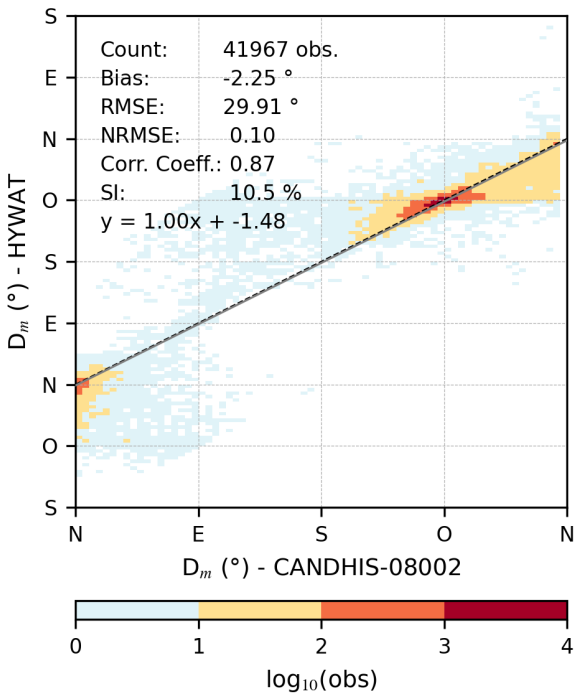


Figure 41 – Diagramme de dispersion pour D_m .

4.8 Bouée 07608 : Penly

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
07-11-2017	11-07-2022	11.0 m	49.99	1.20	Oui

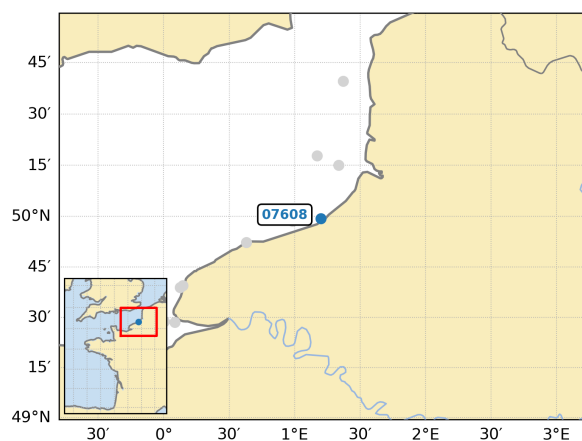
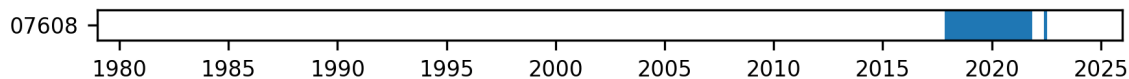


Figure 42 – Position géographique de la bouée 07608.

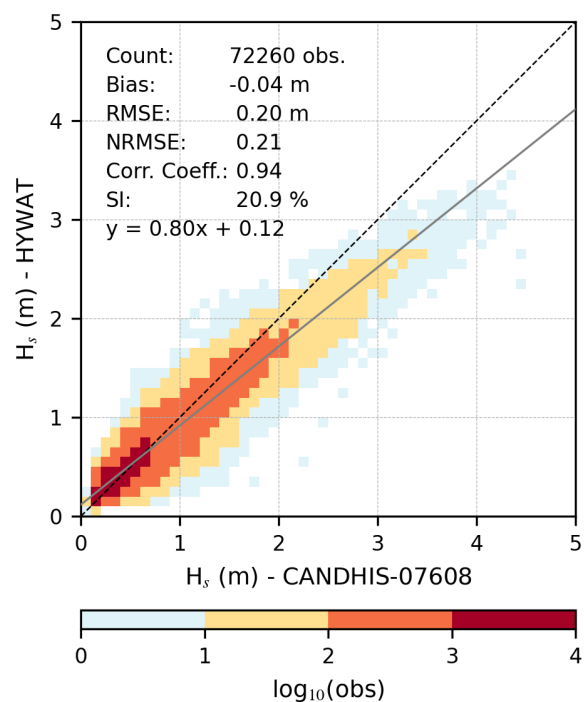


Figure 43 – Diagramme de dispersion pour H_s .

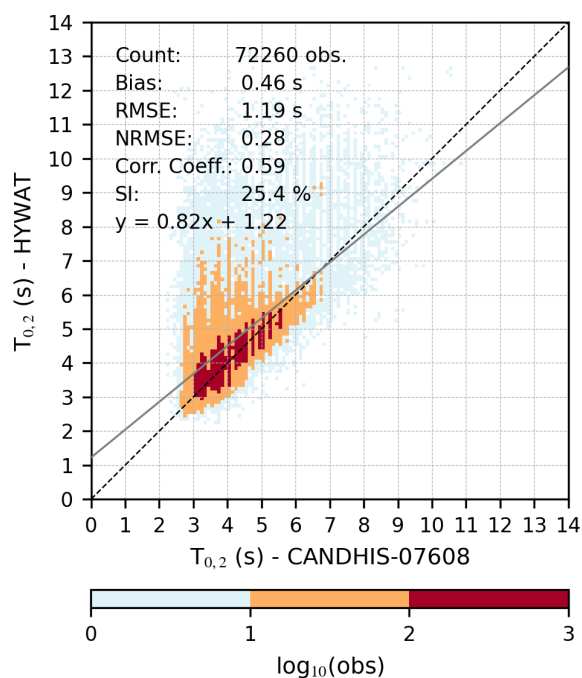


Figure 44 – Diagramme de dispersion pour $T_{0.2}$.

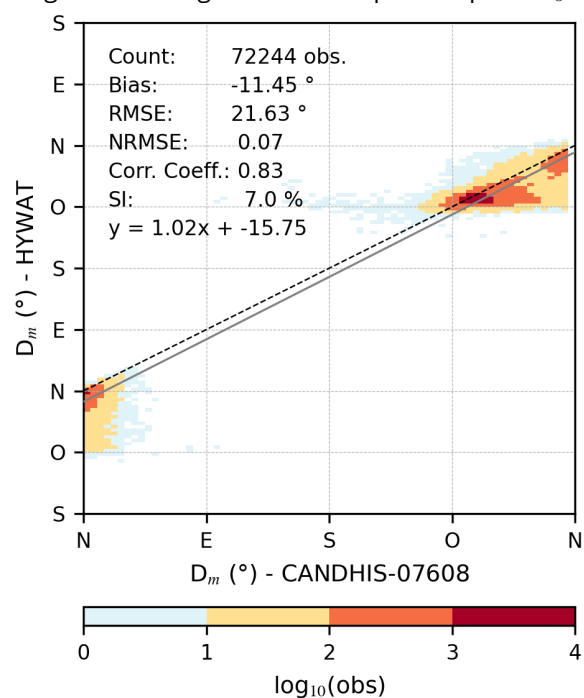


Figure 45 – Diagramme de dispersion pour D_m .

4.9 Bouée 07604 : Dieppe

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
27-02-1987	27-05-1992	18.0 m	49.97	0.98	Non

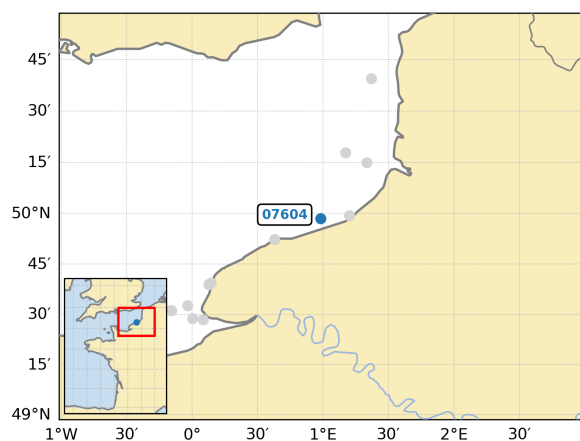
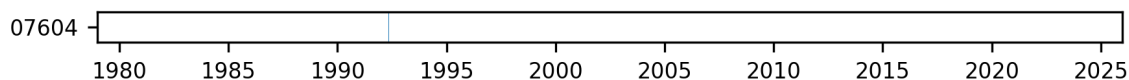


Figure 46 – Position géographique de la bouée 07604.

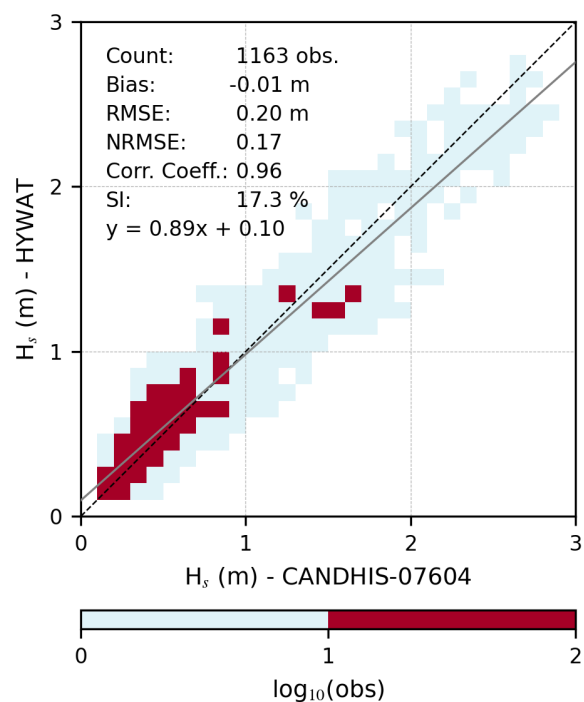


Figure 47 – Diagramme de dispersion pour H_s .

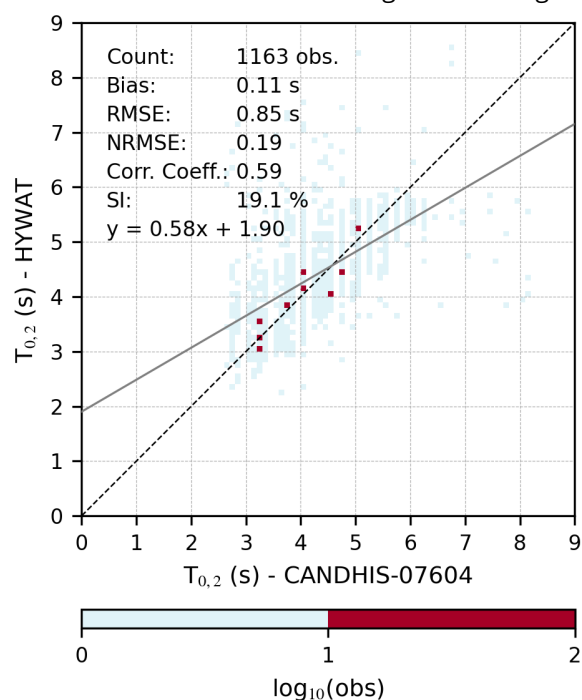


Figure 48 – Diagramme de dispersion pour T_{02} .

4.10 Bouée 07607 : Paluel

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
22-06-2016	12-07-2022	12.0 m	49.87	0.63	Oui

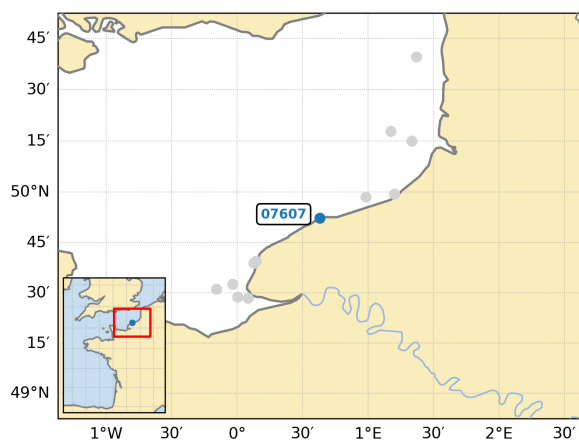
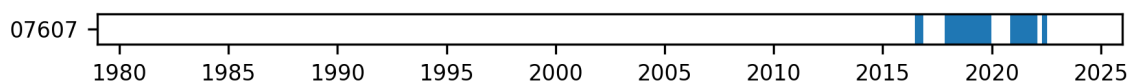


Figure 49 – Position géographique de la bouée 07607.

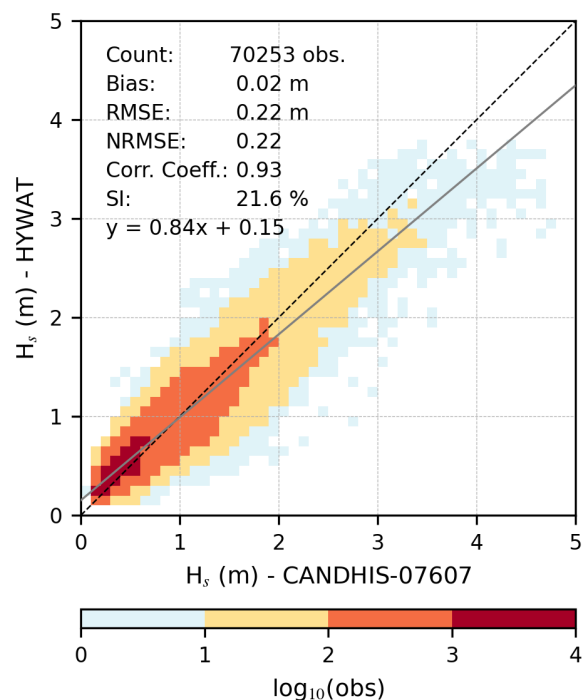


Figure 50 – Diagramme de dispersion pour H_s .

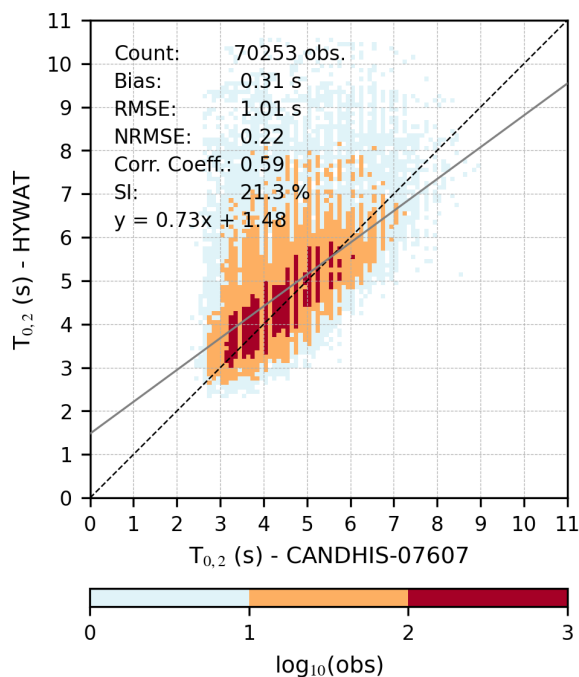


Figure 51 – Diagramme de dispersion pour $T_{0.2}$.

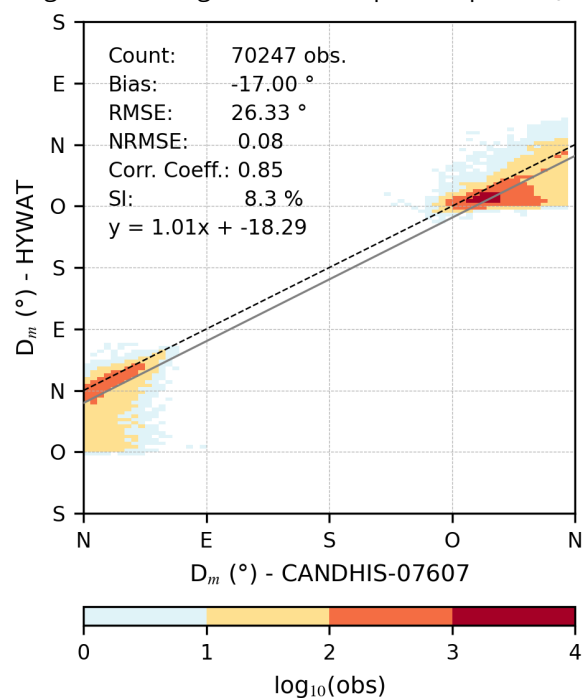


Figure 52 – Diagramme de dispersion pour D_m .

4.11 Bouée 05008 : Cherbourg (extérieur)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
30-09-2003	30-12-2025	25.0 m	49.69	-1.62	Oui

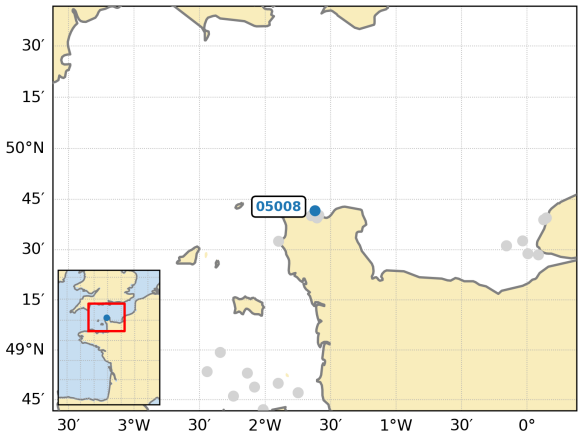
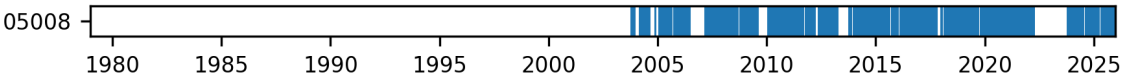


Figure 53 – Position géographique de la bouée 05008.

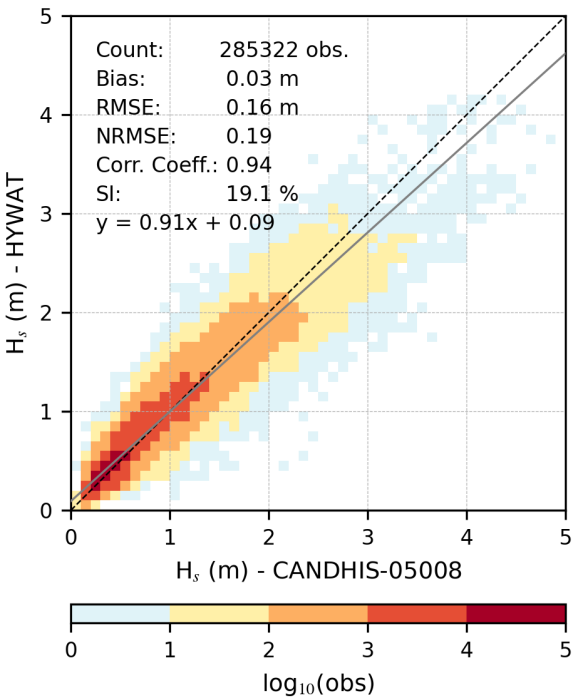


Figure 54 – Diagramme de dispersion pour H_s .

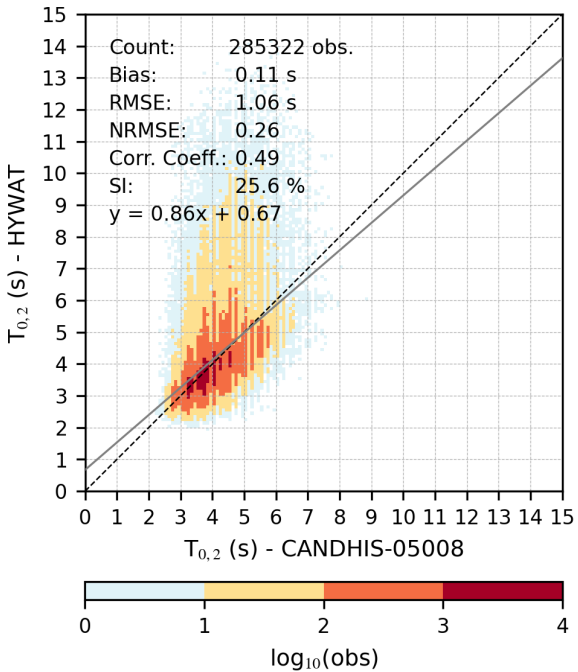


Figure 55 – Diagramme de dispersion pour $T_{0.2}$.

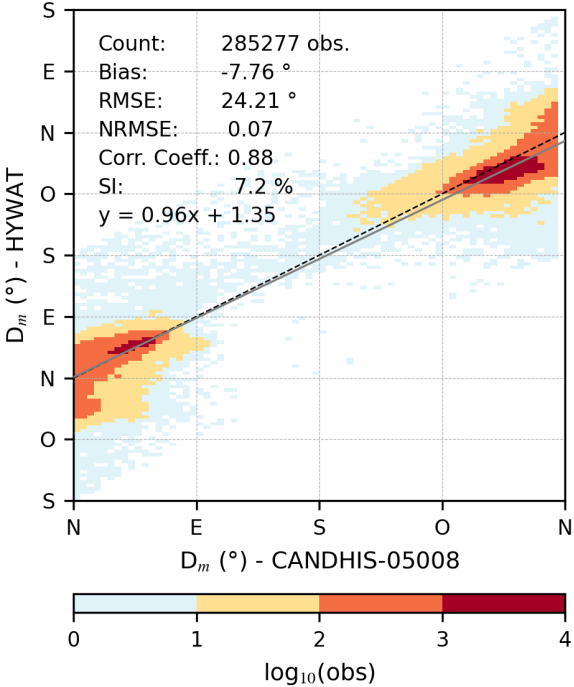


Figure 56 – Diagramme de dispersion pour D_m .

4.12 Bouée 05004 : Cherbourg (grande rade)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-09-2000	01-06-2001	11.0 m	49.67	-1.59	Non

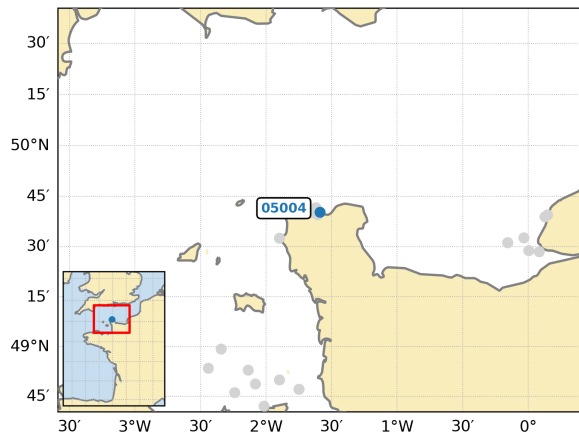
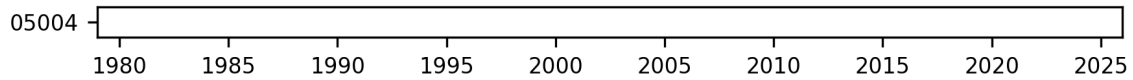


Figure 57 – Position géographique de la bouée 05004.

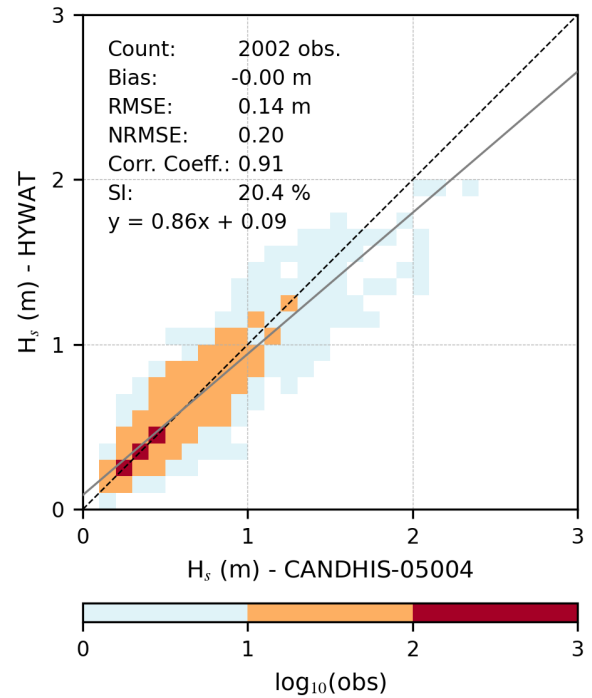


Figure 58 – Diagramme de dispersion pour H_s .

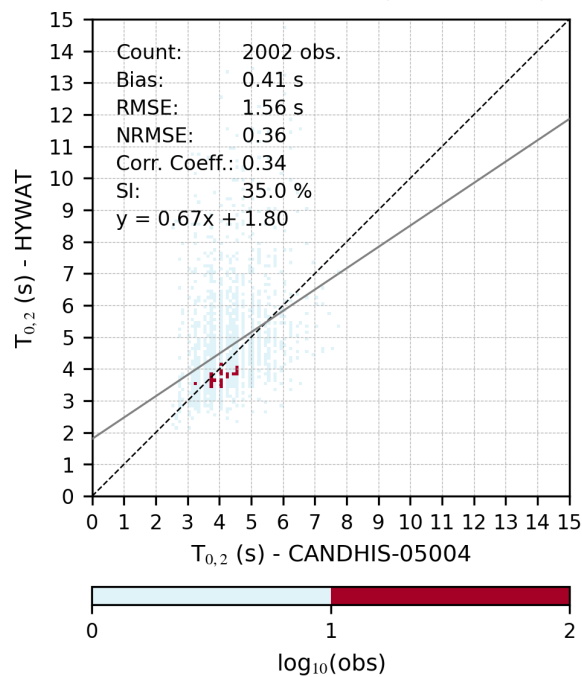


Figure 59 – Diagramme de dispersion pour $T_{0.2}$.

4.13 Bouée 05003 : Cherbourg (grande rade)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-07-1999	21-09-2000	11.0 m	49.67	-1.65	Non

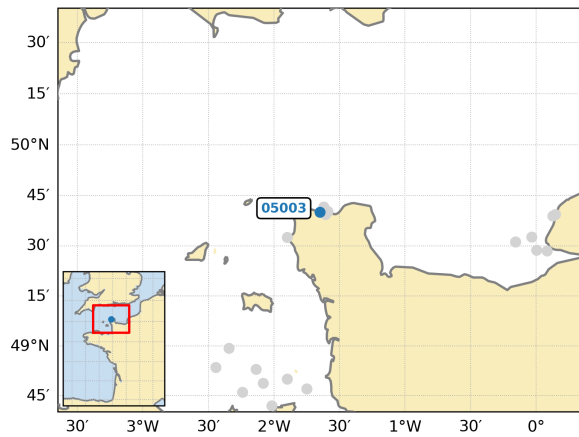
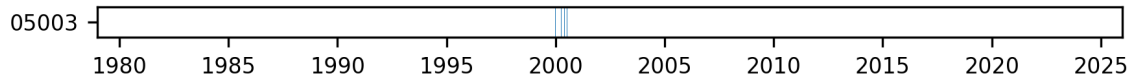


Figure 60 – Position géographique de la bouée 05003.

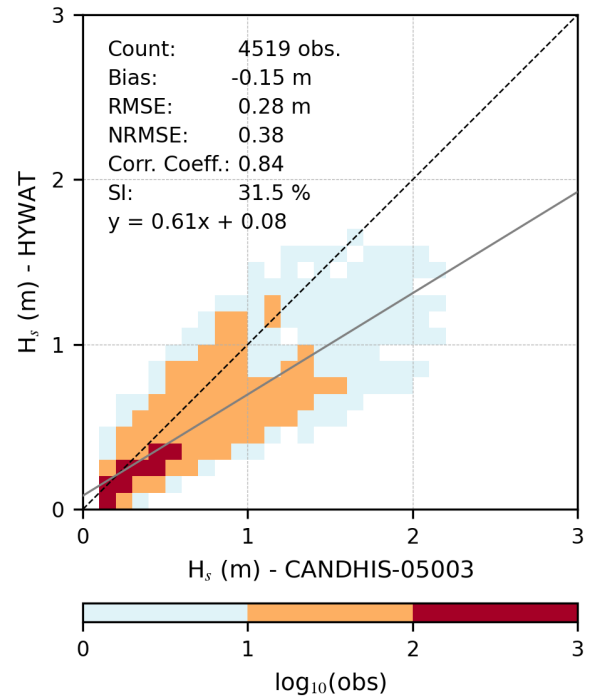


Figure 61 – Diagramme de dispersion pour H_s .

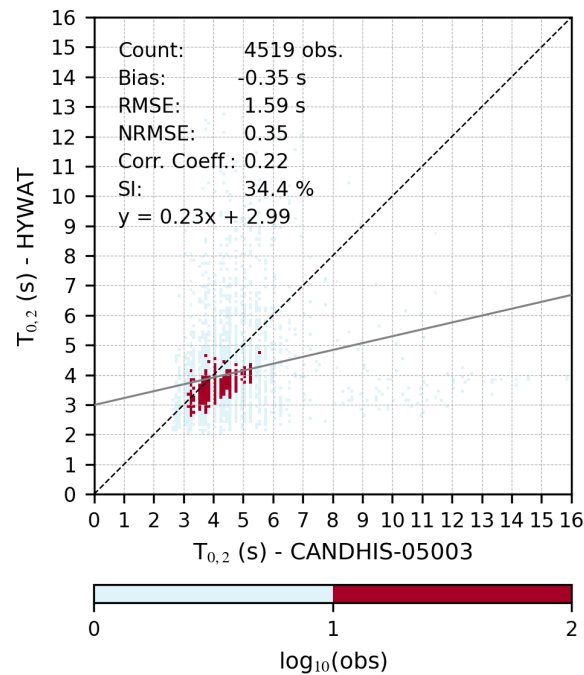


Figure 62 – Diagramme de dispersion pour $T_{0,2}$.

4.14 Bouée 07610 : Port d'Antifer

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
01-12-2022	30-12-2025	8.0 m	49.66	0.15	Non

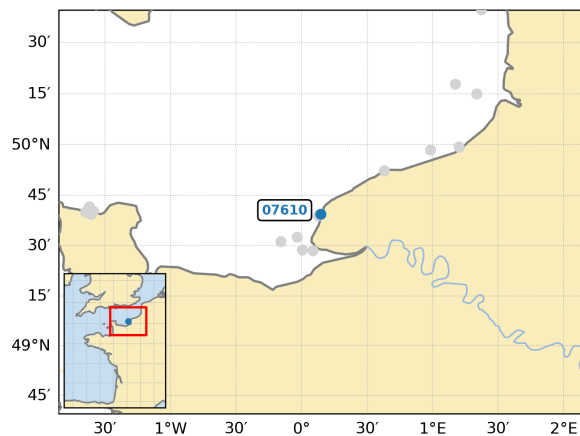
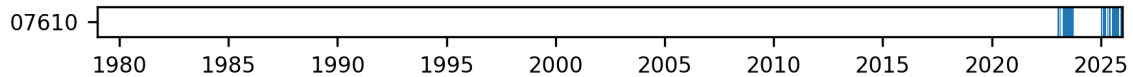


Figure 63 – Position géographique de la bouée 07610.

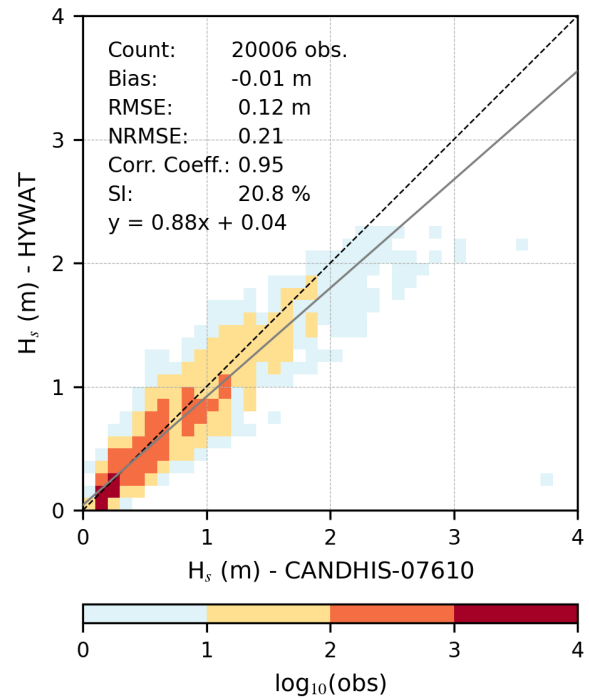


Figure 64 – Diagramme de dispersion pour H_s .

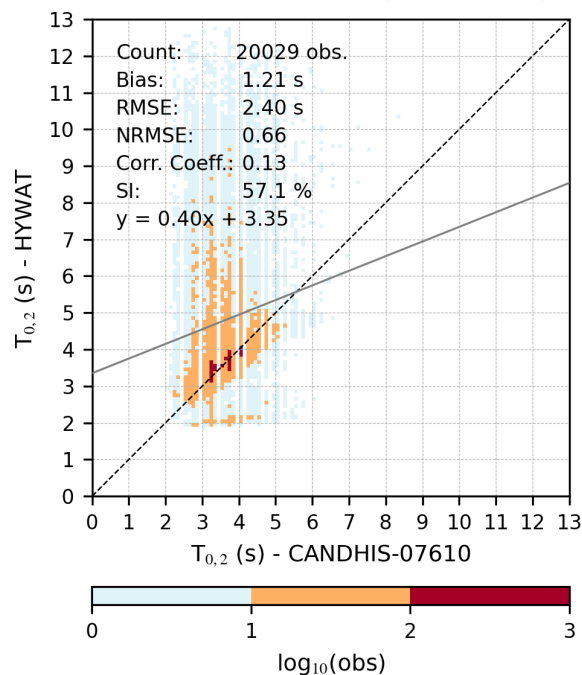


Figure 65 – Diagramme de dispersion pour $T_{0.2}$.

4.15 Bouée 05002 : Cherbourg (petite rade)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-07-1999	31-05-2001	4.0 m	49.66	-1.61	Non

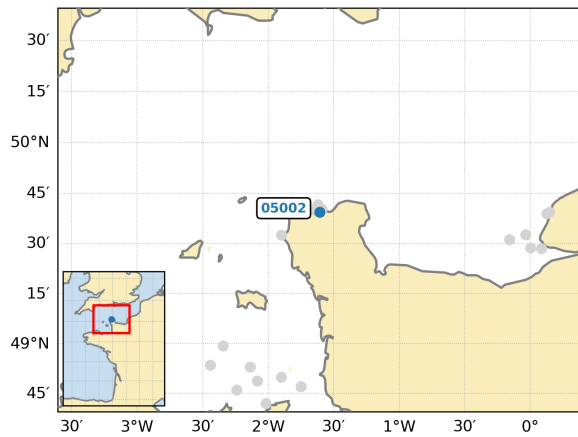
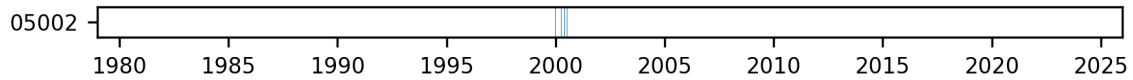


Figure 66 – Position géographique de la bouée 05002.

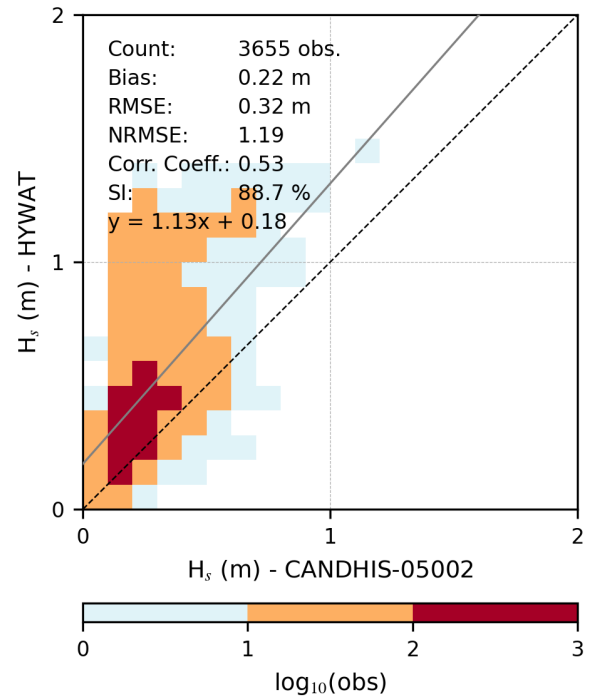


Figure 67 – Diagramme de dispersion pour H_s .

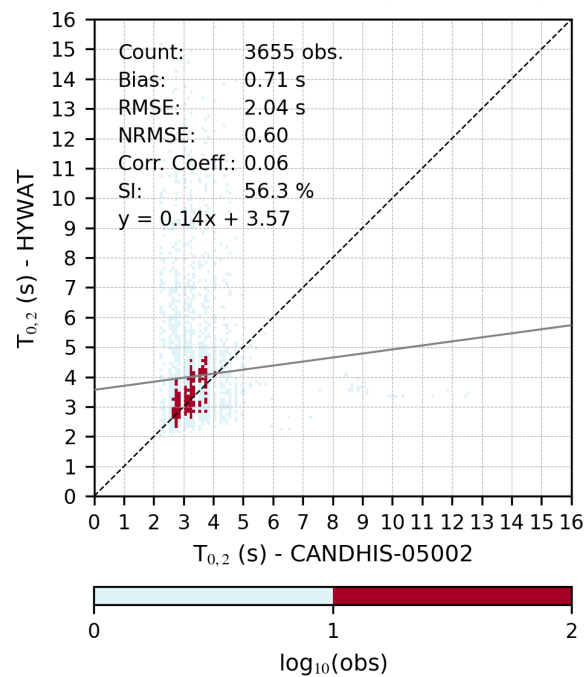


Figure 68 – Diagramme de dispersion pour $T_{0,2}$.

4.16 Bouée 07601 : Antifer

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-07-1996	07-09-2010	17.0 m	49.65	0.13	Non

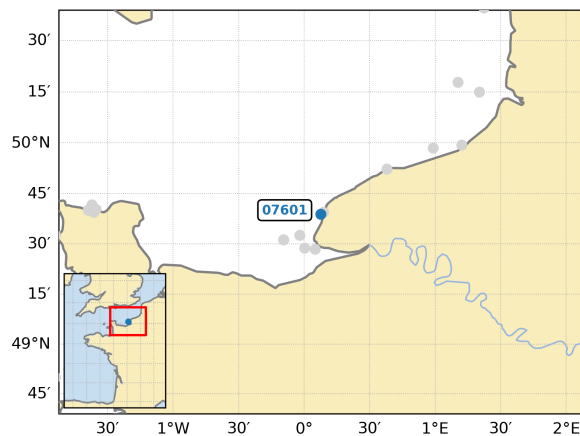
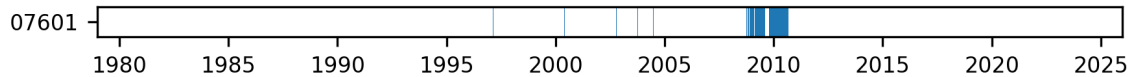


Figure 69 – Position géographique de la bouée 07601.

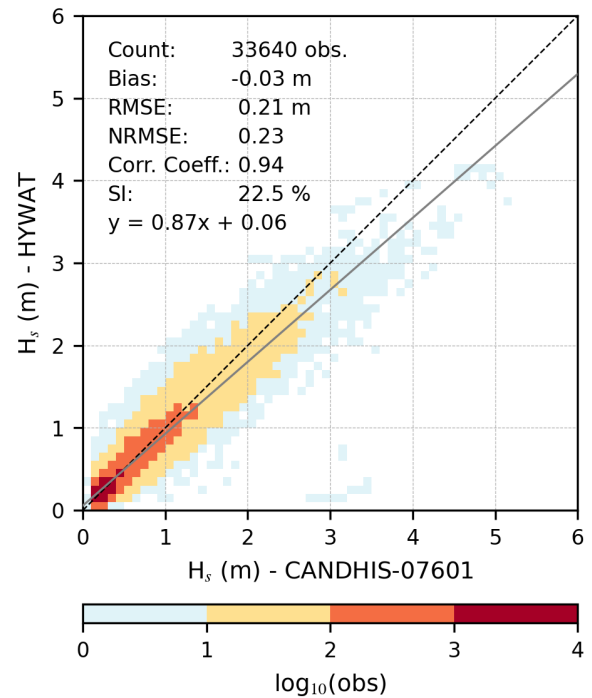


Figure 70 – Diagramme de dispersion pour H_s .

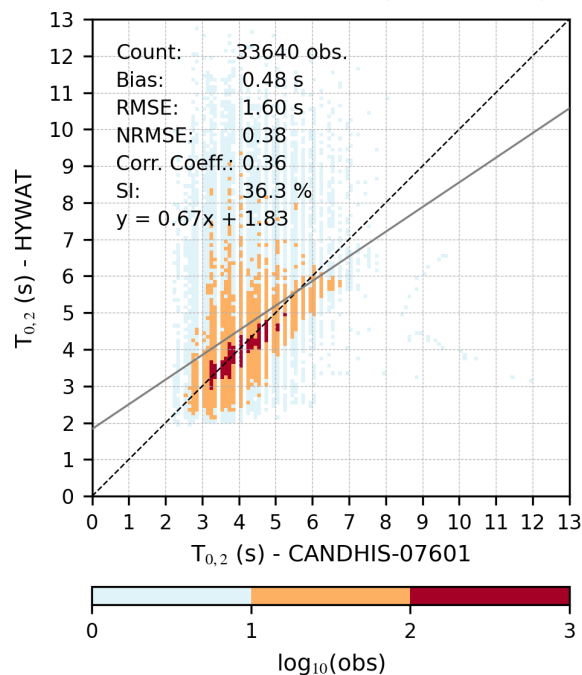


Figure 71 – Diagramme de dispersion pour $T_{0,2}$.

4.17 Bouée 07606 : Le Havre - Metzinger

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
24-02-2011	17-06-2013	17.0 m	49.54	-0.03	Oui

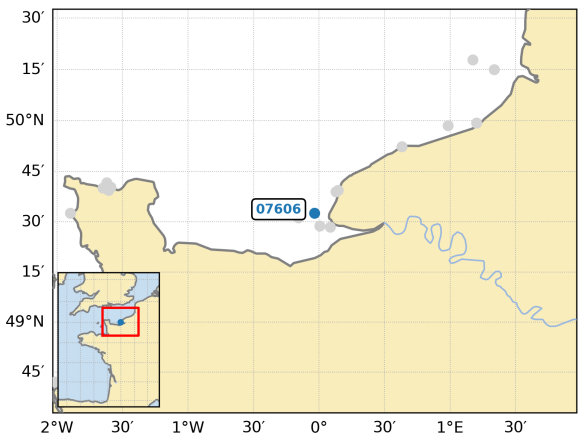
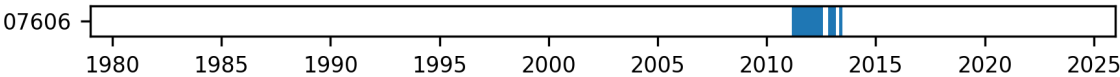


Figure 72 – Position géographique de la bouée 07606.

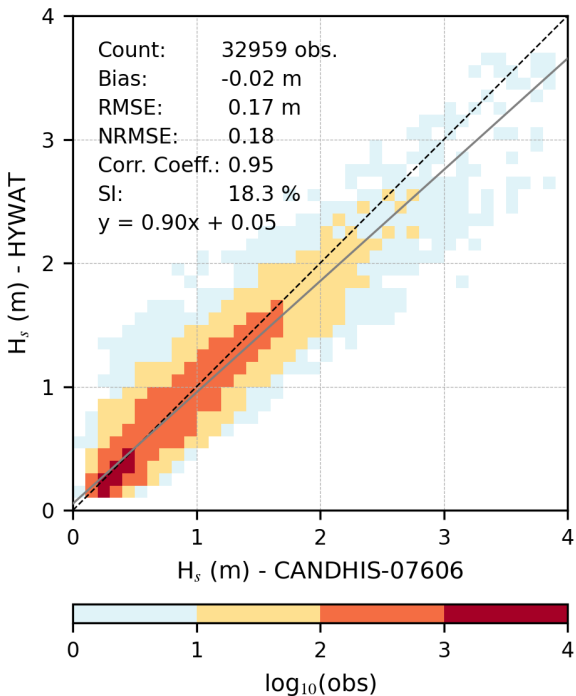


Figure 73 – Diagramme de dispersion pour H_s .

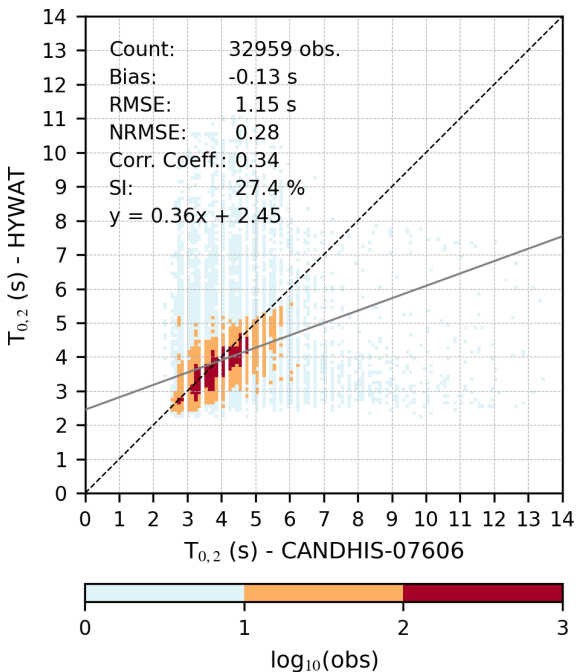


Figure 74 – Diagramme de dispersion pour $T_{0.2}$.

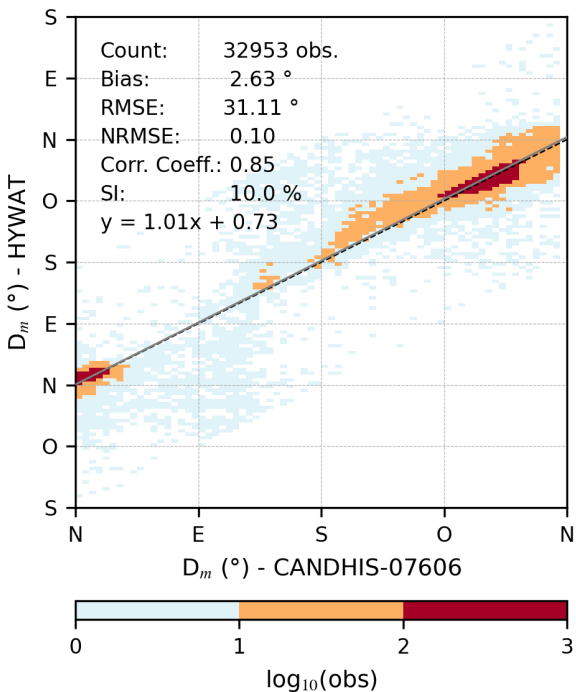


Figure 75 – Diagramme de dispersion pour D_m .

4.18 Bouée 05009 : Flamanville

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
03-10-2018	20-12-2020	17.0 m	49.54	-1.90	Oui

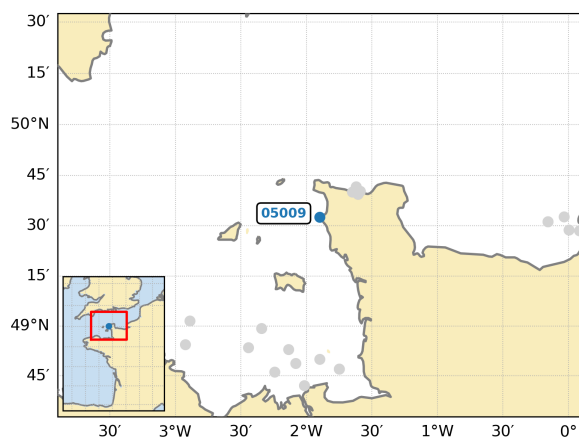
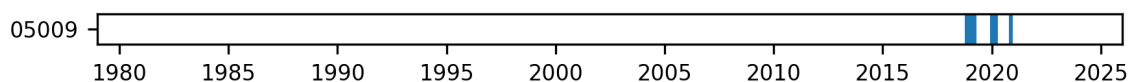


Figure 76 – Position géographique de la bouée 05009.

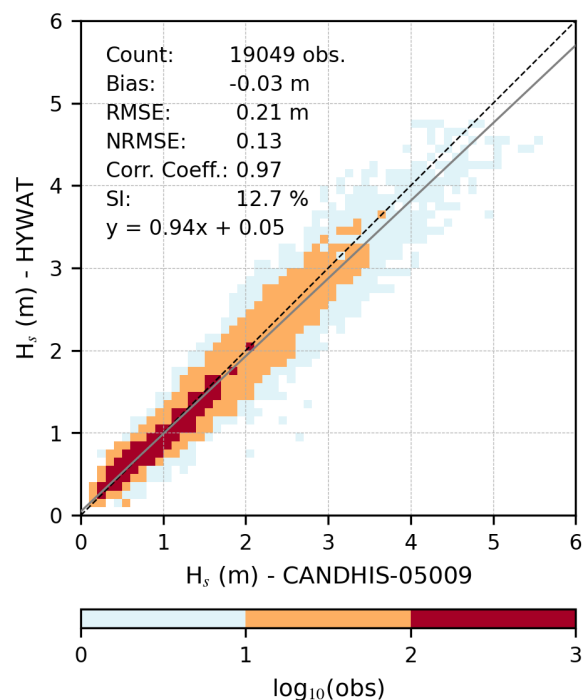


Figure 77 – Diagramme de dispersion pour H_s .

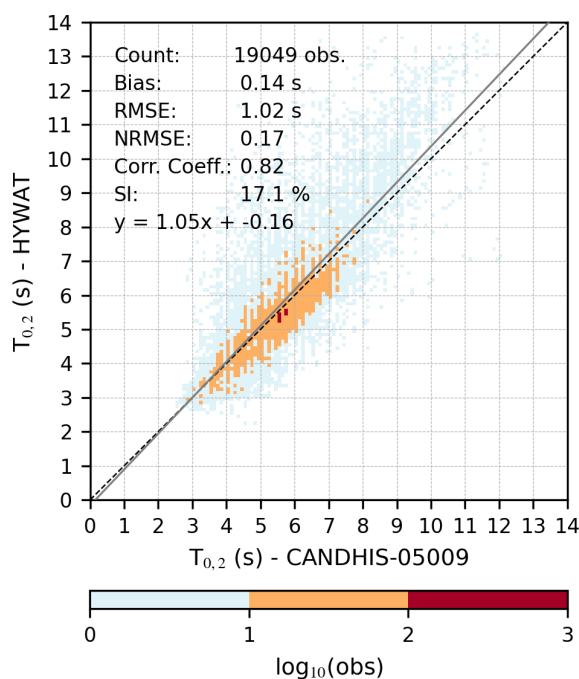


Figure 78 – Diagramme de dispersion pour $T_{0.2}$.

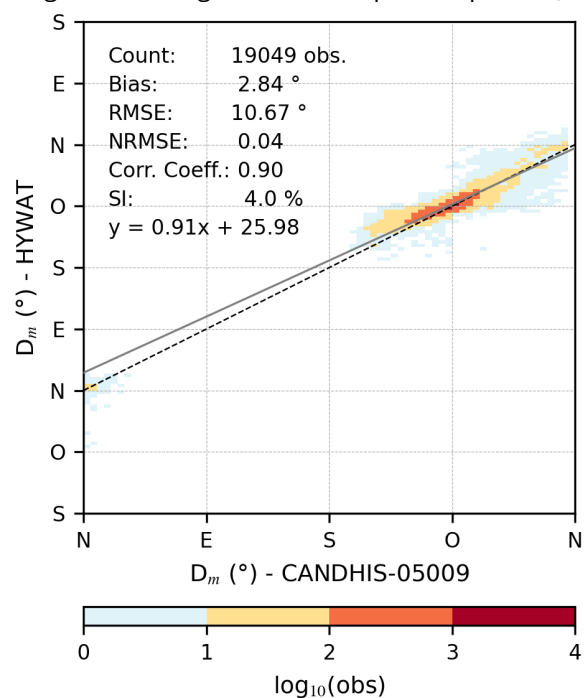


Figure 79 – Diagramme de dispersion pour D_m .

4.19 Bouée 07603 : Le Havre LHA

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
30-10-1997	20-09-2008	17.0 m	49.52	-0.16	Non

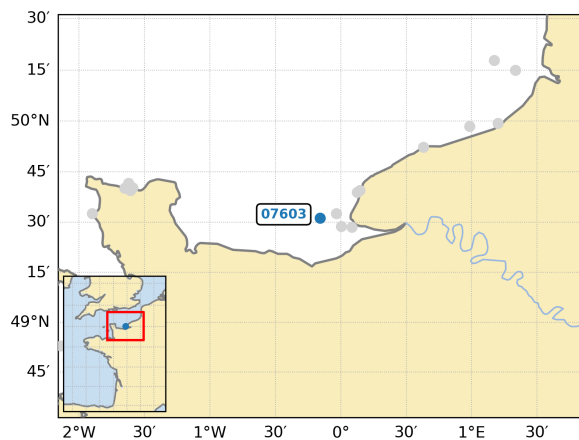


Figure 80 – Position géographique de la bouée 07603.

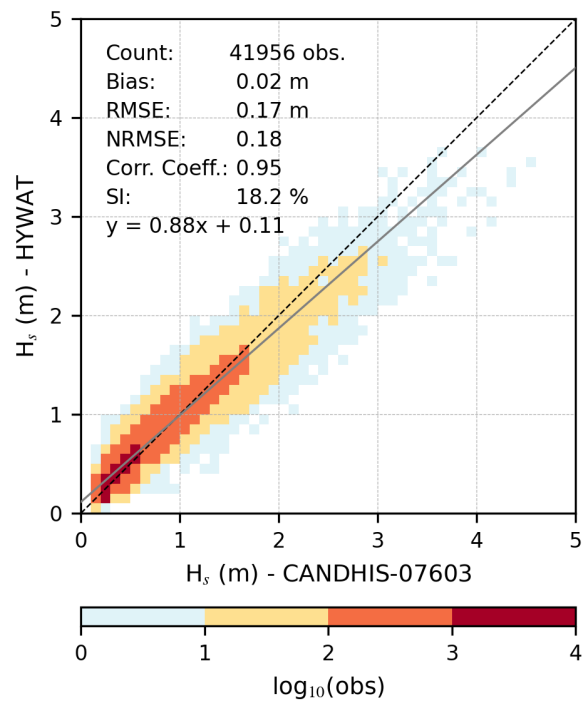


Figure 81 – Diagramme de dispersion pour H_s .

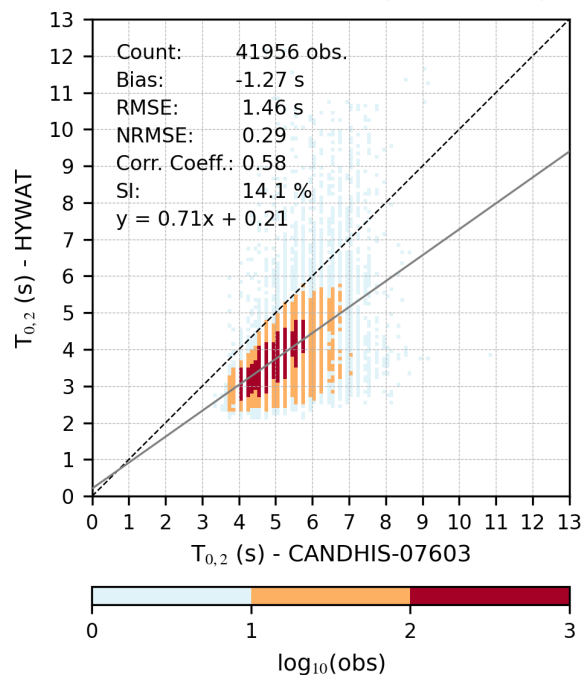


Figure 82 – Diagramme de dispersion pour $T_{0,2}$.

4.20 Bouée 07602 : Le Havre

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-08-1996	18-12-1997	17.0 m	49.52	-0.16	Non

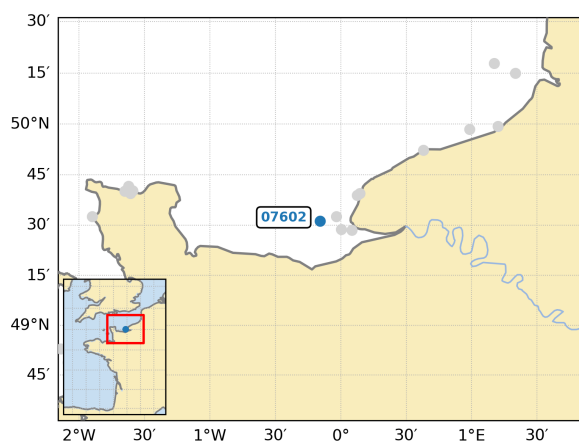
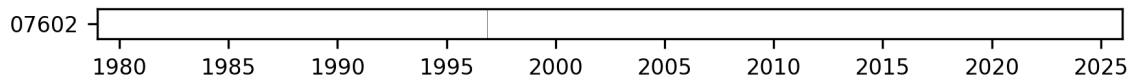


Figure 83 – Position géographique de la bouée 07602.

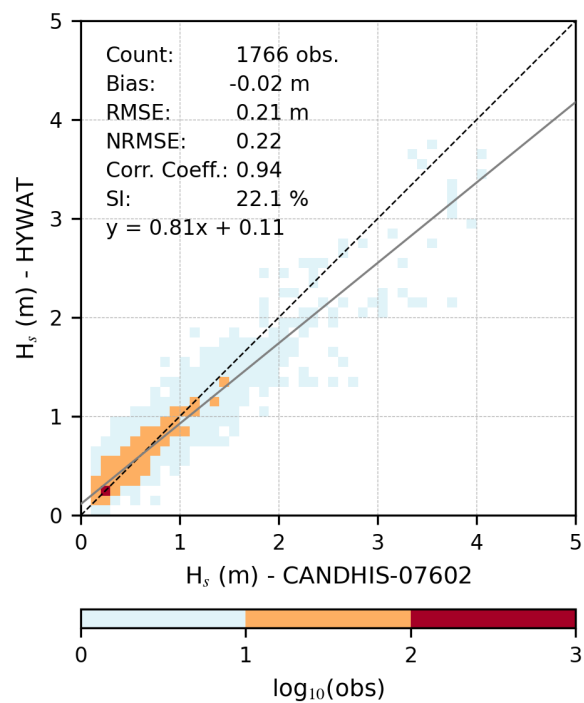


Figure 84 – Diagramme de dispersion pour H_s .

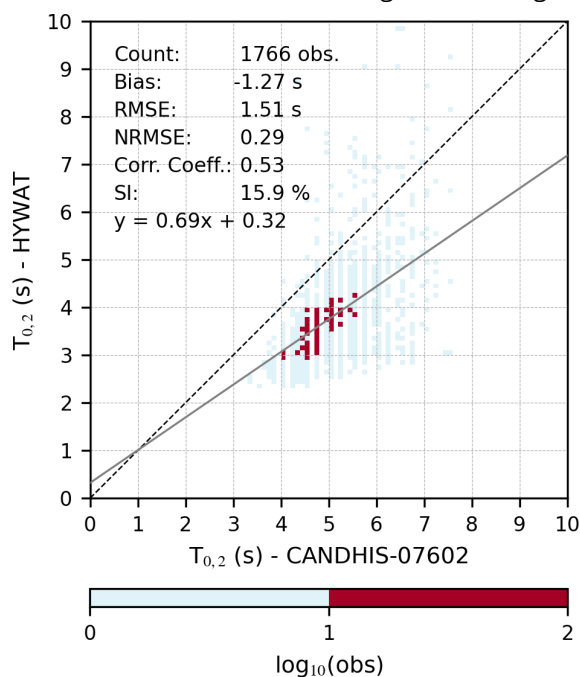


Figure 85 – Diagramme de dispersion pour $T_{0.2}$.

4.21 Bouée 07611 : Le Havre - Nord du mouillage

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
04-04-2023	30-12-2025	11.0 m	49.48	0.00	Oui

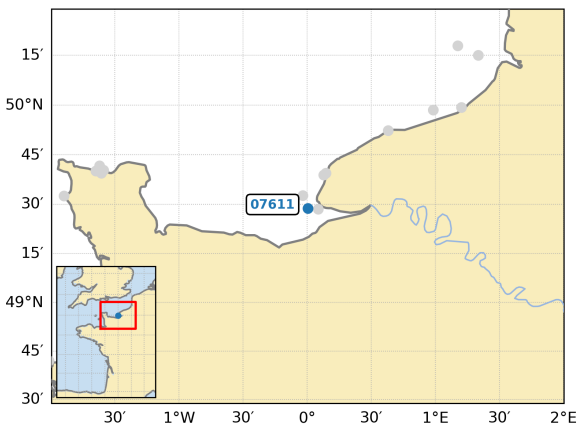
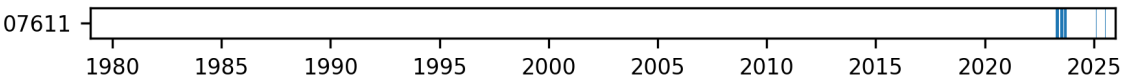


Figure 86 – Position géographique de la bouée 07611.

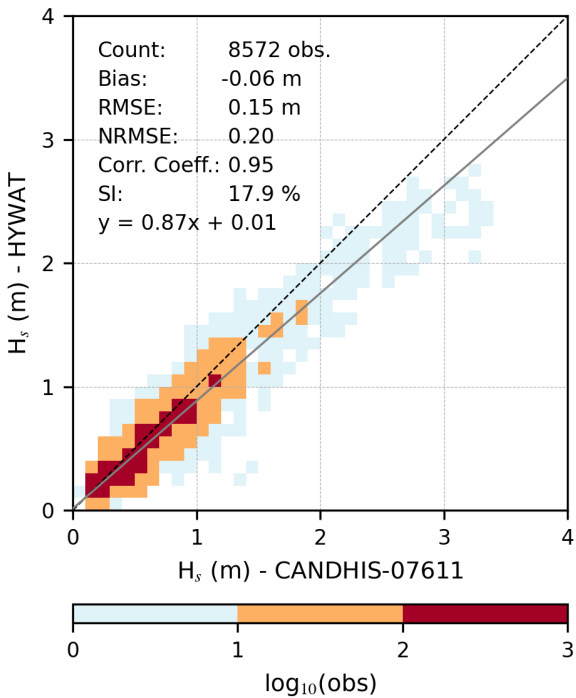


Figure 87 – Diagramme de dispersion pour H_s .

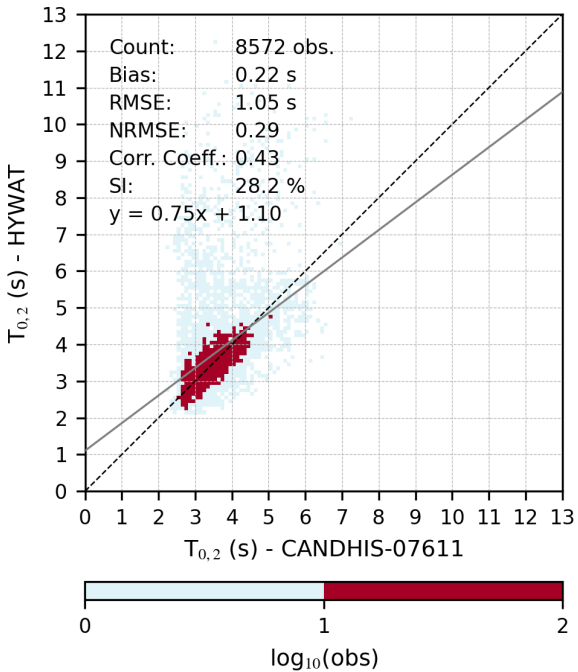


Figure 88 – Diagramme de dispersion pour $T_{0.2}$.

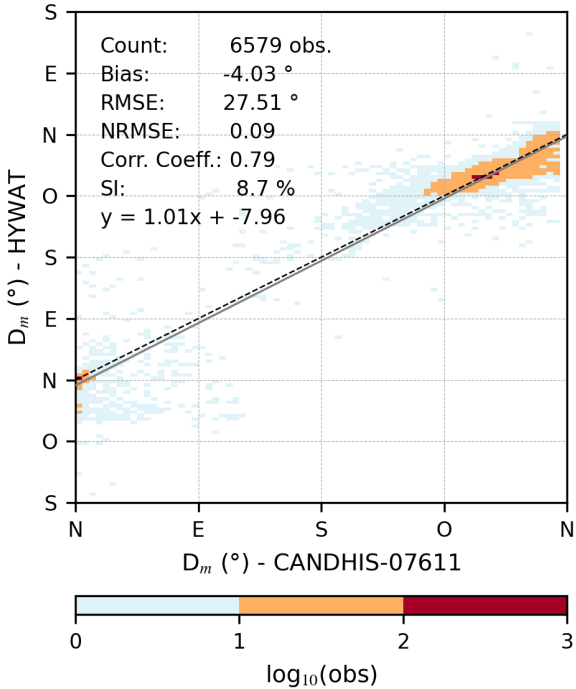


Figure 89 – Diagramme de dispersion pour D_m .

4.22 Bouée 07609 : Le Havre - Haut du Sud-Ouest

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
08-11-2022	30-12-2025	8.0 m	49.48	0.08	Non

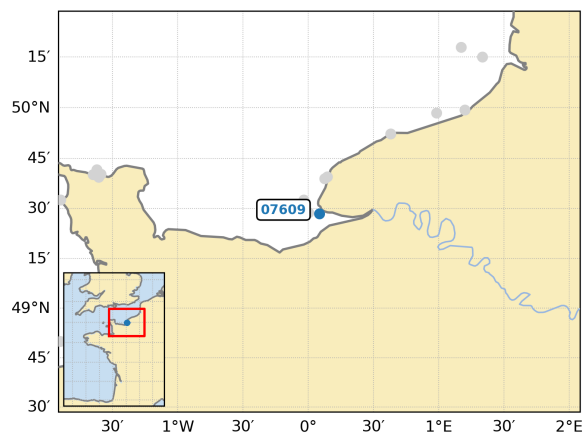
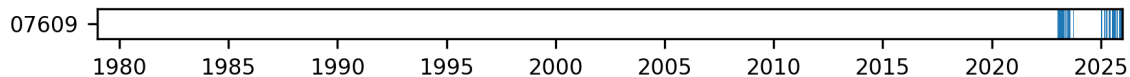


Figure 90 – Position géographique de la bouée 07609.

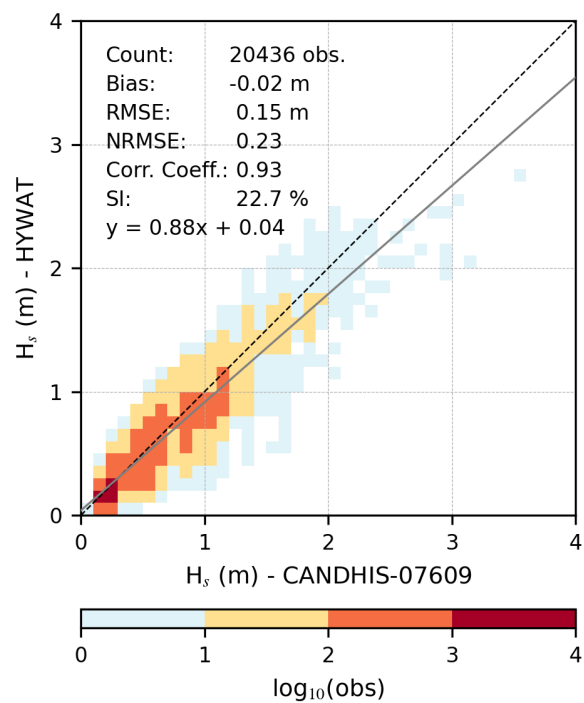


Figure 91 – Diagramme de dispersion pour H_s .

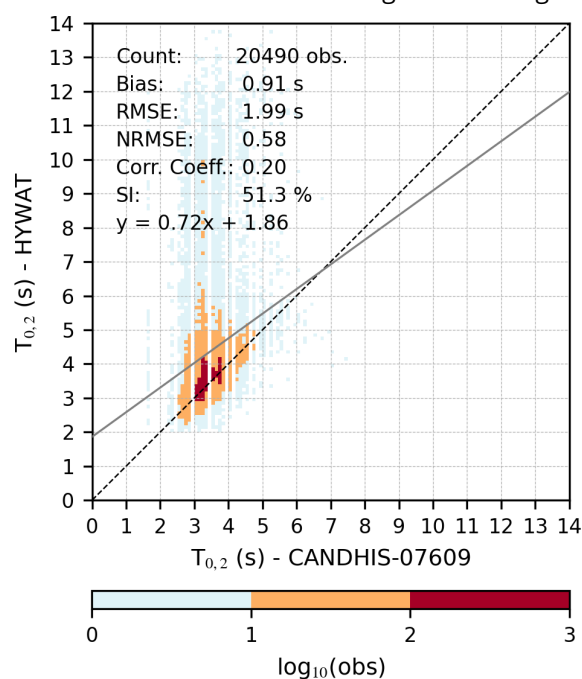


Figure 92 – Diagramme de dispersion pour $T_{0.2}$.

4.23 Bouée 02204 : Bréhat

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-06-2016	04-02-2021	50.0 m	49.03	-2.89	Oui

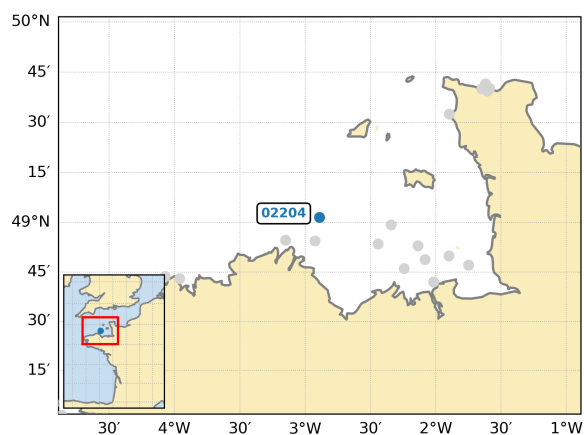
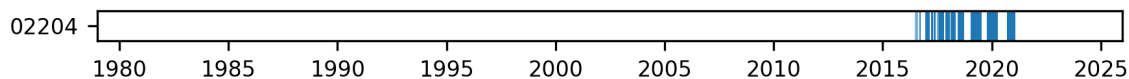


Figure 93 – Position géographique de la bouée 02204.

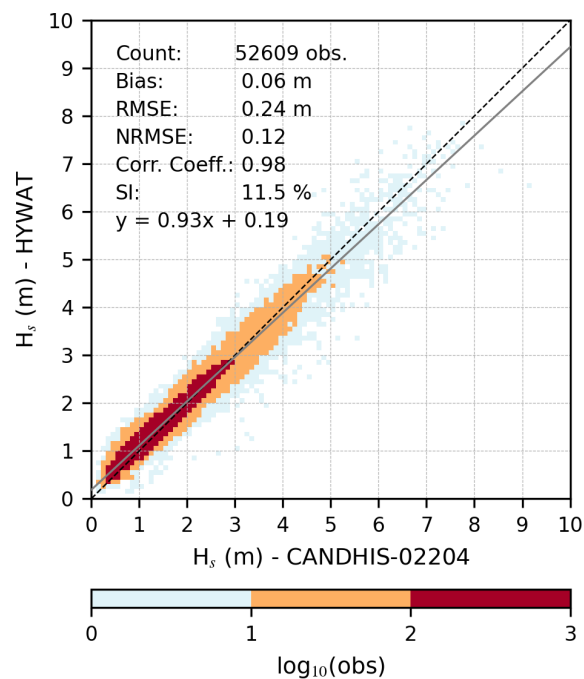


Figure 94 – Diagramme de dispersion pour H_s .

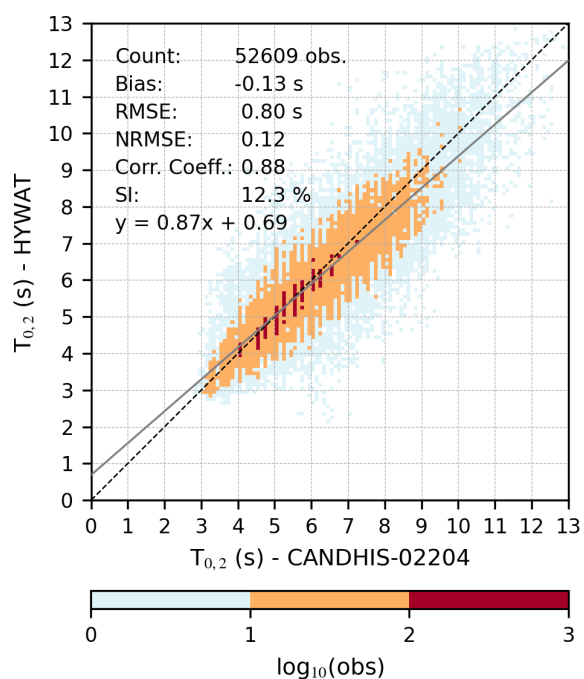


Figure 95 – Diagramme de dispersion pour $T_{0.2}$.

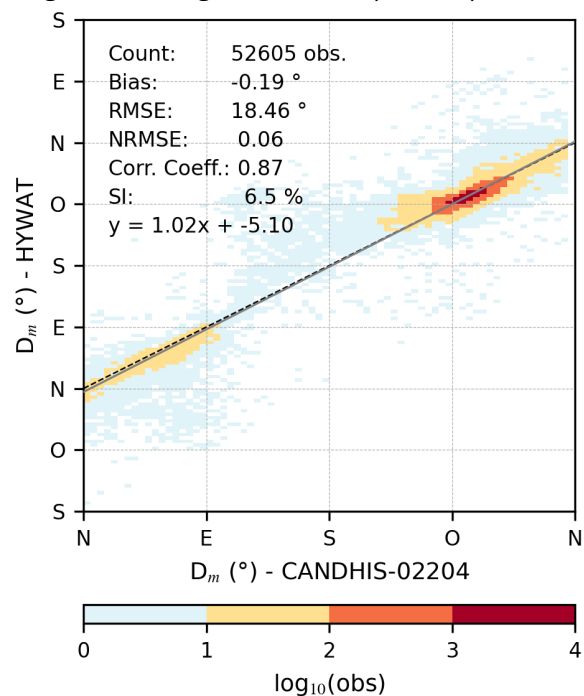


Figure 96 – Diagramme de dispersion pour D_m .

4.24 Bouée 02203 : Les Minquiers Nord

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
30-03-2011	24-10-2013	35.0 m	48.99	-2.34	Oui

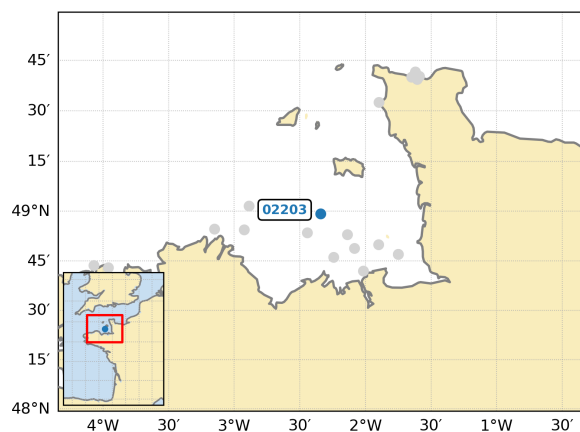
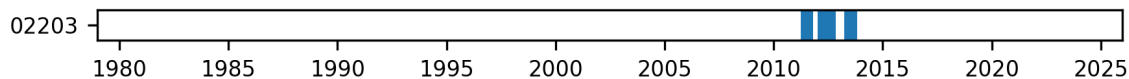


Figure 97 – Position géographique de la bouée 02203.

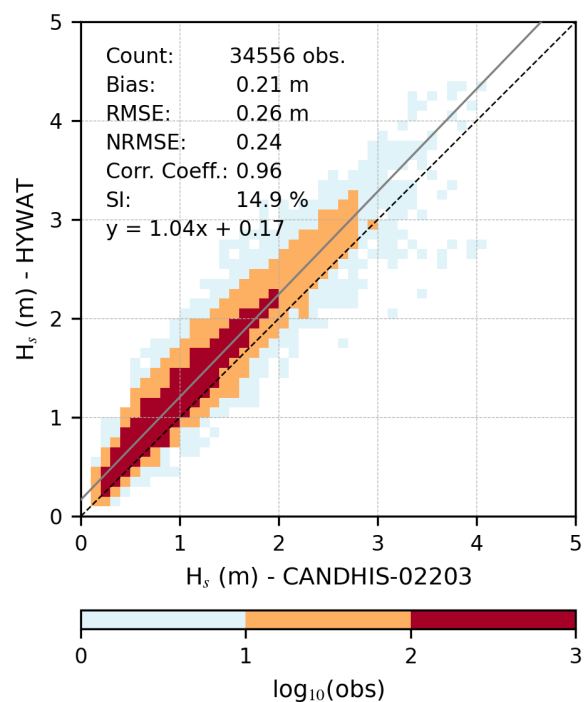


Figure 98 – Diagramme de dispersion pour H_s .

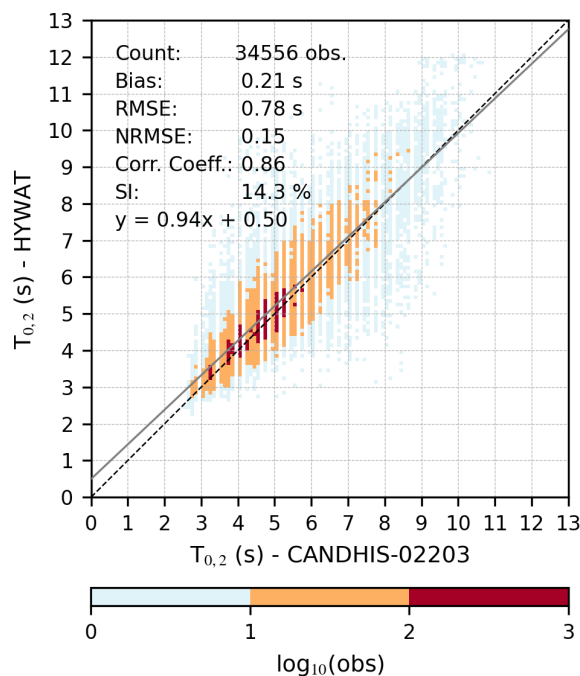


Figure 99 – Diagramme de dispersion pour $T_{0.2}$.

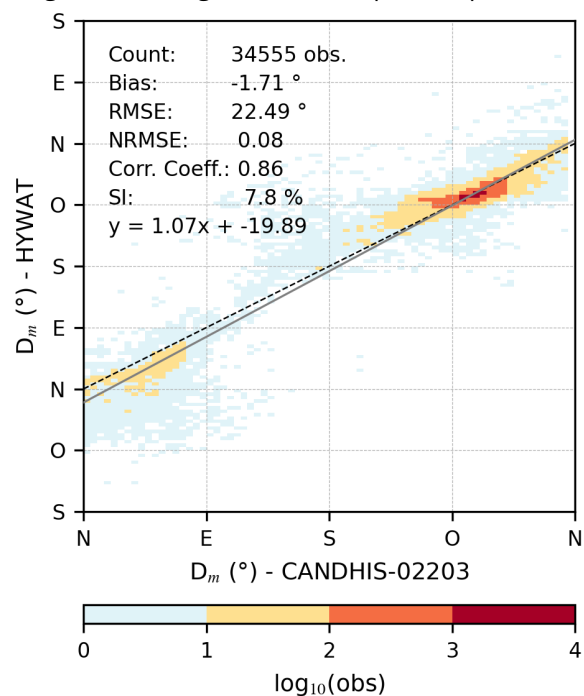


Figure 100 – Diagramme de dispersion pour D_m .

4.25 Bouée 02202 : Les Minquiers2

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
20-08-1997	16-05-2009	38.0 m	48.89	-2.44	Oui

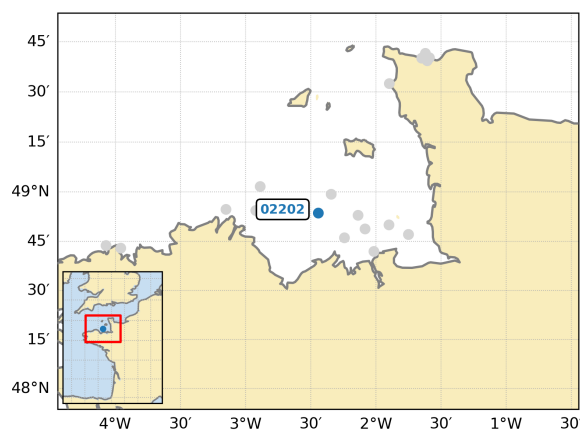
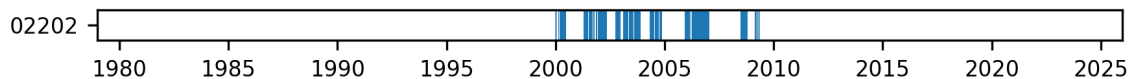


Figure 101 – Position géographique de la bouée 02202.

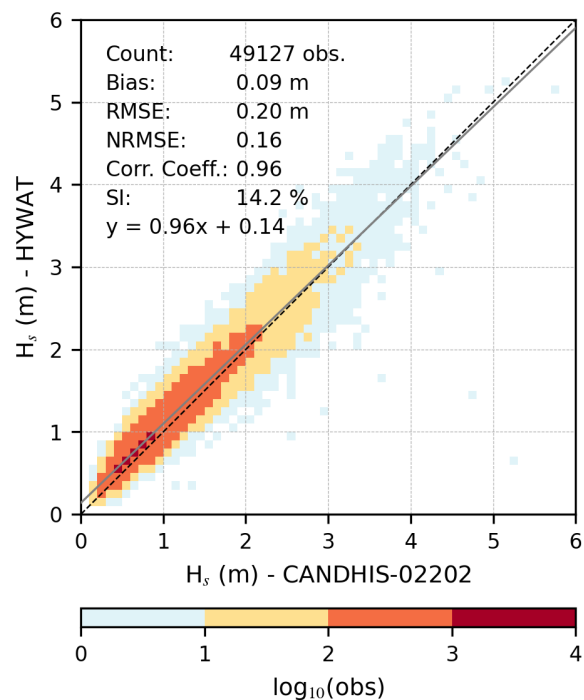


Figure 102 – Diagramme de dispersion pour H_s .

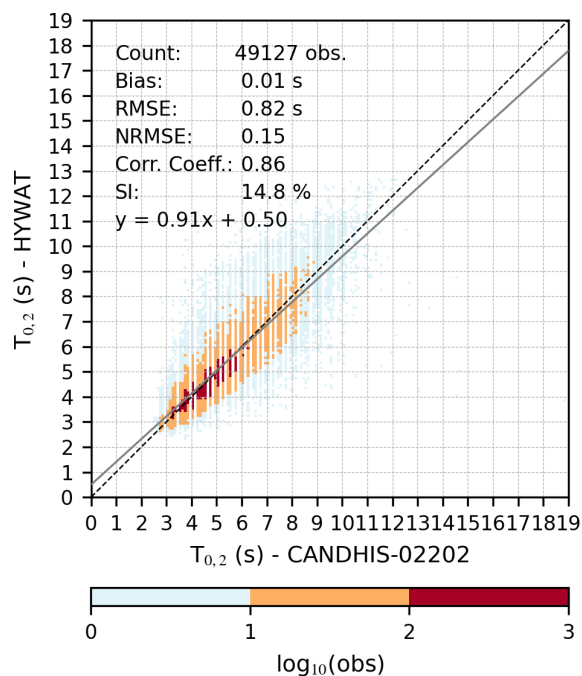


Figure 103 – Diagramme de dispersion pour $T_{0.2}$.

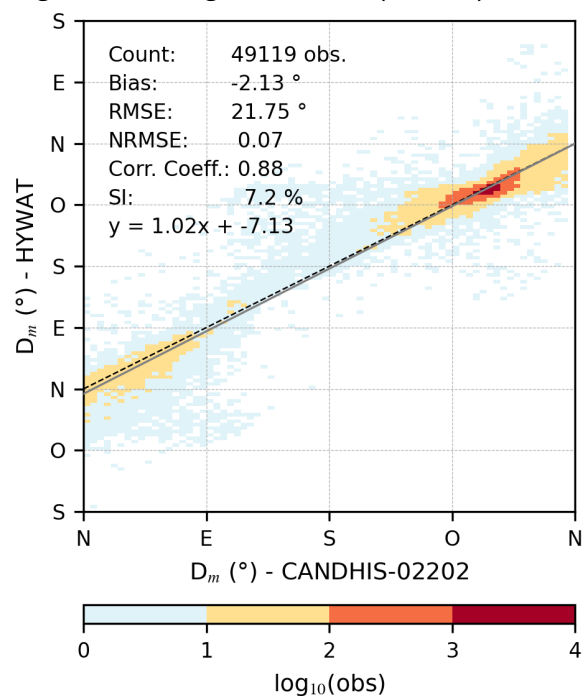


Figure 104 – Diagramme de dispersion pour D_m .

4.26 Bouée 05006 : Chausey Ouest

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
06-02-2003	10-03-2003	33.0 m	48.88	-2.14	Non

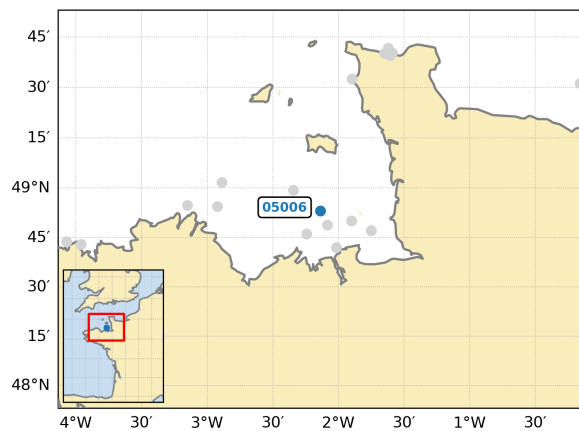
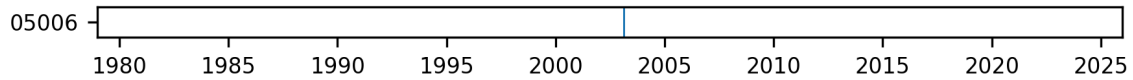


Figure 105 – Position géographique de la bouée 05006.

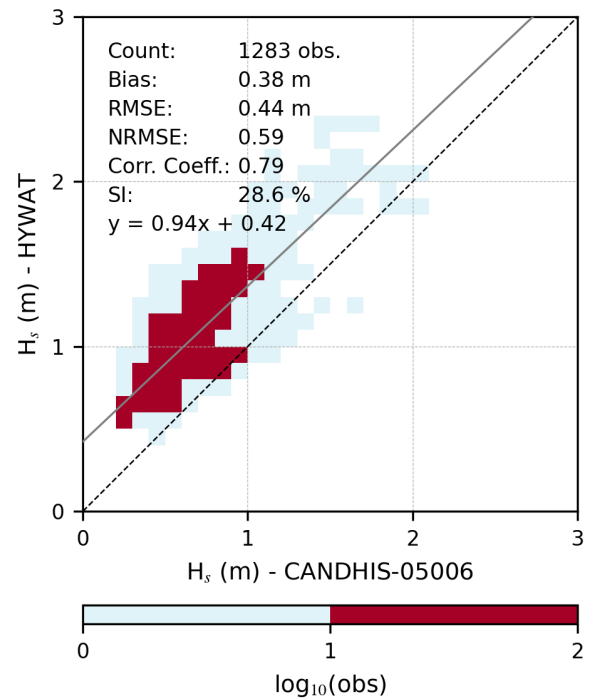


Figure 106 – Diagramme de dispersion pour H_s .

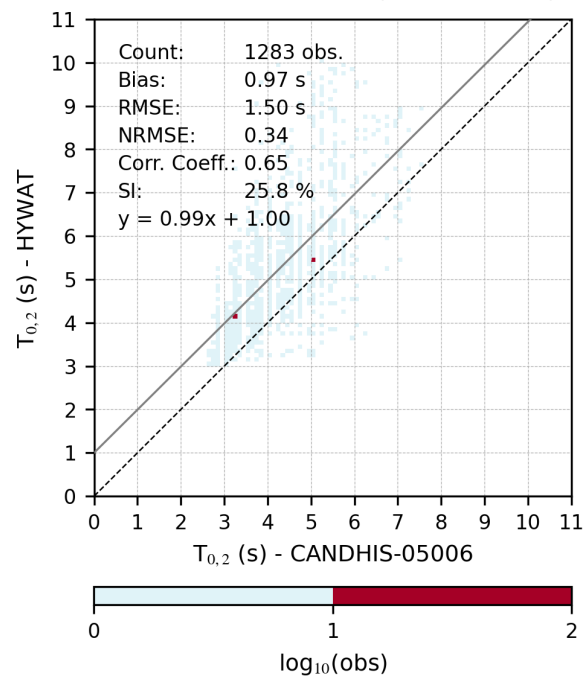


Figure 107 – Diagramme de dispersion pour T_{02} .

4.27 Bouée 05005 : Chausey Sud

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
05-02-2003	05-03-2003	26.0 m	48.83	-1.90	Non

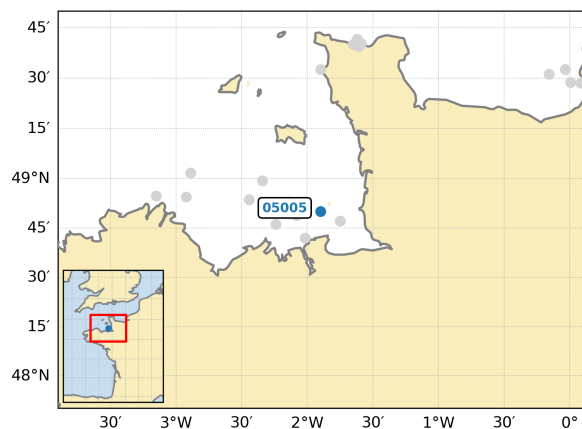
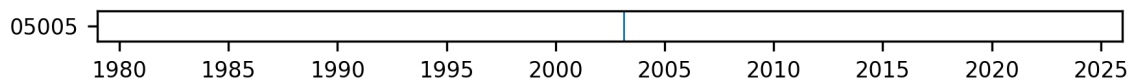


Figure 108 – Position géographique de la bouée 05005.

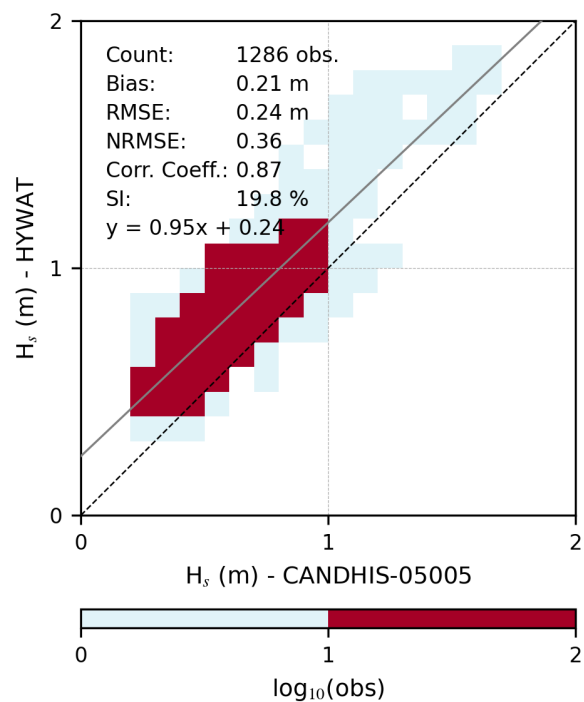


Figure 109 – Diagramme de dispersion pour H_s .

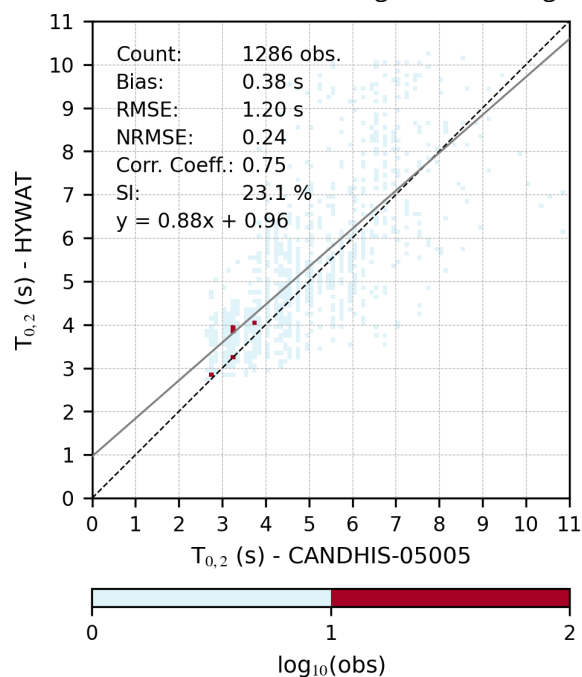


Figure 110 – Diagramme de dispersion pour T_{02} .

4.28 Bouée 03502 : Basse Trouvée

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
15-11-2018	29-04-2019	25.0 m	48.81	-2.08	Oui

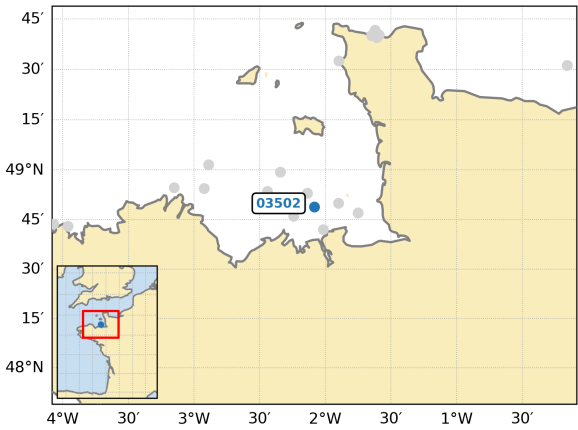
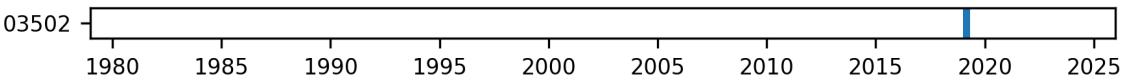


Figure 111 – Position géographique de la bouée 03502.

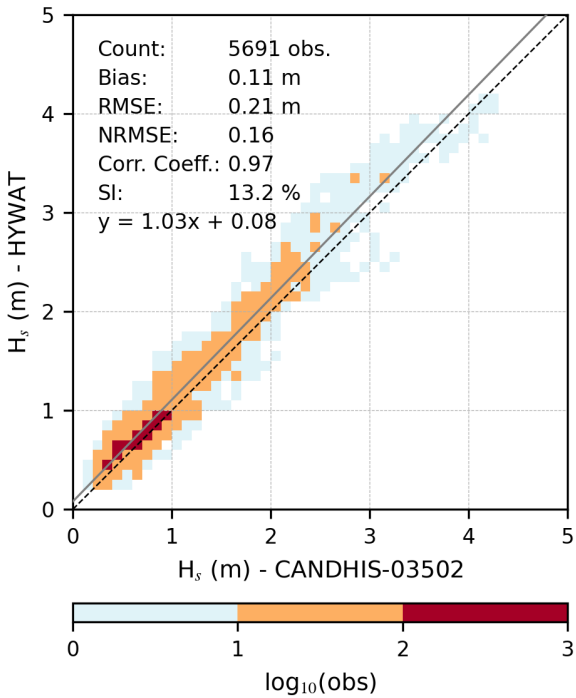


Figure 112 – Diagramme de dispersion pour H_s .

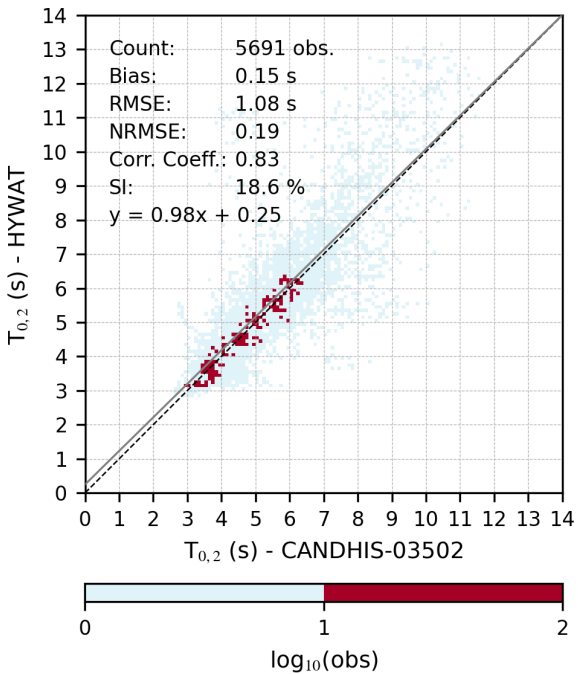


Figure 113 – Diagramme de dispersion pour $T_{0.2}$.

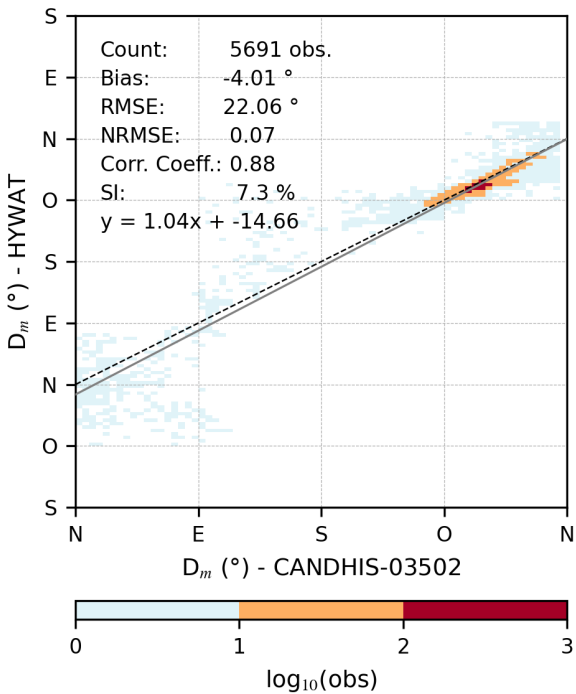


Figure 114 – Diagramme de dispersion pour D_m .

4.29 Bouée 05001 : Mont Saint-Michel

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
20-02-1997	26-05-1997	15.0 m	48.78	-1.75	Non

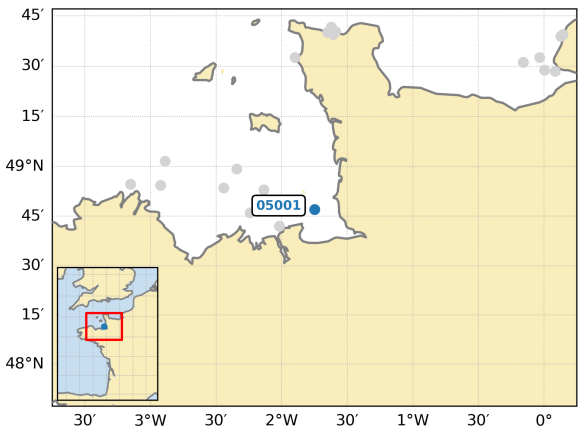
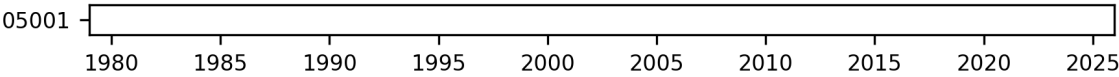


Figure 115 – Position géographique de la bouée 05001.

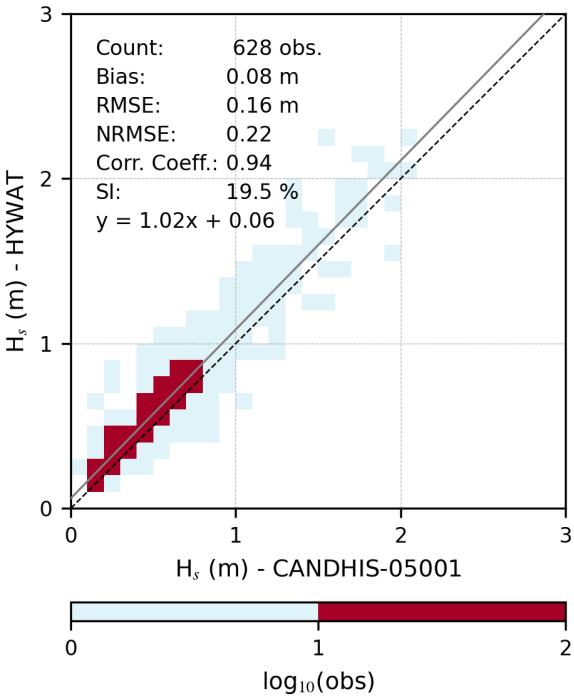


Figure 116 – Diagramme de dispersion pour H_s .

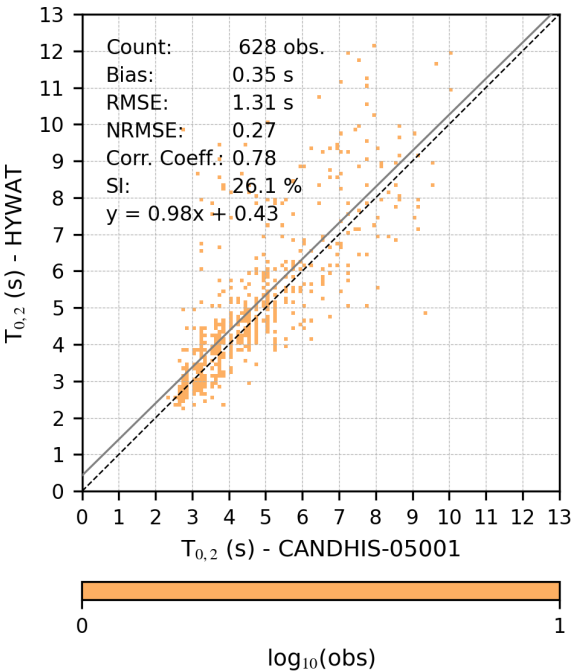


Figure 117 – Diagramme de dispersion pour T_{02} .

4.30 Bouée 05007 : Mont Saint Michel 2

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
06-02-2003	14-04-2003	15.0 m	48.78	-1.75	Non

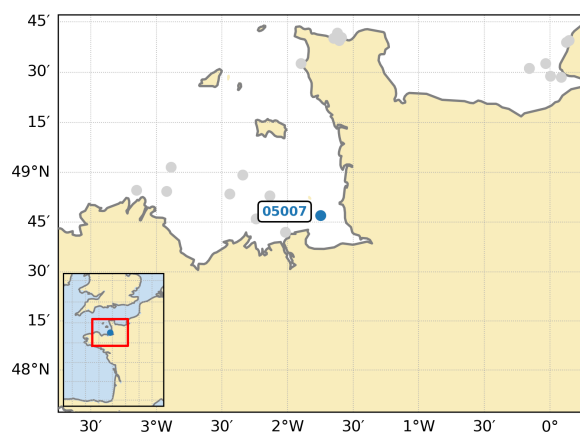
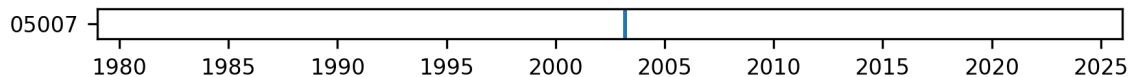


Figure 118 – Position géographique de la bouée 05007.

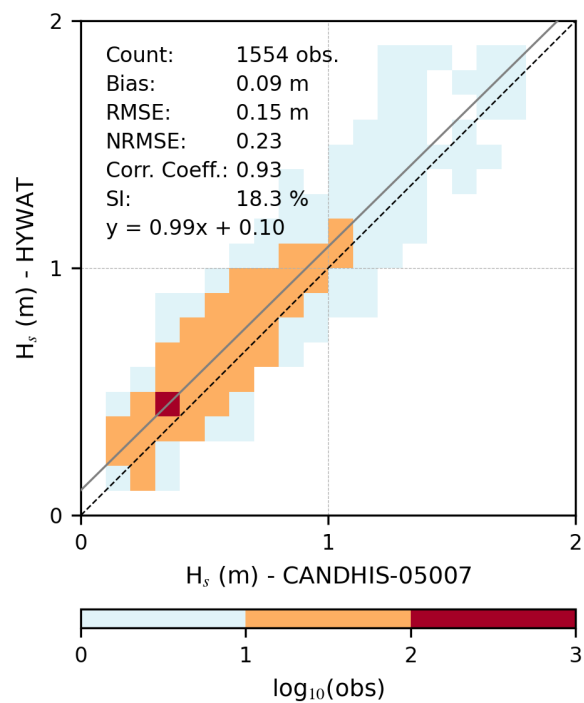


Figure 119 – Diagramme de dispersion pour H_s .

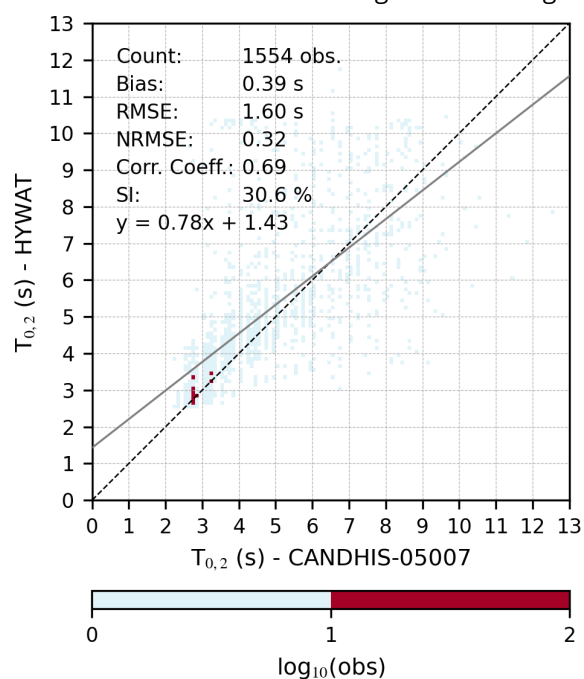


Figure 120 – Diagramme de dispersion pour T_{02} .

4.31 Bouée 02206 : Basse des Sauvages

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-12-2018	29-04-2019	25.0 m	48.77	-2.24	Oui

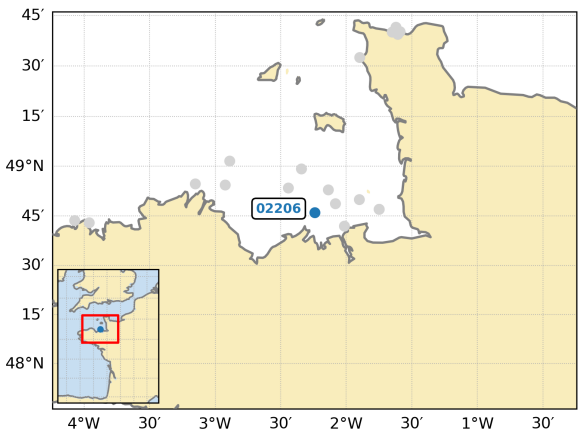
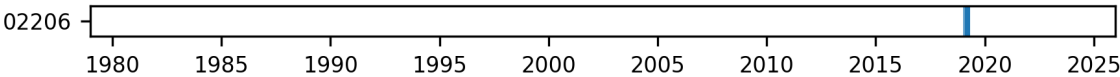


Figure 121 – Position géographique de la bouée 02206.

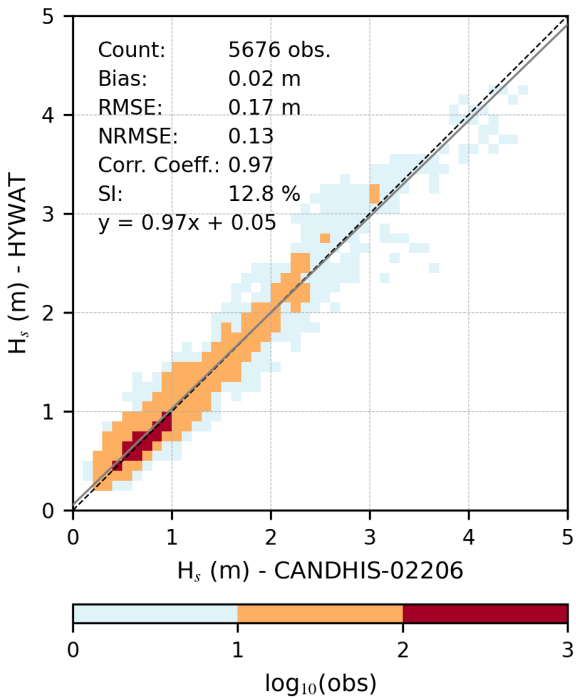


Figure 122 – Diagramme de dispersion pour H_s .

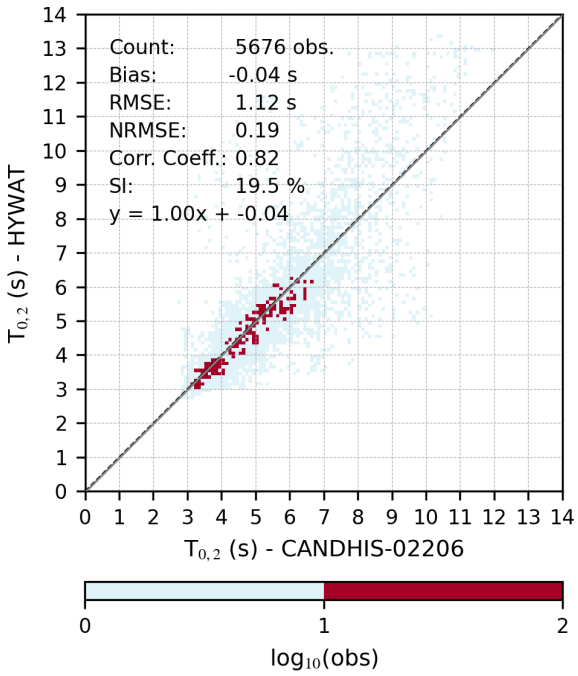


Figure 123 – Diagramme de dispersion pour $T_{0.2}$.

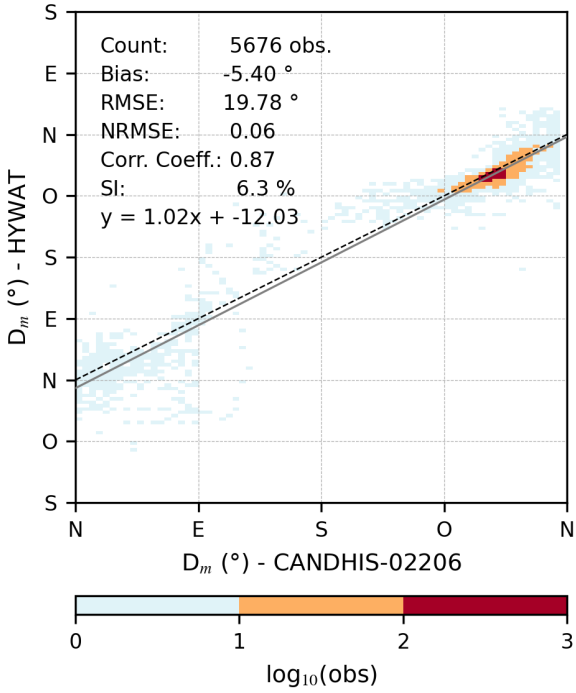


Figure 124 – Diagramme de dispersion pour D_m .

4.32 Bouée 02922 : Ile de Batz

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
27-03-2019	30-12-2025	30.0 m	48.73	-4.07	Oui

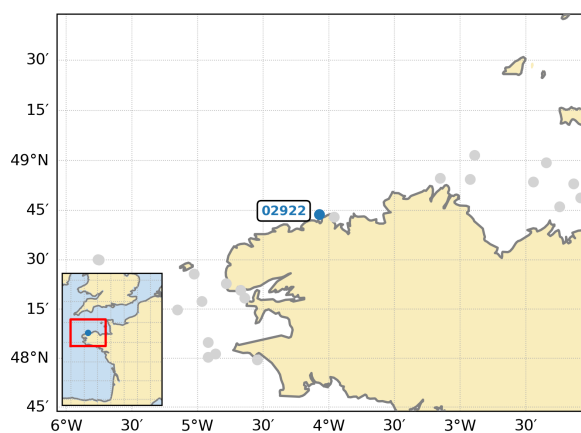
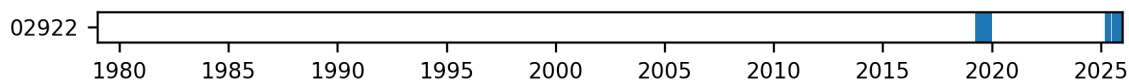


Figure 125 – Position géographique de la bouée 02922.

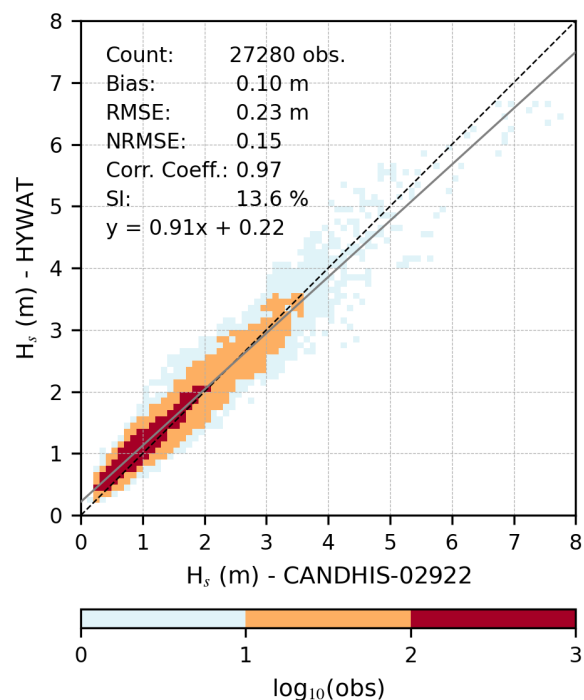


Figure 126 – Diagramme de dispersion pour H_s .

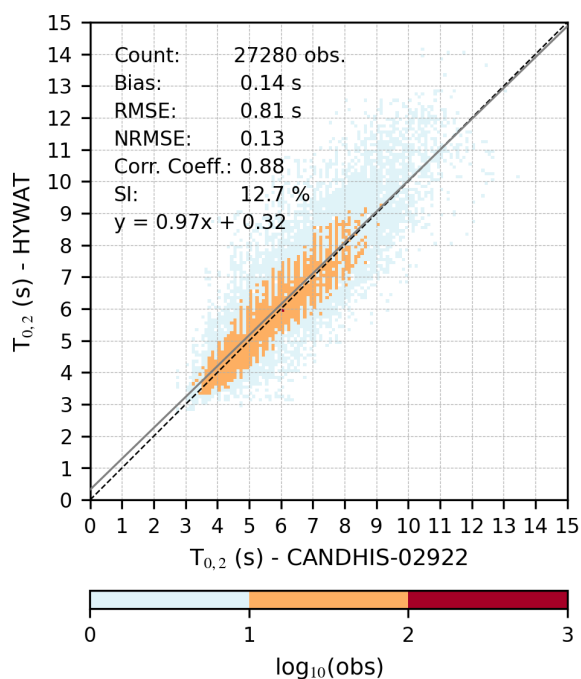


Figure 127 – Diagramme de dispersion pour $T_{0.2}$.

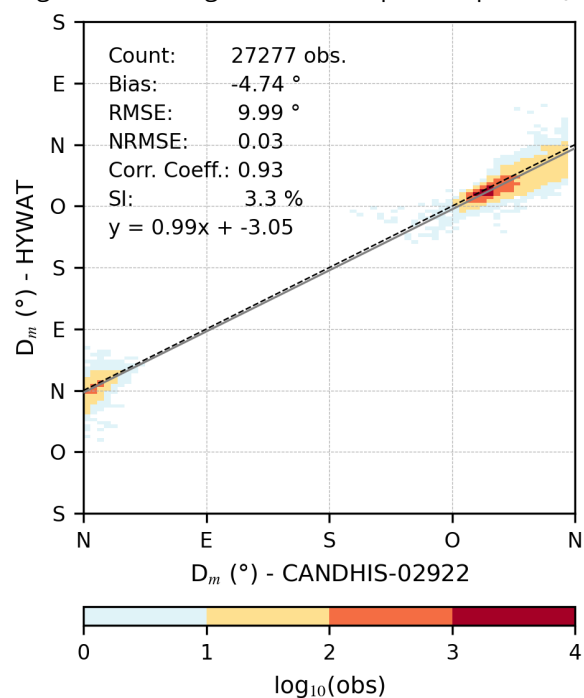


Figure 128 – Diagramme de dispersion pour D_m .

4.33 Bouée 02910 : Roscoff (Port de Blosson)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-10-2005	01-03-2015	5.0 m	48.72	-3.96	Oui

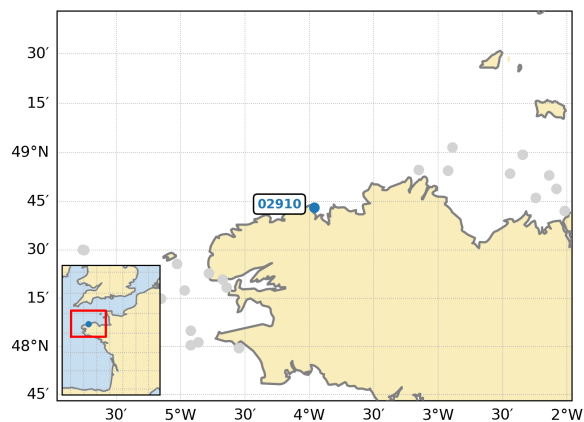
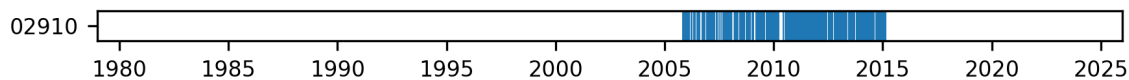


Figure 129 – Position géographique de la bouée 02910.

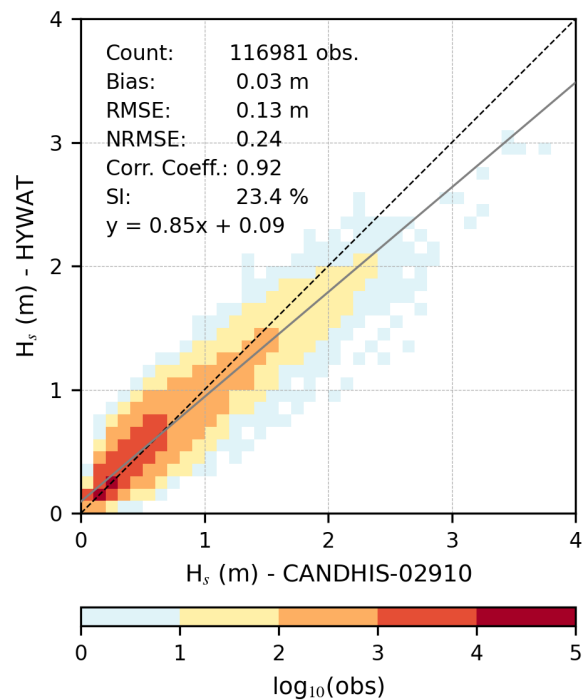


Figure 130 – Diagramme de dispersion pour H_s .

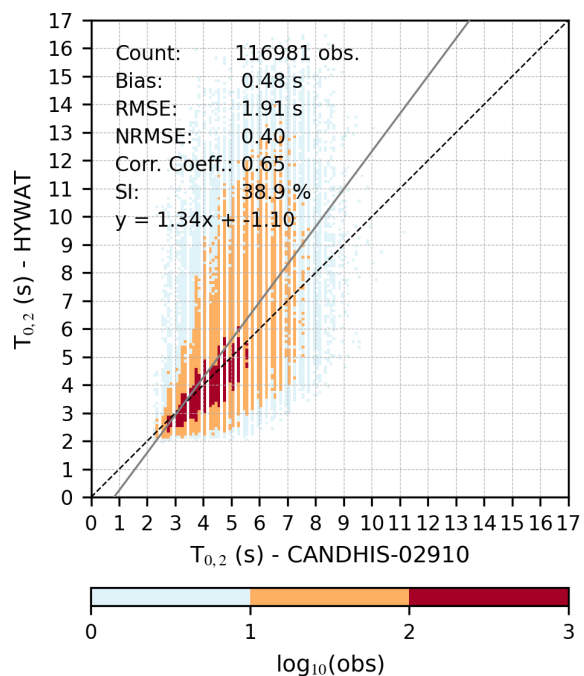


Figure 131 – Diagramme de dispersion pour $T_{0,2}$.

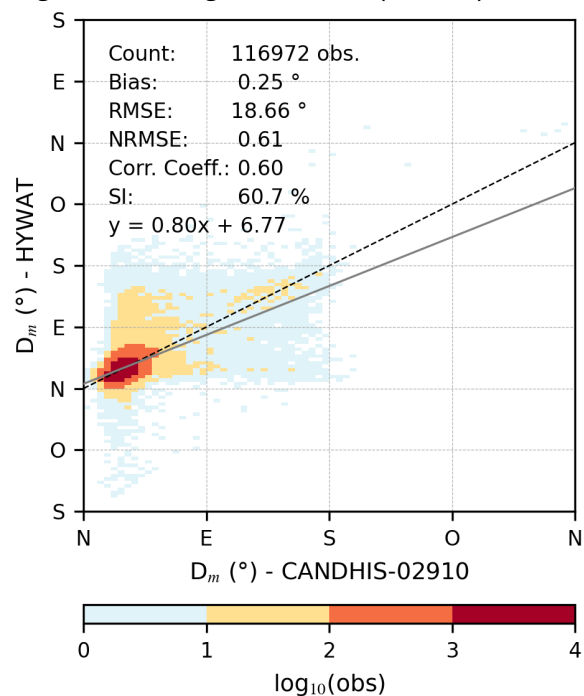


Figure 132 – Diagramme de dispersion pour D_m .

4.34 Bouée 03501 : Saint Malo

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
09-08-1993	23-09-1995	99.99 m	48.70	-2.02	Non

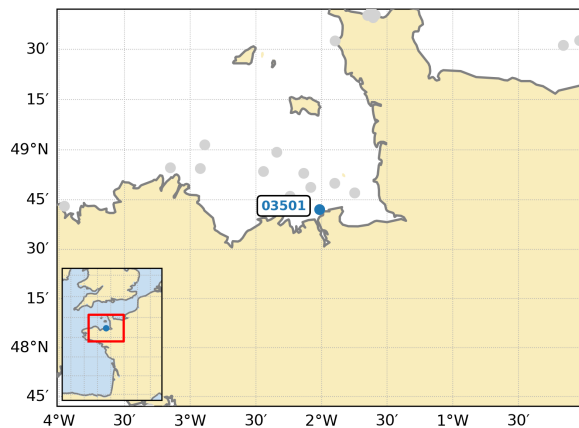
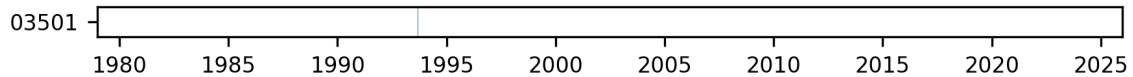


Figure 133 – Position géographique de la bouée 03501.

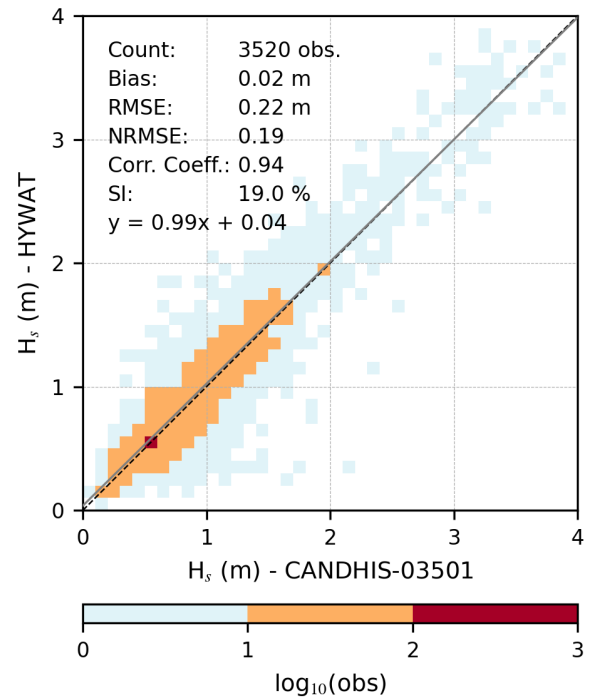


Figure 134 – Diagramme de dispersion pour H_s .

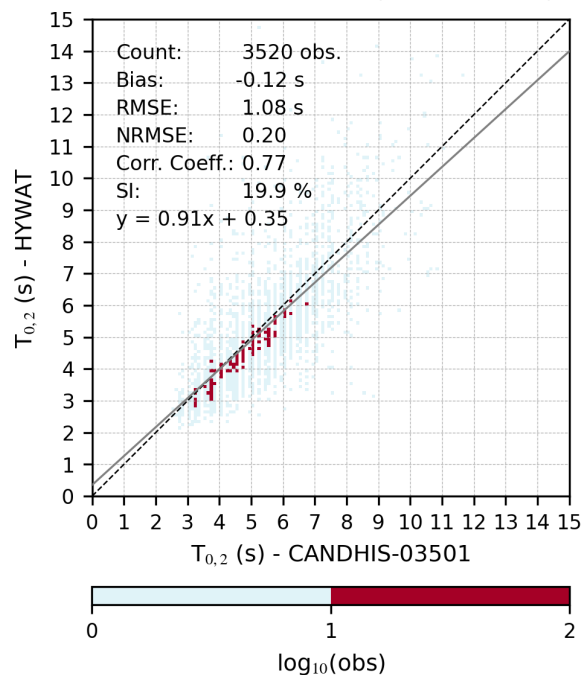


Figure 135 – Diagramme de dispersion pour $T_{0.2}$.

4.35 Bouée 02906 : Ouessant

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-01-2004	07-03-2004	110.0 m	48.50	-5.76	Oui

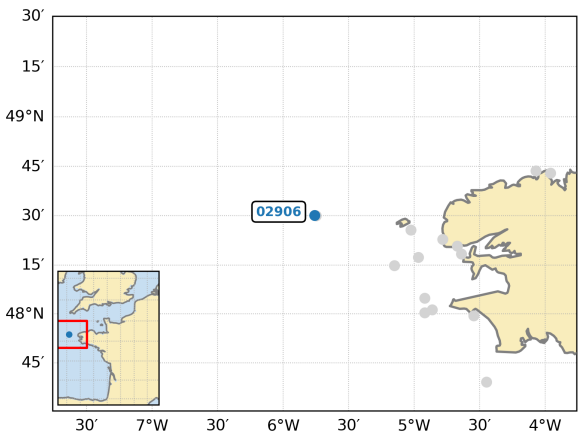
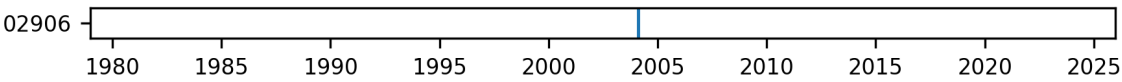


Figure 136 – Position géographique de la bouée 02906.

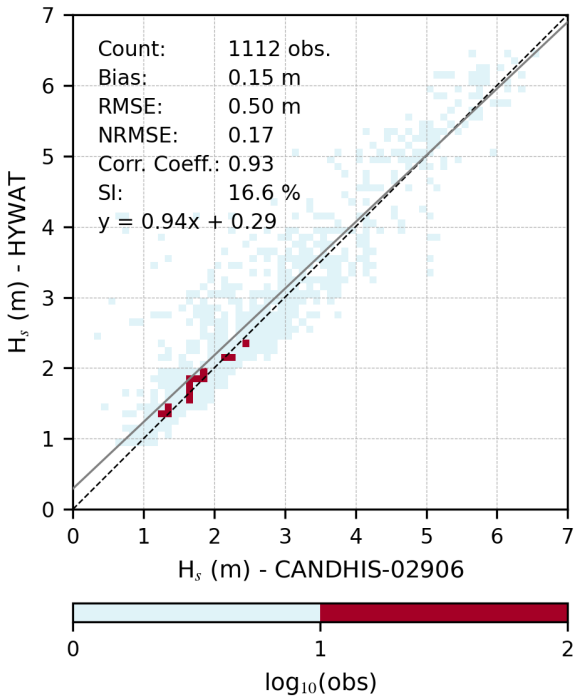


Figure 137 – Diagramme de dispersion pour H_s .

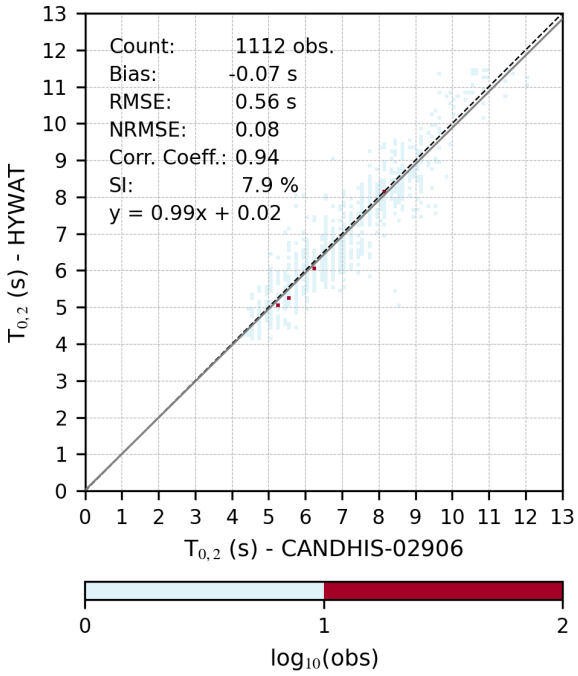


Figure 138 – Diagramme de dispersion pour $T_{0.2}$.

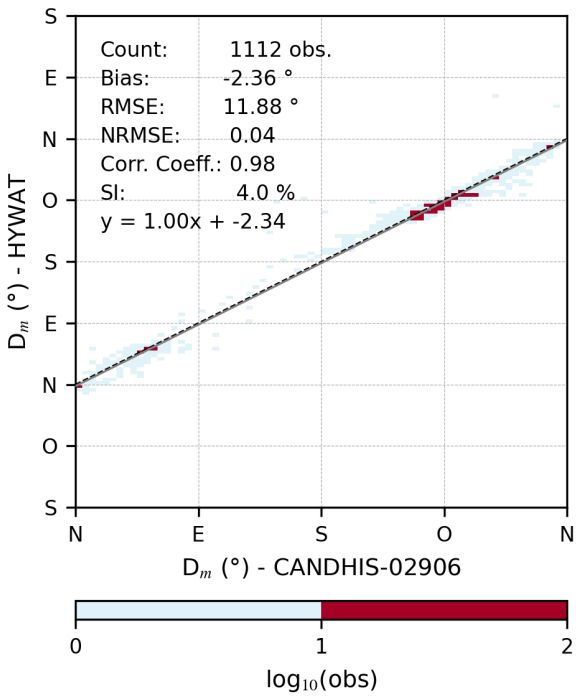


Figure 139 – Diagramme de dispersion pour D_m .

4.36 Bouée 02902 : Ouessant large

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
30-08-1985	28-11-2011	110.0 m	48.50	-5.75	Non

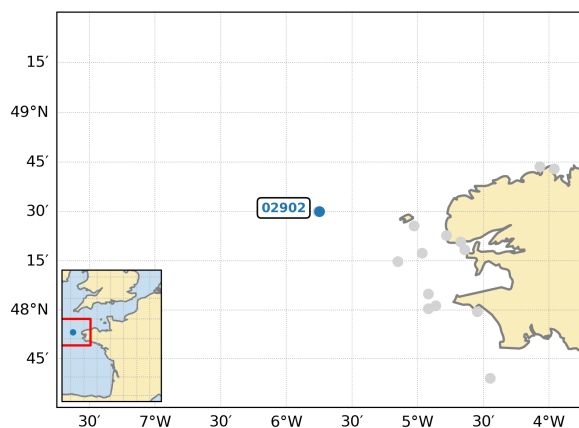
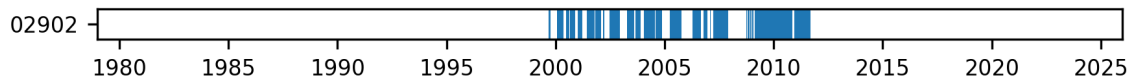


Figure 140 – Position géographique de la bouée 02902.

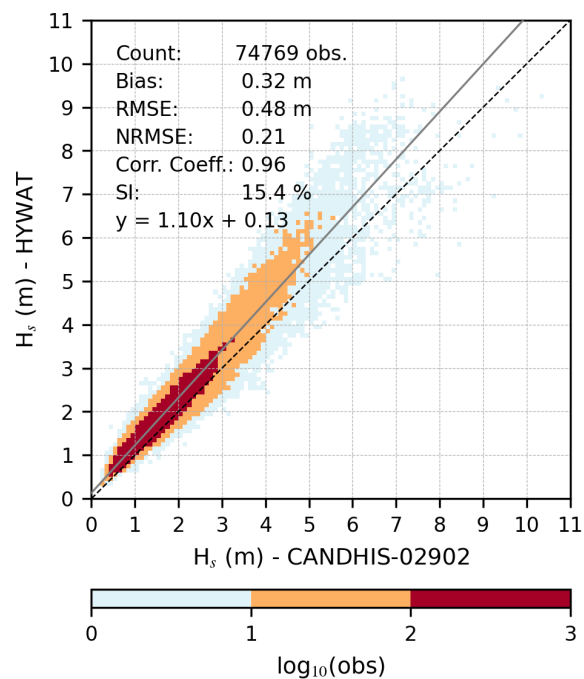


Figure 141 – Diagramme de dispersion pour H_s .

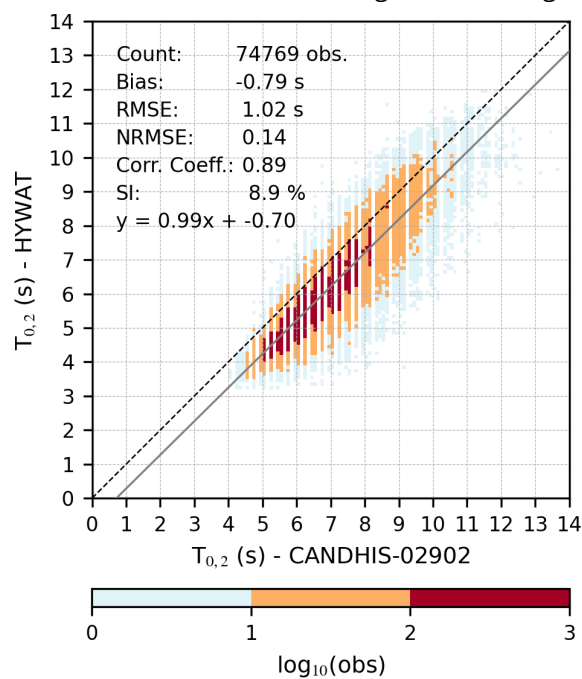


Figure 142 – Diagramme de dispersion pour T_{02} .

4.37 Bouée 02919 : Kereon

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-10-2012	17-04-2014	40.0 m	48.43	-5.03	Oui

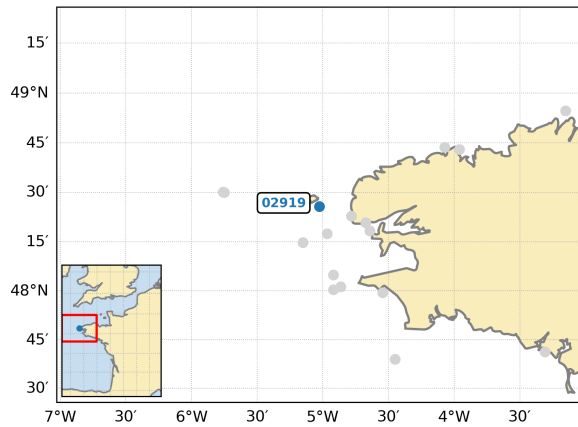
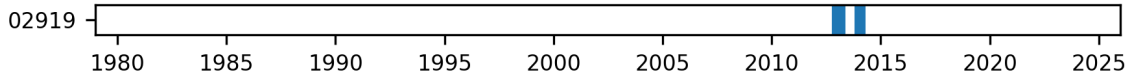


Figure 143 – Position géographique de la bouée 02919.

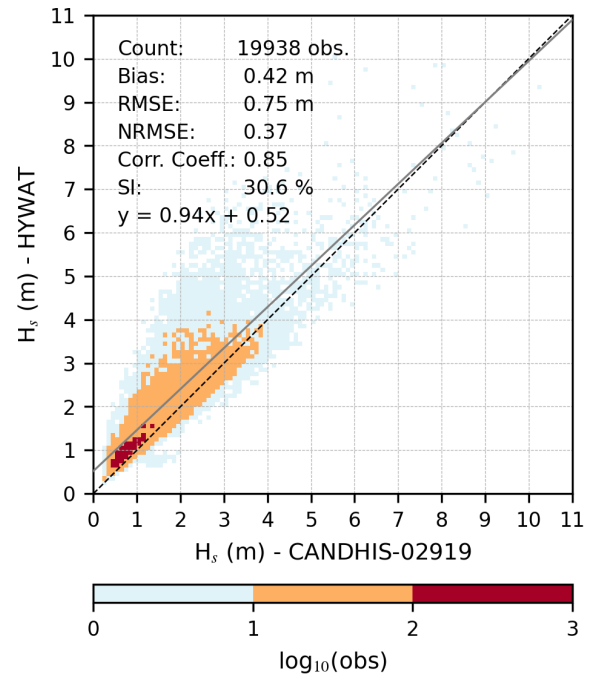


Figure 144 – Diagramme de dispersion pour H_s .

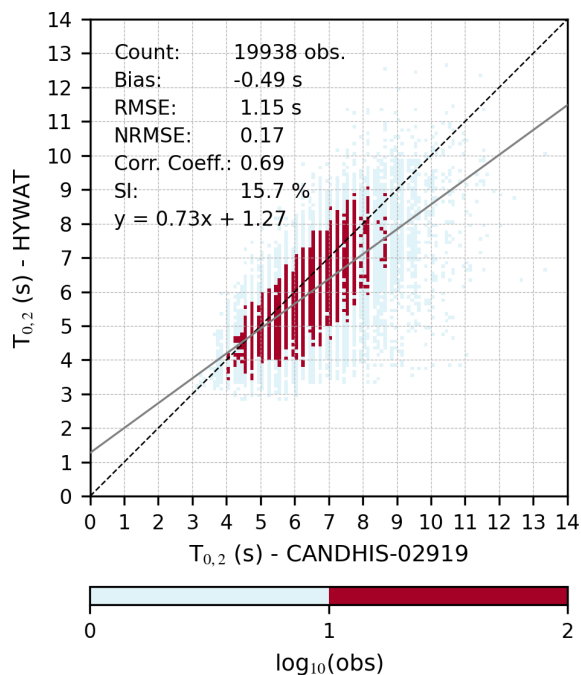


Figure 145 – Diagramme de dispersion pour $T_{0.2}$.

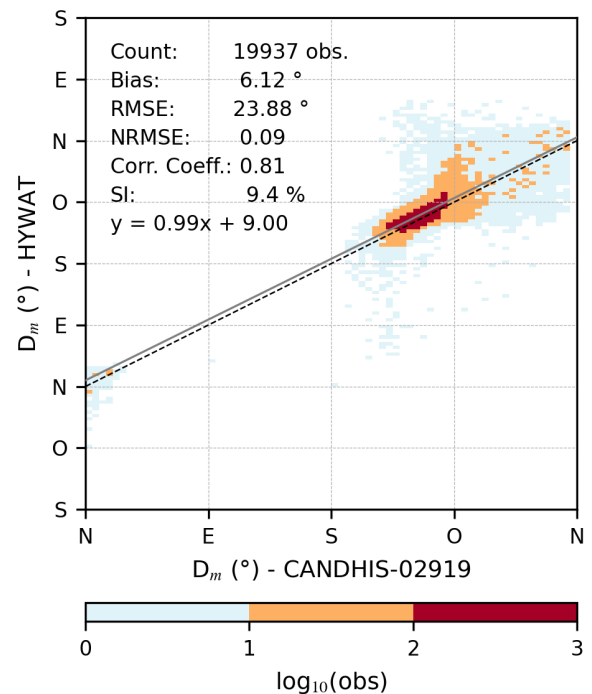


Figure 146 – Diagramme de dispersion pour D_m .

4.38 Bouée 02907 : Blancs Sablons

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
15-03-2004	18-05-2004	15.0 m	48.38	-4.78	Non

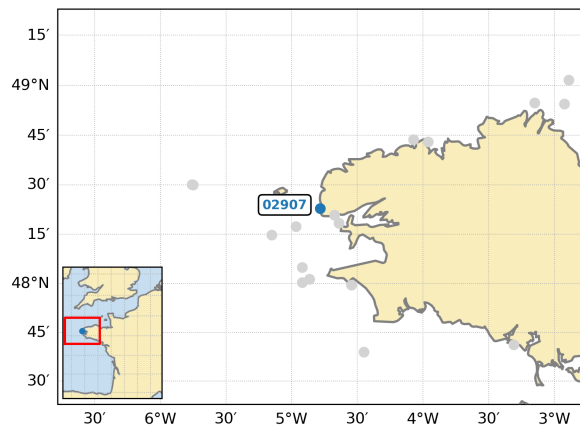
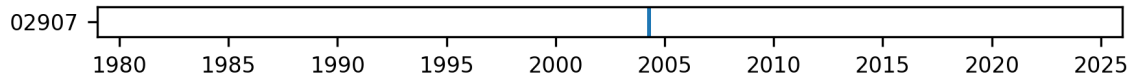


Figure 147 – Position géographique de la bouée 02907.

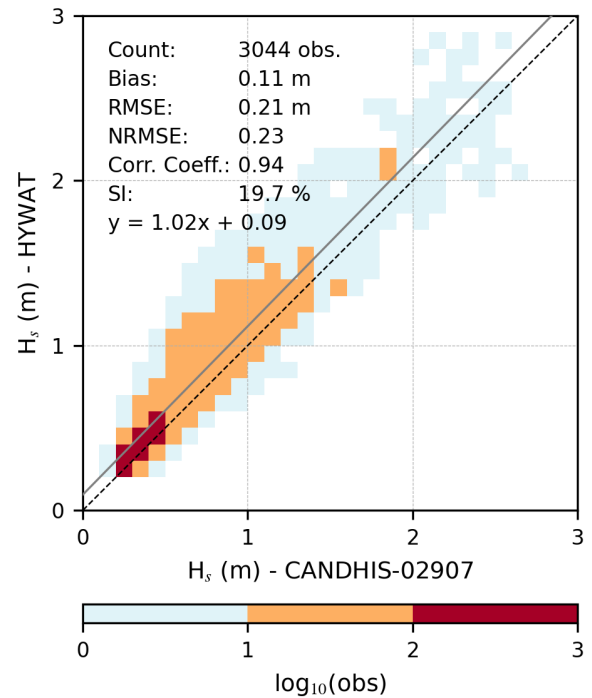


Figure 148 – Diagramme de dispersion pour H_s .

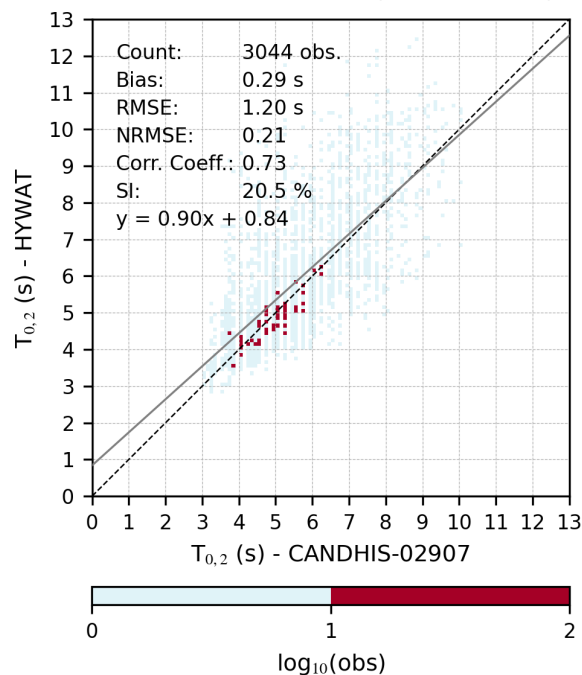


Figure 149 – Diagramme de dispersion pour $T_{0.2}$.

4.39 Bouée 02908 : Porsmilin

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
16-03-2004	10-05-2004	13.0 m	48.35	-4.67	Oui

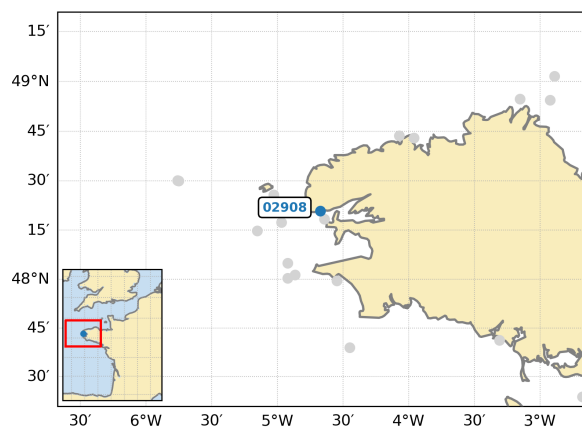
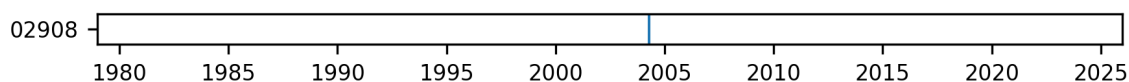


Figure 150 – Position géographique de la bouée 02908.

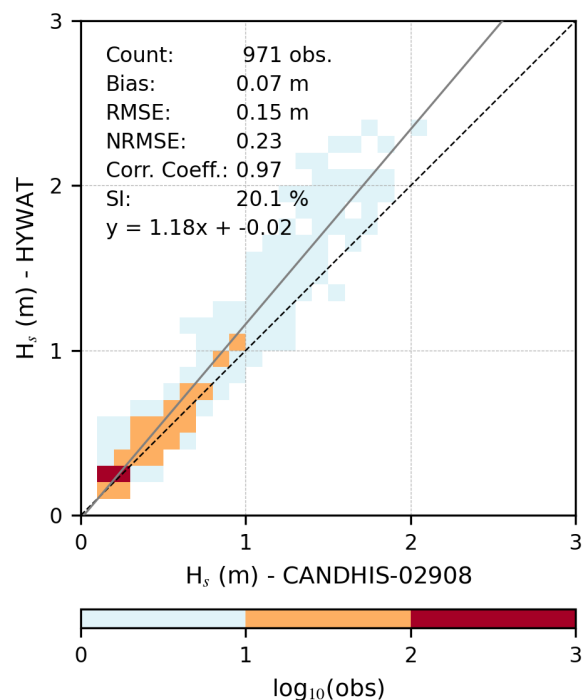


Figure 151 – Diagramme de dispersion pour H_s .

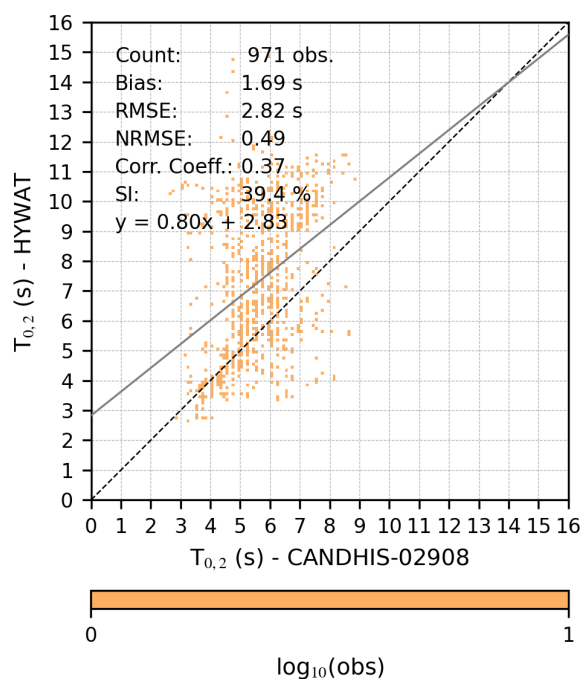


Figure 152 – Diagramme de dispersion pour $T_{0.2}$.

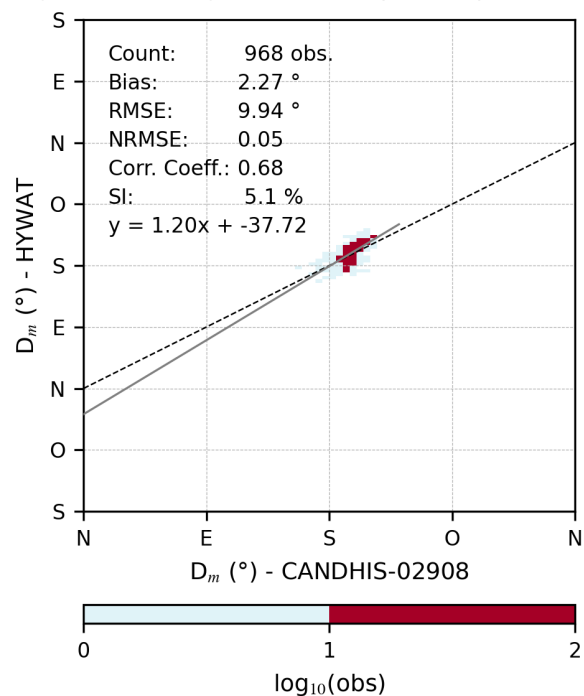


Figure 153 – Diagramme de dispersion pour D_m .

4.40 Bouée 02903 : Le Toulinguet

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-12-1994	10-07-1997	25.0 m	48.31	-4.64	Oui

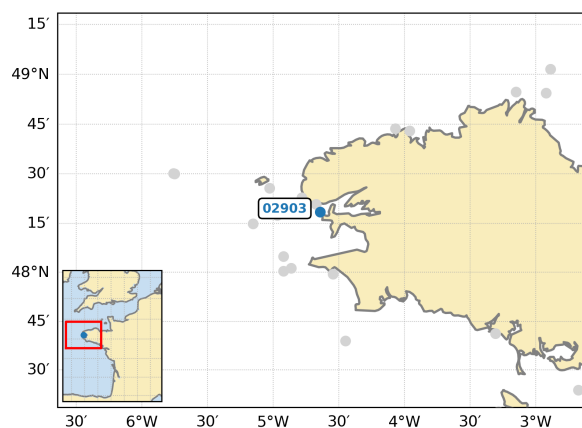
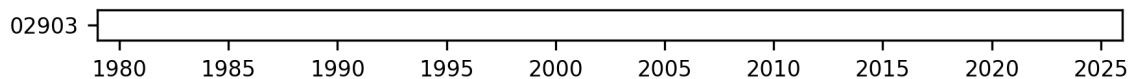


Figure 154 – Position géographique de la bouée 02903.

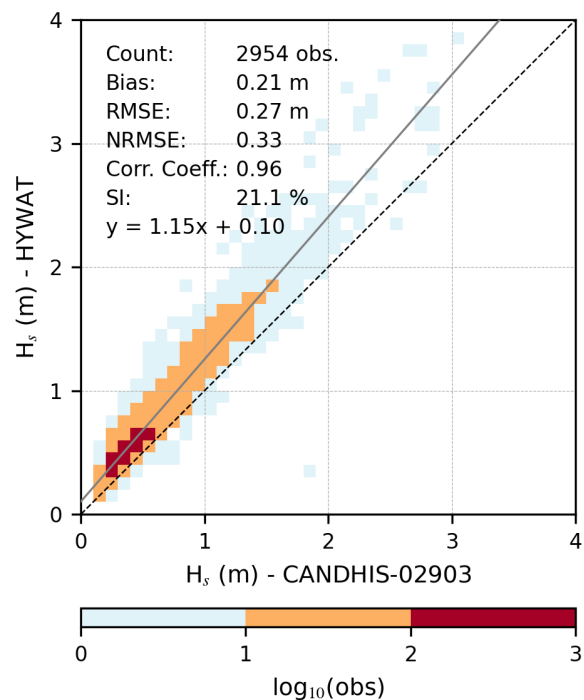


Figure 155 – Diagramme de dispersion pour H_s .

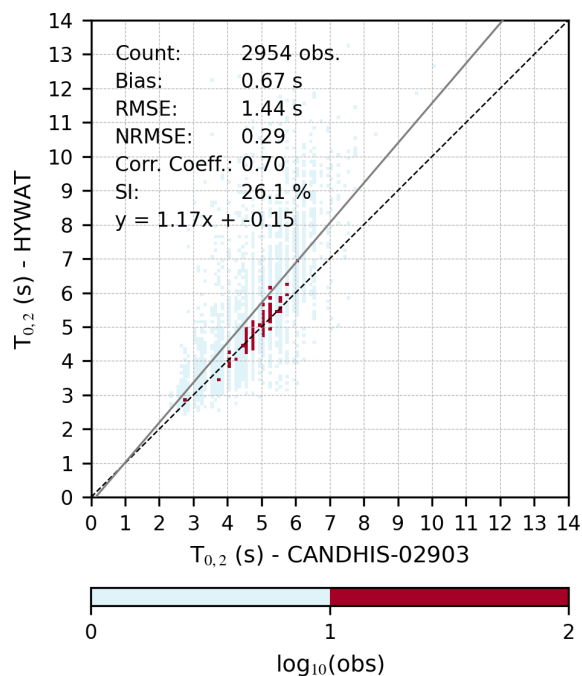


Figure 156 – Diagramme de dispersion pour $T_{0.2}$.

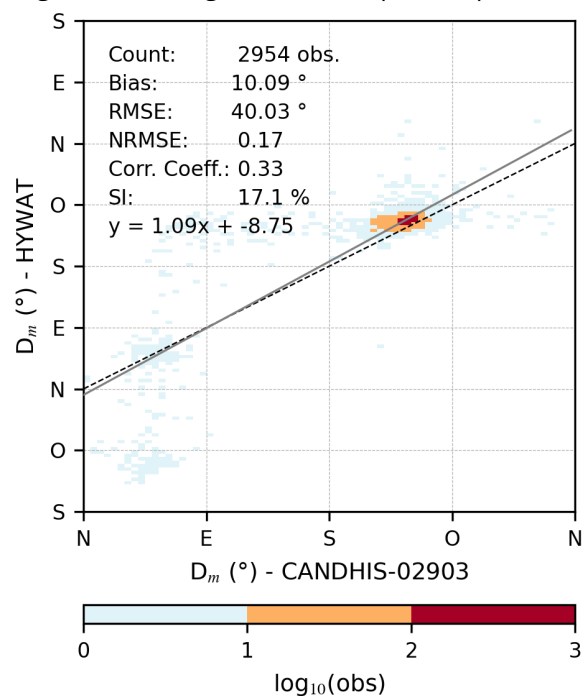


Figure 157 – Diagramme de dispersion pour D_m .

4.41 Bouée 02911 : Les Pierres Noires

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
15-10-2005	30-12-2025	60.0 m	48.29	-4.97	Oui

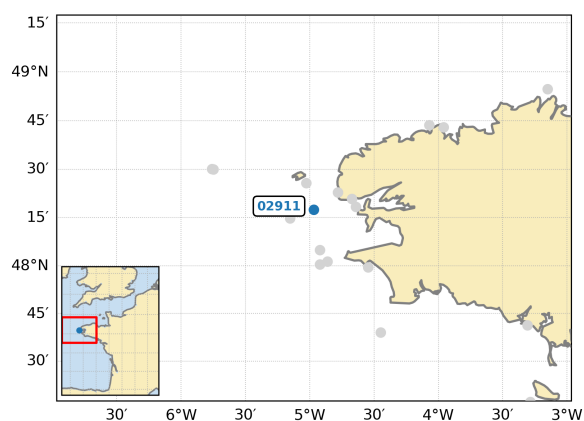
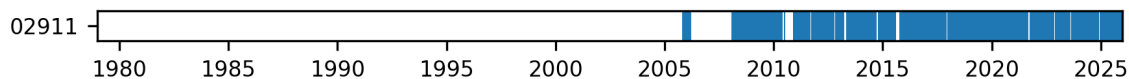


Figure 158 – Position géographique de la bouée 02911.

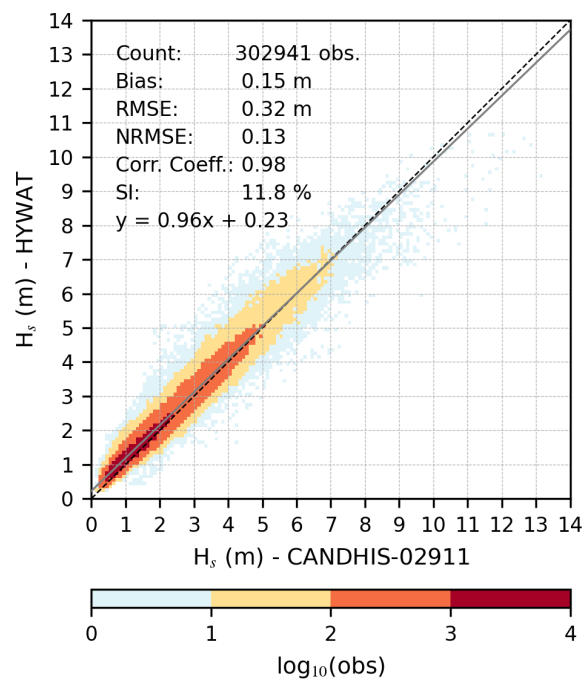


Figure 159 – Diagramme de dispersion pour H_s .

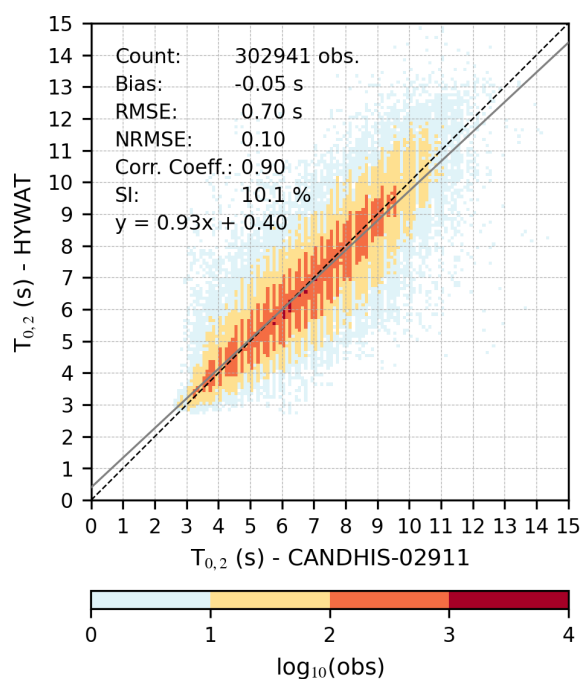


Figure 160 – Diagramme de dispersion pour $T_{0.2}$.

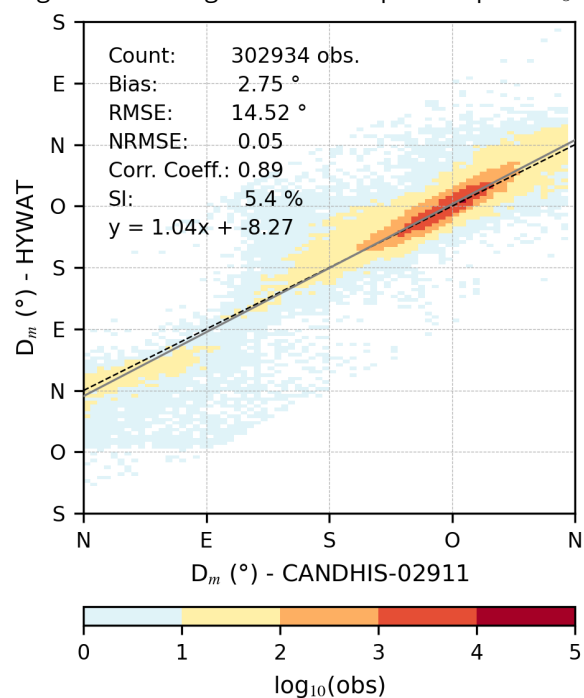


Figure 161 – Diagramme de dispersion pour D_m .

4.42 Bouée 02917 : Ouessant sud

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
30-01-2014	29-04-2014	94.0 m	48.25	-5.15	Oui

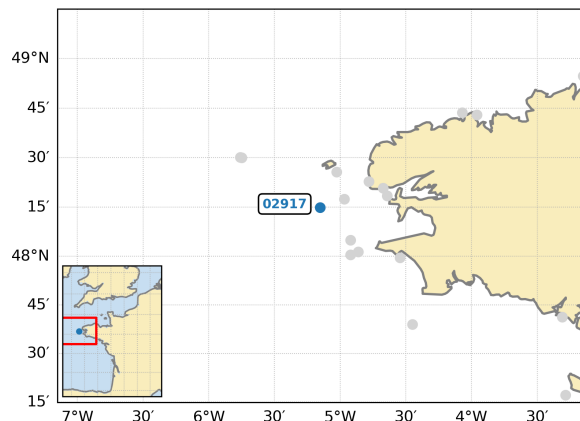
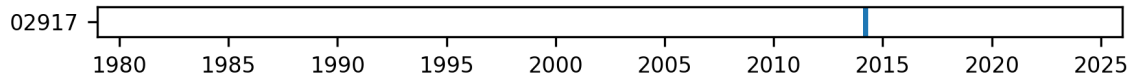


Figure 162 – Position géographique de la bouée 02917.

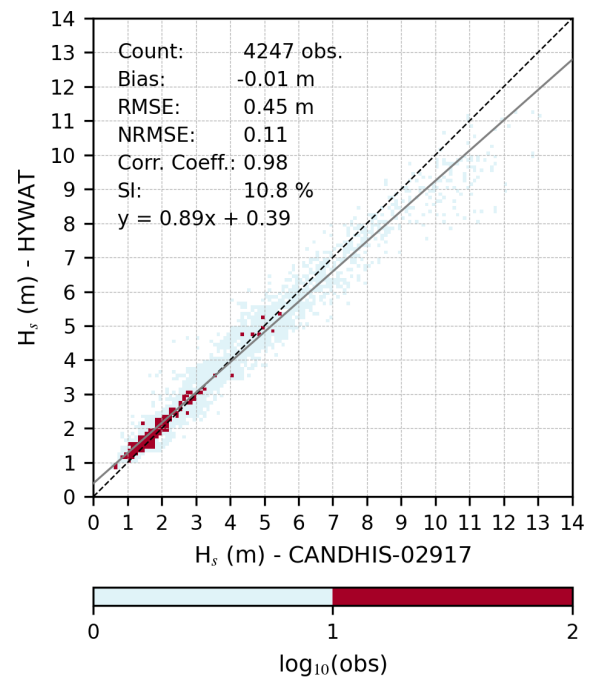


Figure 163 – Diagramme de dispersion pour H_s .

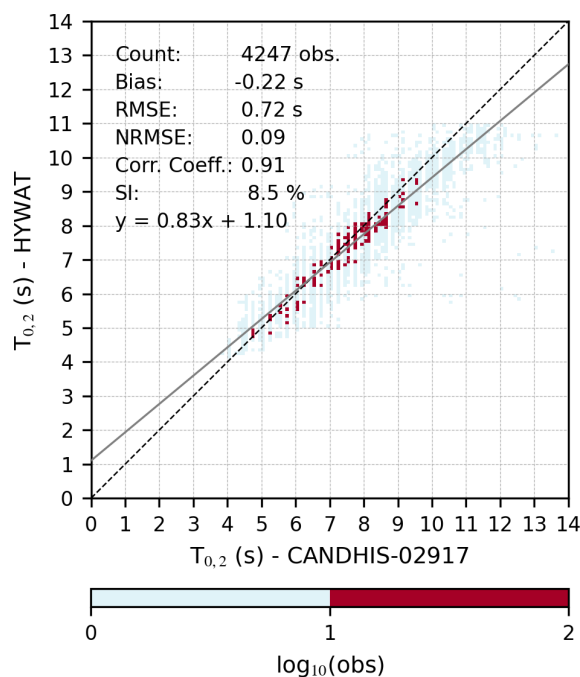


Figure 164 – Diagramme de dispersion pour $T_{0.2}$.

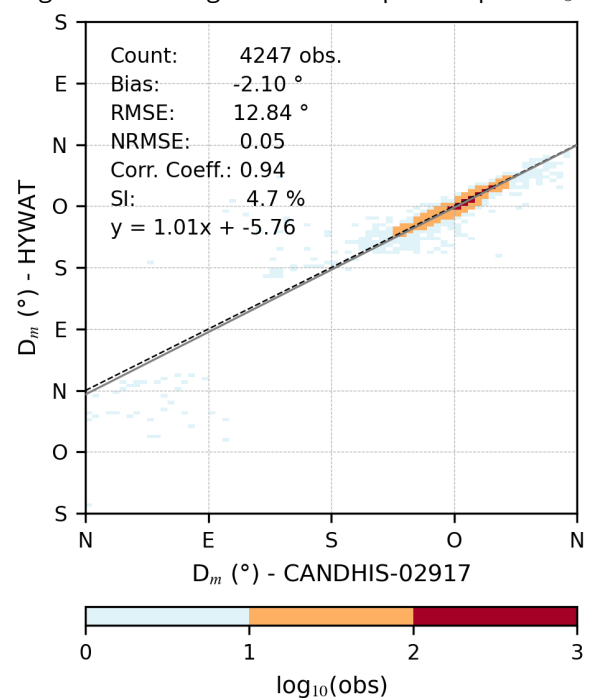


Figure 165 – Diagramme de dispersion pour D_m .

4.43 Bouée 02916 : Ile de Sein Nord

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-10-2012	22-04-2013	70.0 m	48.08	-4.92	Oui

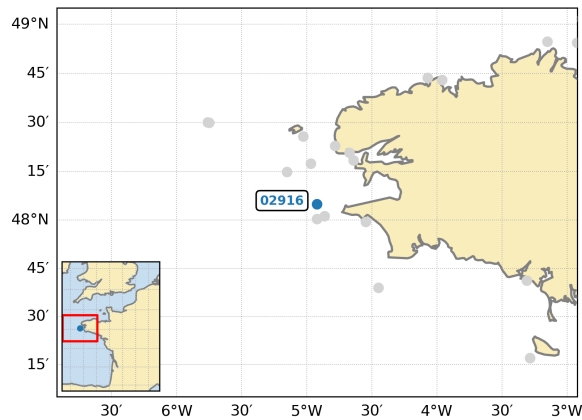
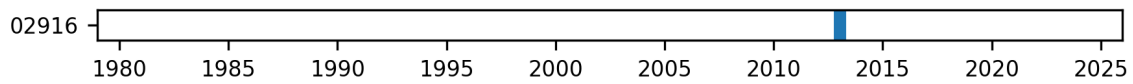


Figure 166 – Position géographique de la bouée 02916.

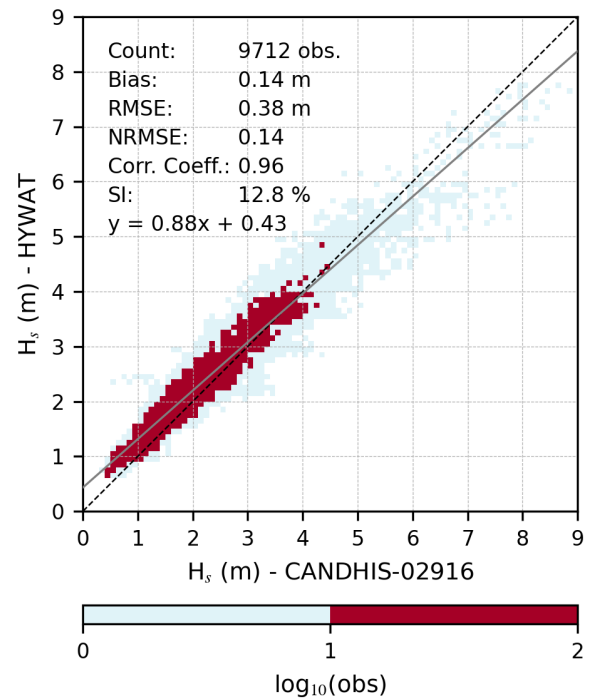


Figure 167 – Diagramme de dispersion pour H_s .

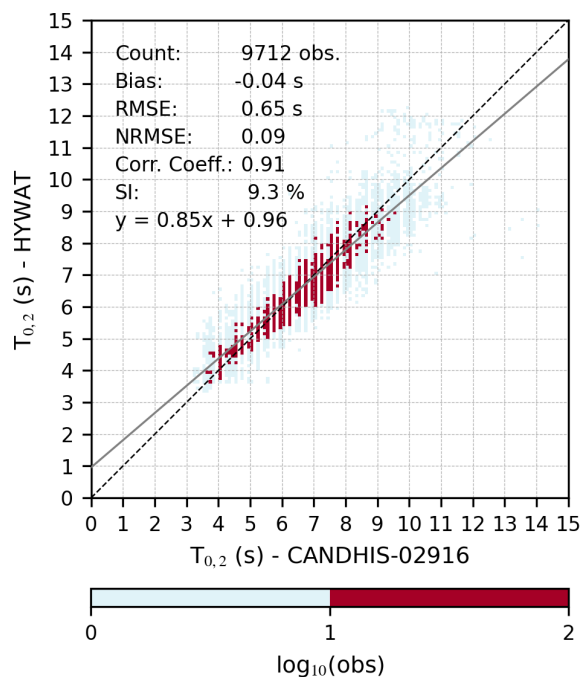


Figure 168 – Diagramme de dispersion pour $T_{0.2}$.

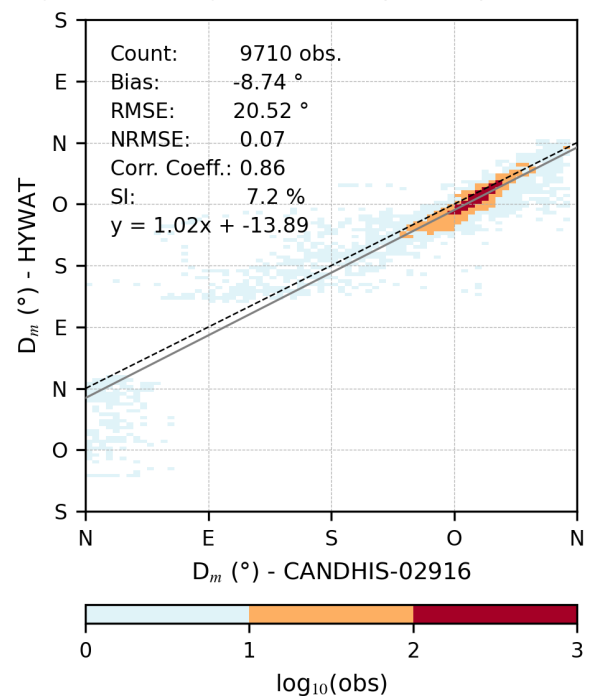


Figure 169 – Diagramme de dispersion pour D_m .

4.44 Bouée 02920 : Ile de Sein

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
14-10-2013	10-04-2014	25.0 m	48.02	-4.86	Oui

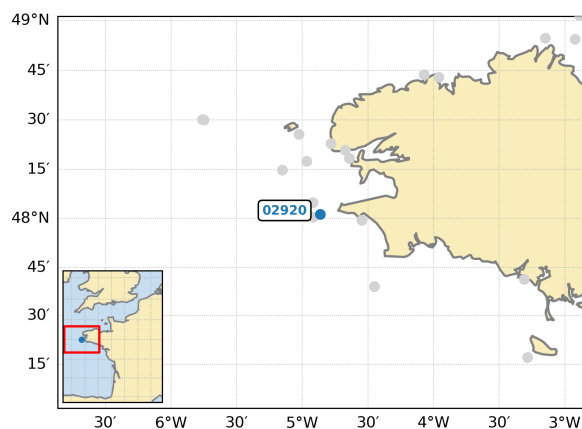
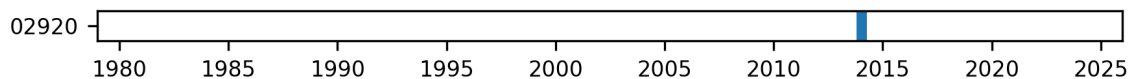


Figure 170 – Position géographique de la bouée 02920.

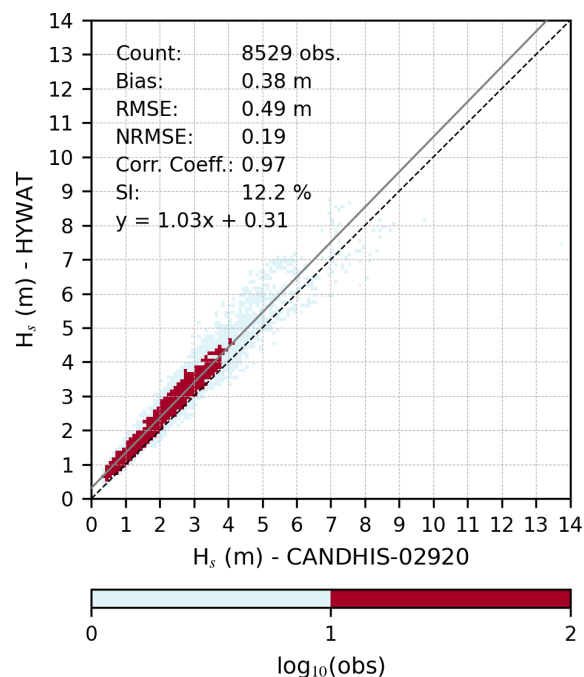


Figure 171 – Diagramme de dispersion pour H_s .

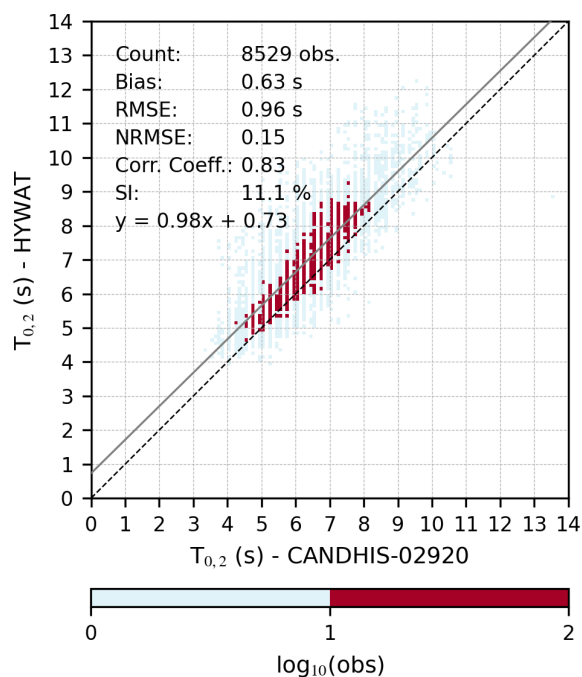


Figure 172 – Diagramme de dispersion pour $T_{0.2}$.

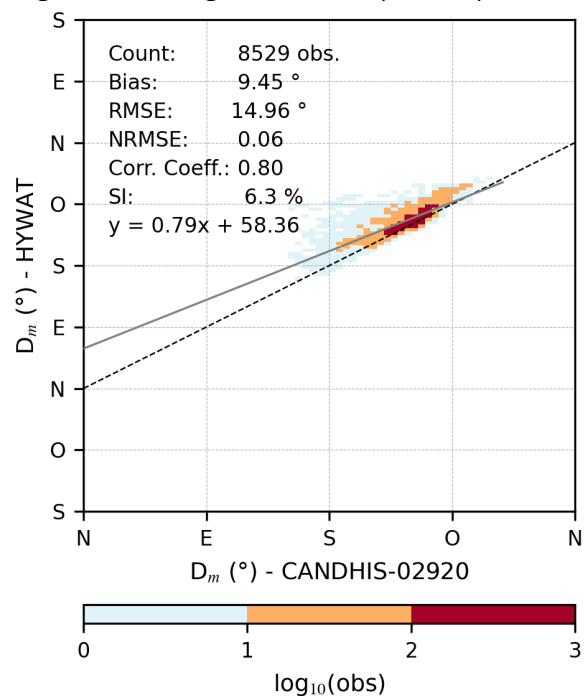


Figure 173 – Diagramme de dispersion pour D_m .

4.45 Bouée 02915 : Ile de Sein Sud

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-10-2012	22-04-2013	45.0 m	48.01	-4.92	Oui

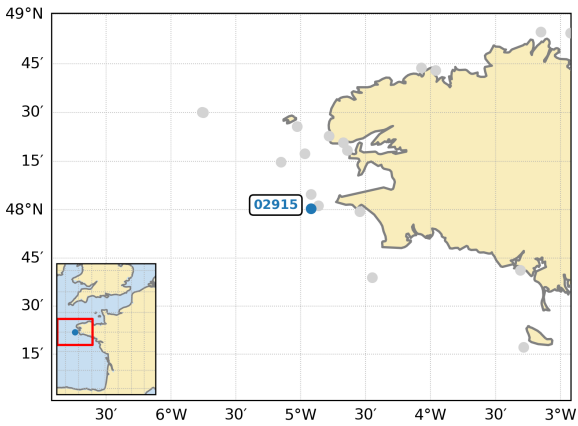
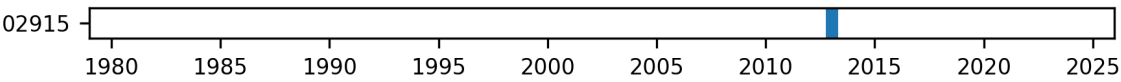


Figure 174 – Position géographique de la bouée 02915.

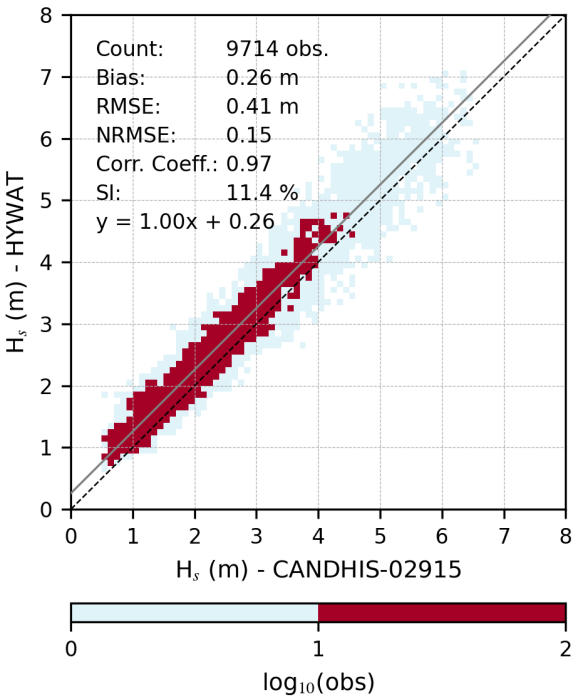


Figure 175 – Diagramme de dispersion pour H_s .

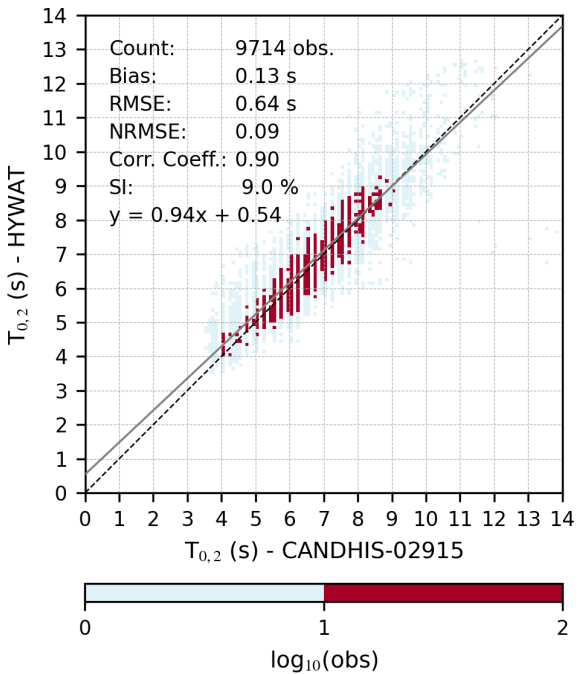


Figure 176 – Diagramme de dispersion pour $T_{0.2}$.

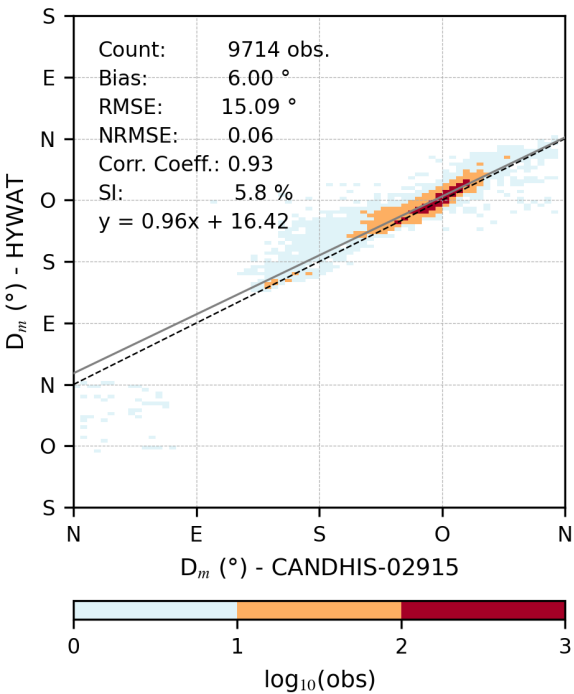


Figure 177 – Diagramme de dispersion pour D_m .

4.46 Bouée 02921 : Esquibien

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
03-12-2013	30-09-2014	16.0 m	47.99	-4.55	Oui

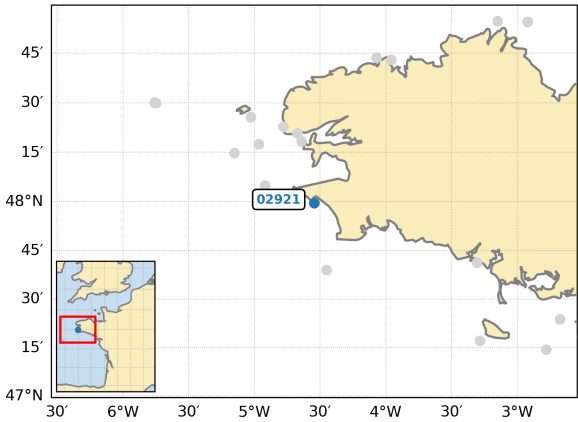
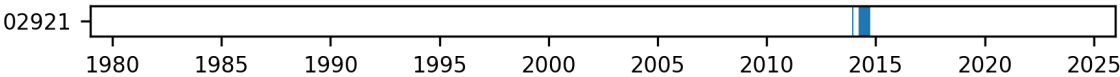


Figure 178 – Position géographique de la bouée 02921.

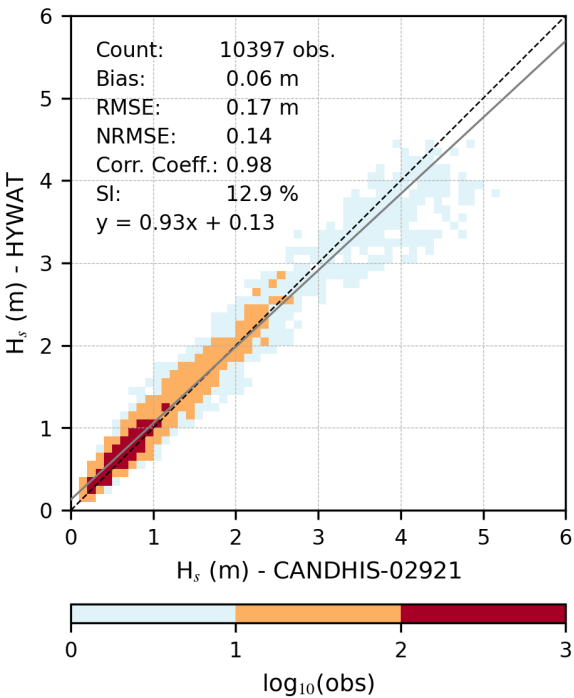


Figure 179 – Diagramme de dispersion pour H_s .

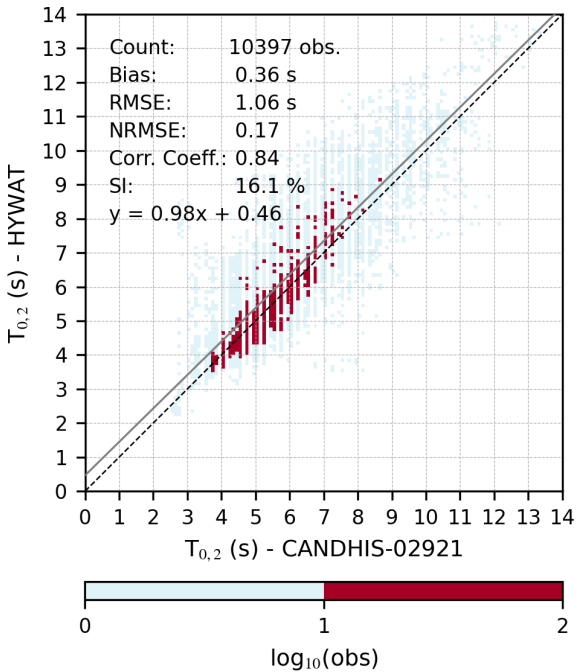


Figure 180 – Diagramme de dispersion pour $T_{0.2}$.

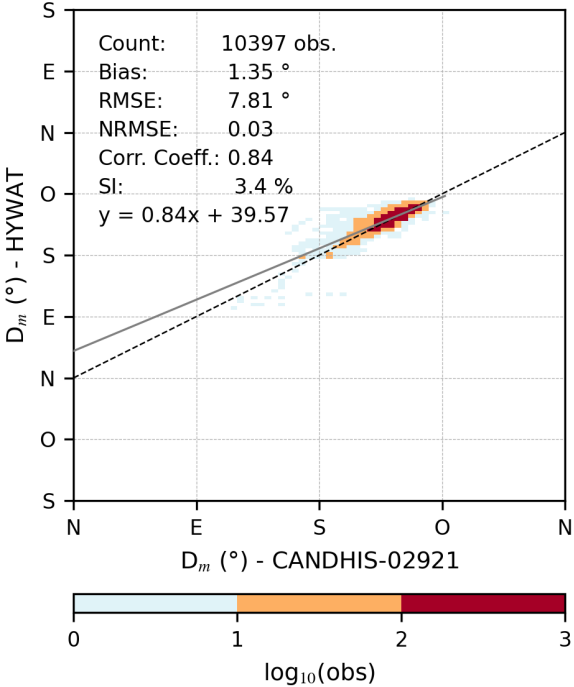


Figure 181 – Diagramme de dispersion pour D_m .

4.47 Bouée 05601 : Gâvres

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
04-11-1997	09-12-1997	5.0 m	47.69	-3.31	Non

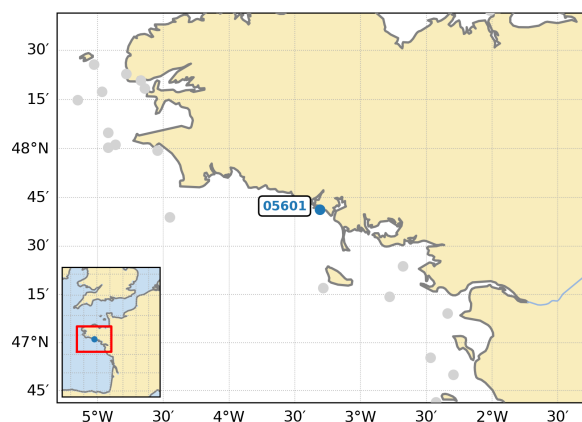
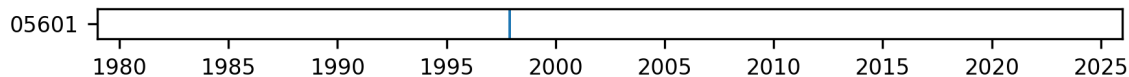


Figure 182 – Position géographique de la bouée 05601.

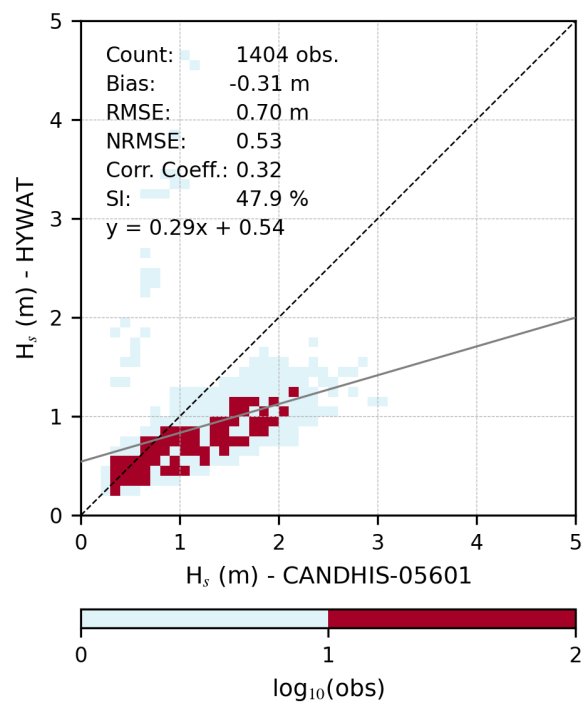


Figure 183 – Diagramme de dispersion pour H_s .

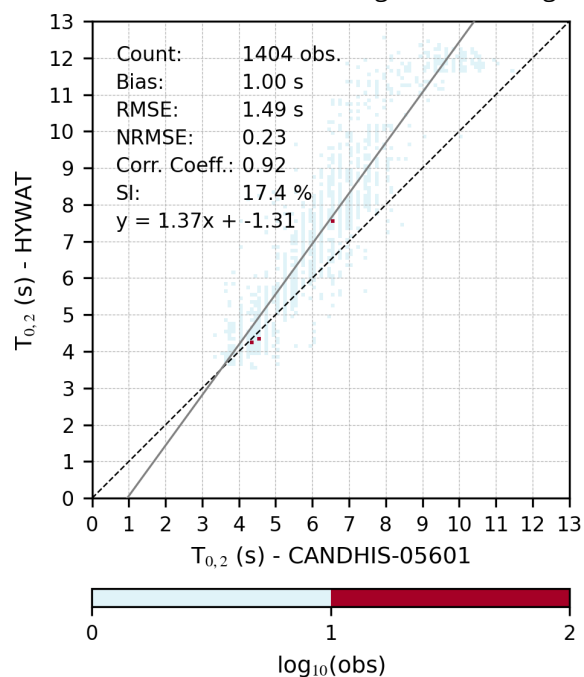


Figure 184 – Diagramme de dispersion pour T_{02} .

4.48 Bouée 02914 : Penmarc'h

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
09-11-2009	27-02-2010	105.0 m	47.65	-4.45	Oui

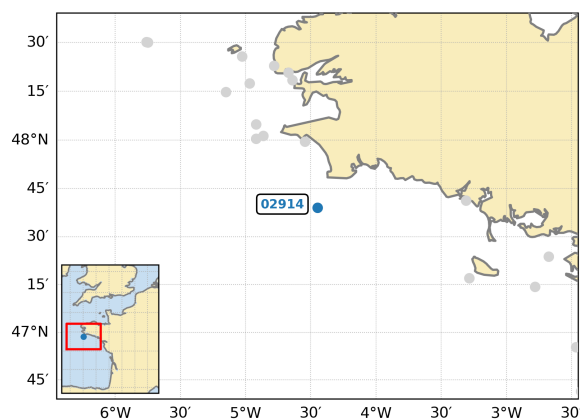
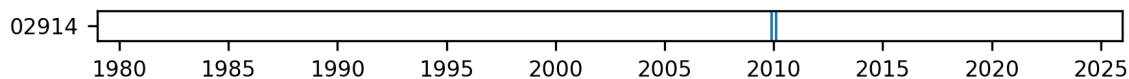


Figure 185 – Position géographique de la bouée 02914.

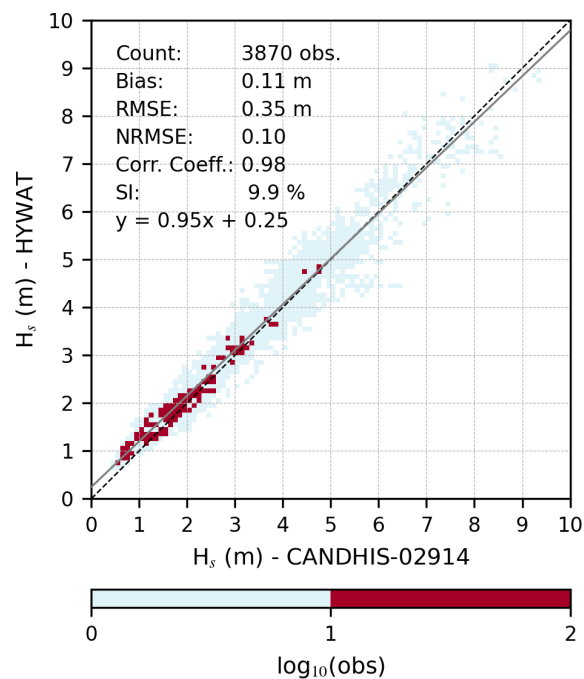


Figure 186 – Diagramme de dispersion pour H_s .

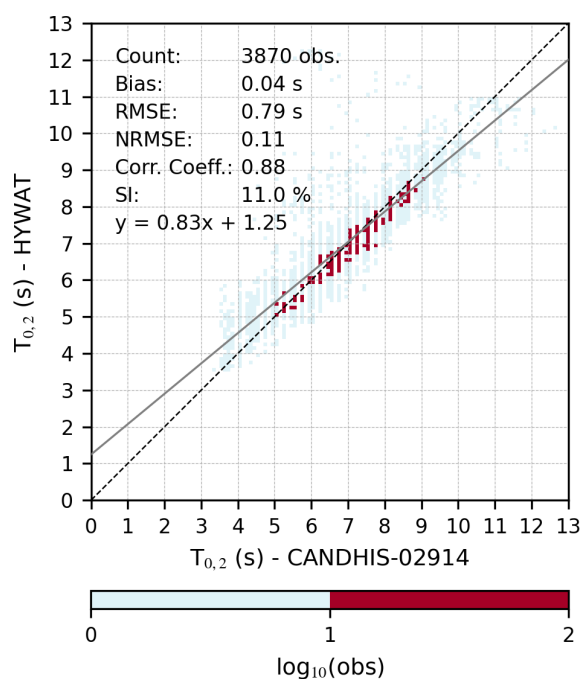


Figure 187 – Diagramme de dispersion pour $T_{0.2}$.

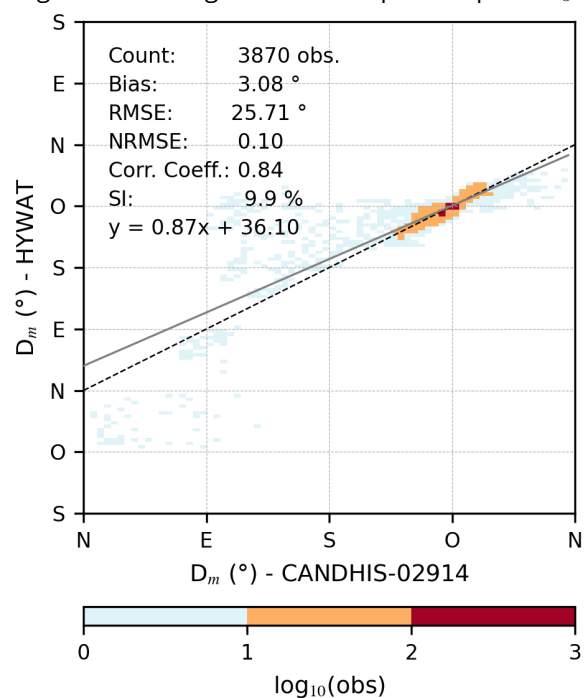


Figure 188 – Diagramme de dispersion pour D_m .

4.49 Bouée 04402 : Le Croisic

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
03-04-2003	02-07-2003	17.0 m	47.40	-2.68	Non

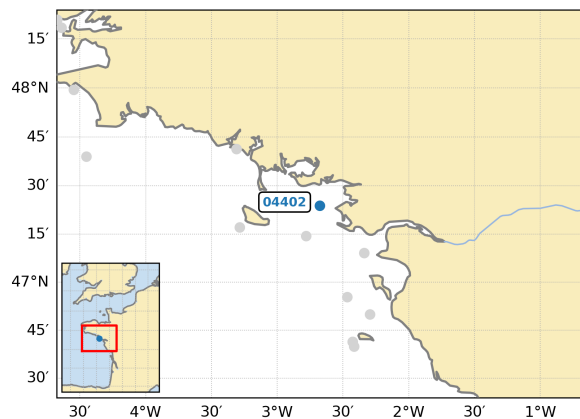
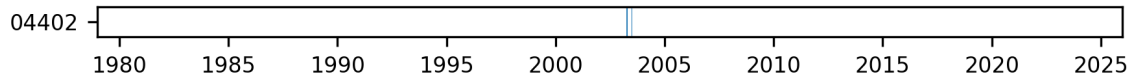


Figure 189 – Position géographique de la bouée 04402.

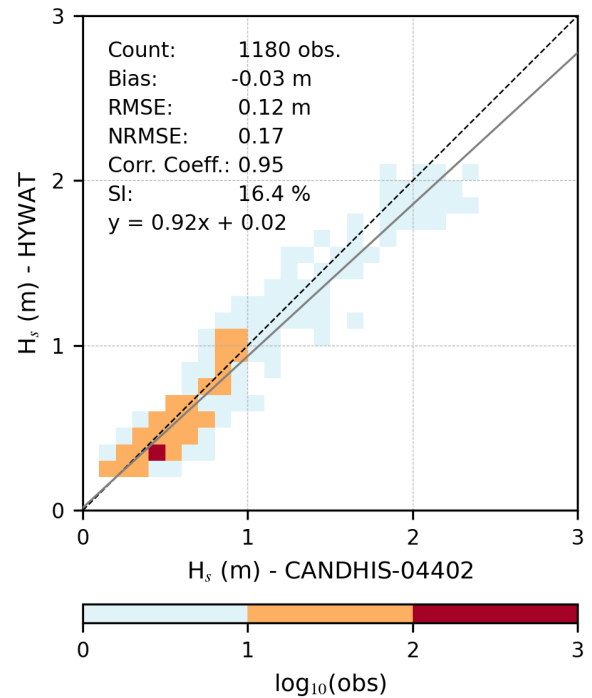


Figure 190 – Diagramme de dispersion pour H_s .

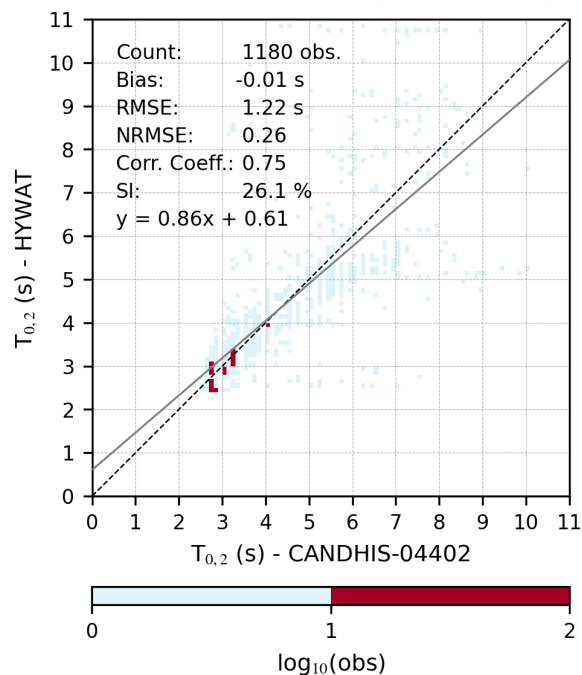


Figure 191 – Diagramme de dispersion pour T_{02} .

4.50 Bouée 05602 : Belle-Ile

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
18-10-2010	30-12-2025	45.0 m	47.28	-3.29	Oui

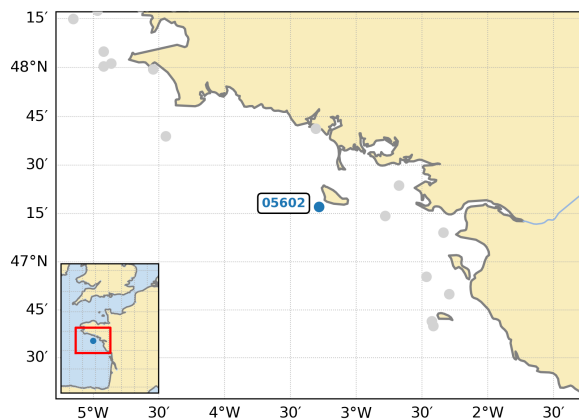
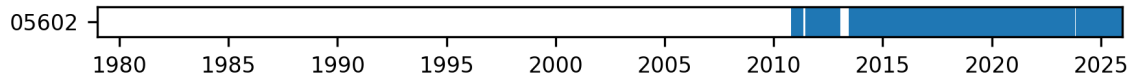


Figure 192 – Position géographique de la bouée 05602.

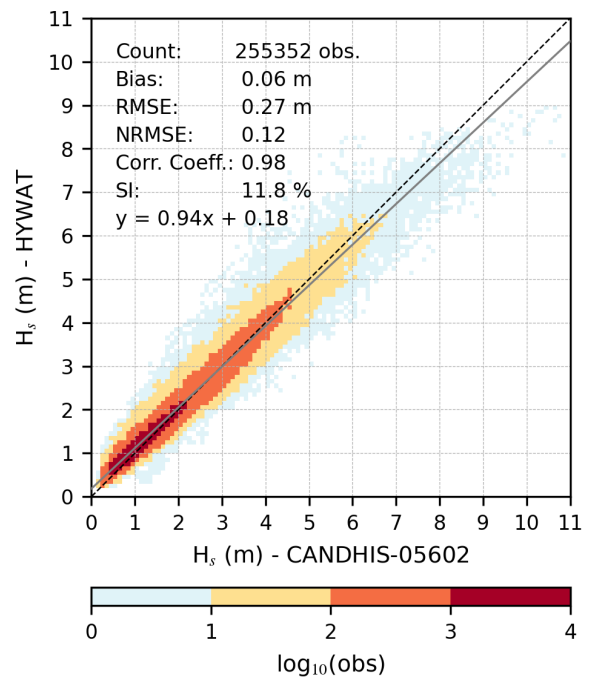


Figure 193 – Diagramme de dispersion pour H_s .

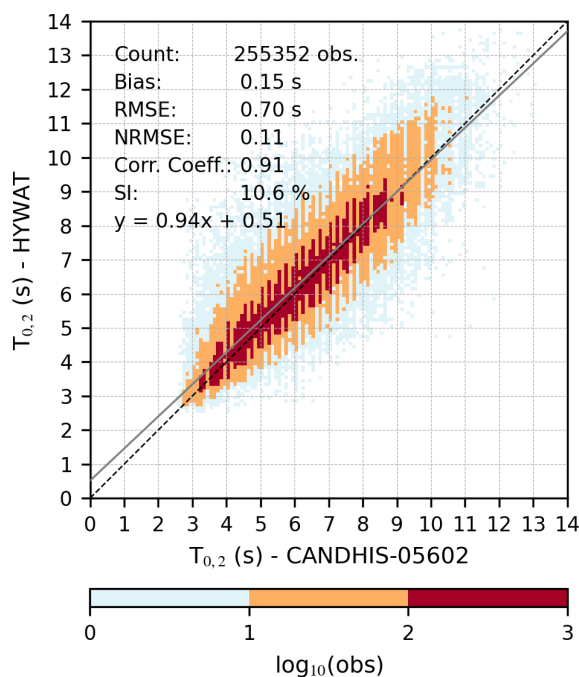


Figure 194 – Diagramme de dispersion pour $T_{0.2}$.

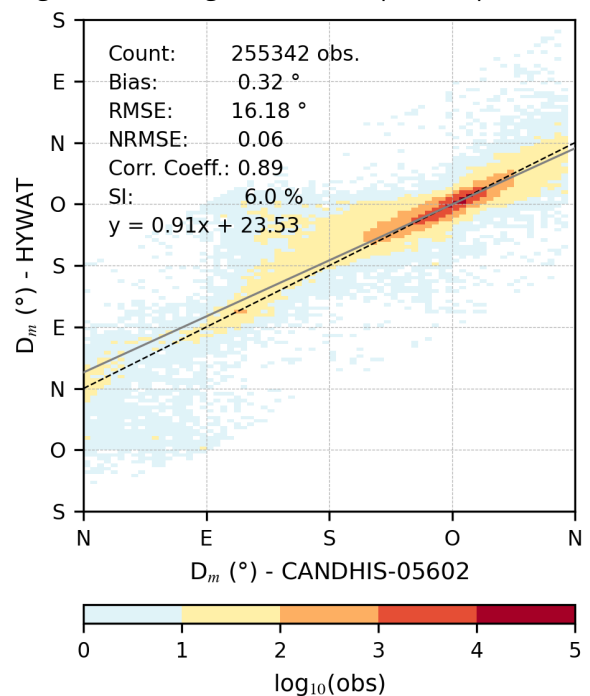


Figure 195 – Diagramme de dispersion pour D_m .

4.51 Bouée 04403 : SEM-REV - Plateau du Four

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
01-04-2008	30-12-2025	30.0 m	47.24	-2.78	Oui

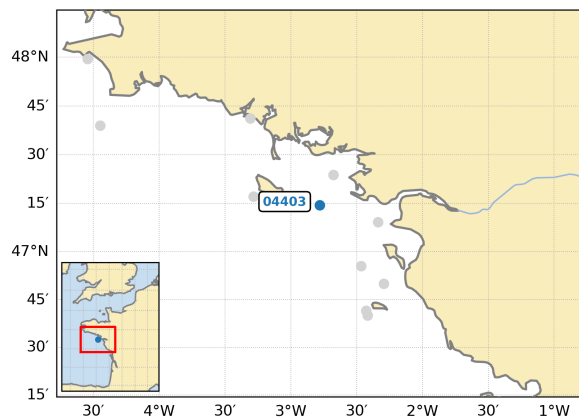
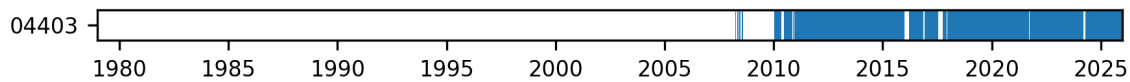


Figure 196 – Position géographique de la bouée 04403.

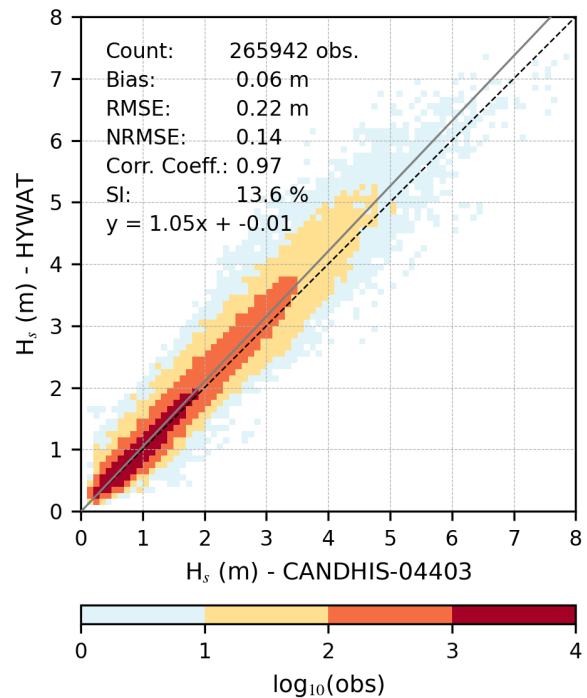


Figure 197 – Diagramme de dispersion pour H_s .

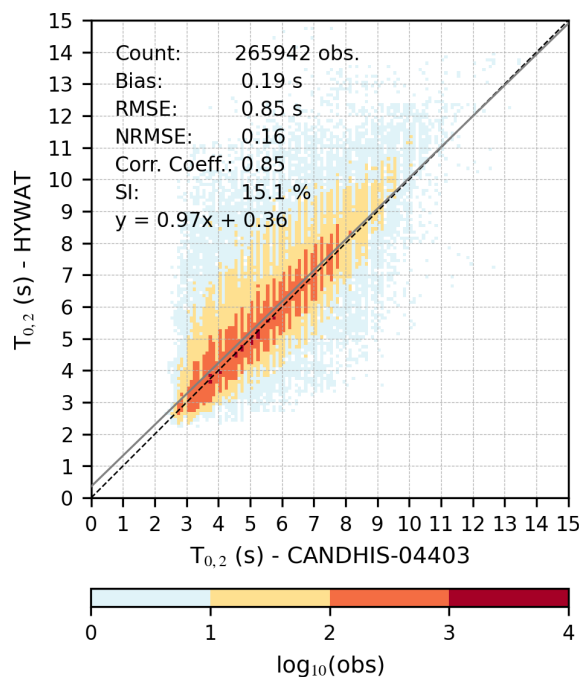


Figure 198 – Diagramme de dispersion pour $T_{0.2}$.

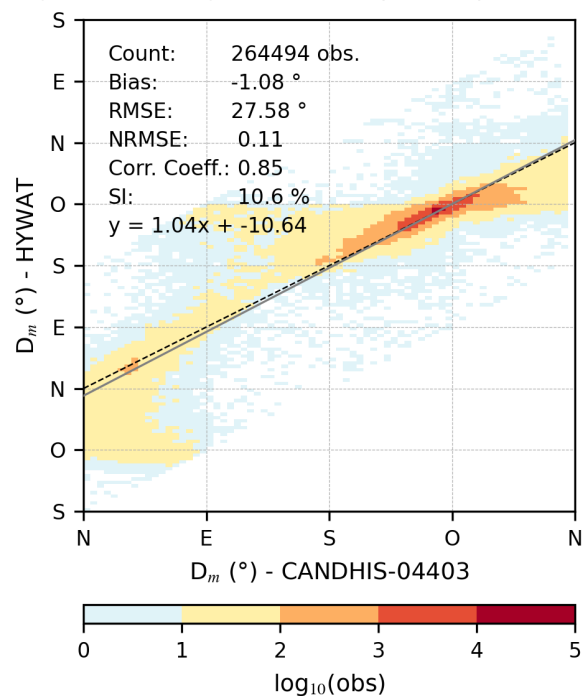


Figure 199 – Diagramme de dispersion pour D_m .

4.52 Bouée 04401 : Saint Nazaire

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-06-1999	30-12-2006	17.0 m	47.15	-2.34	Non

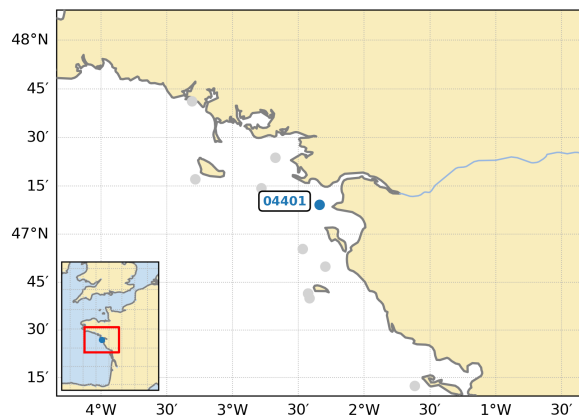
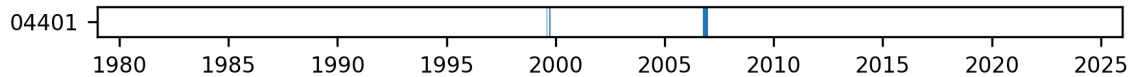


Figure 200 – Position géographique de la bouée 04401.

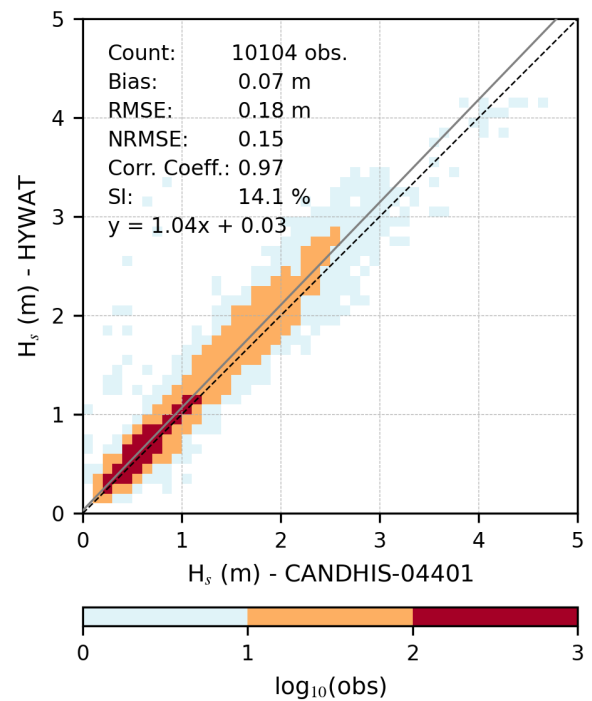


Figure 201 – Diagramme de dispersion pour H_s .

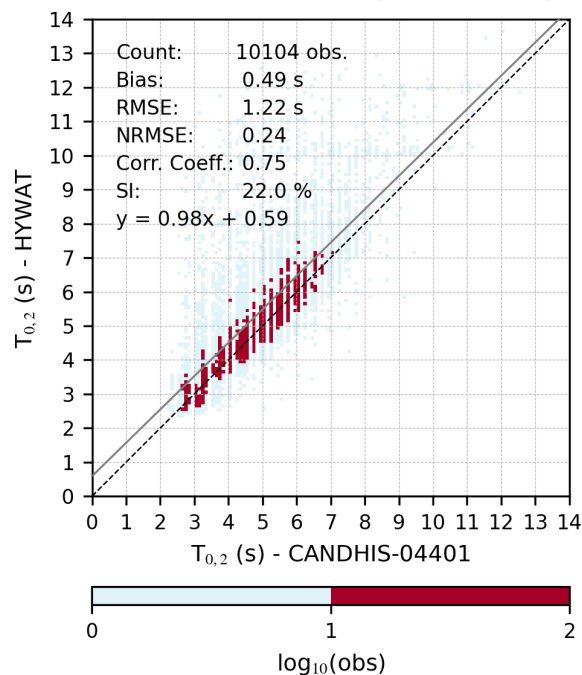


Figure 202 – Diagramme de dispersion pour T_{02} .

4.53 Bouée 08505 : Noirmoutier

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
27-07-2022	30-12-2025	18.0 m	46.92	-2.47	Oui

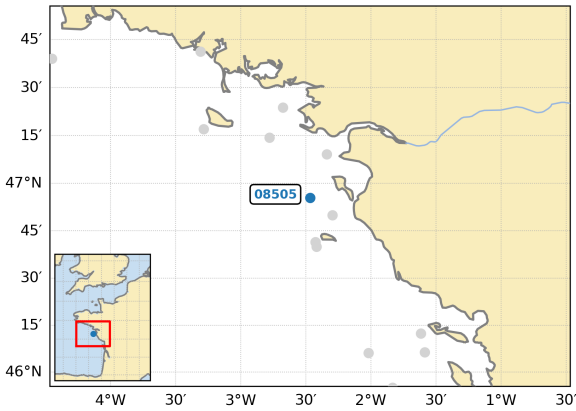
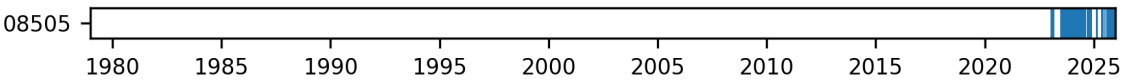


Figure 203 – Position géographique de la bouée 08505.

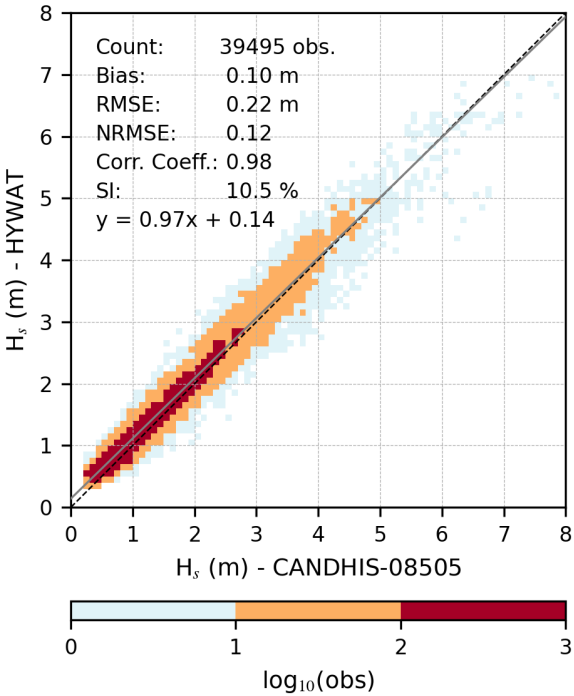


Figure 204 – Diagramme de dispersion pour H_s .

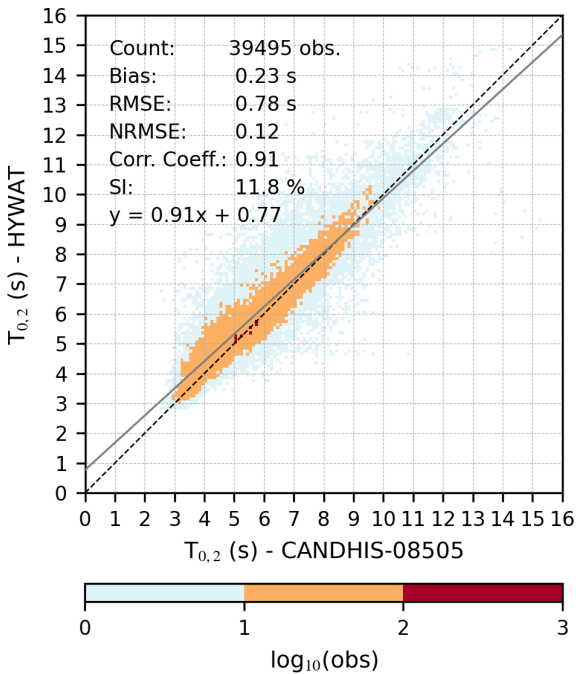


Figure 205 – Diagramme de dispersion pour $T_{0.2}$.

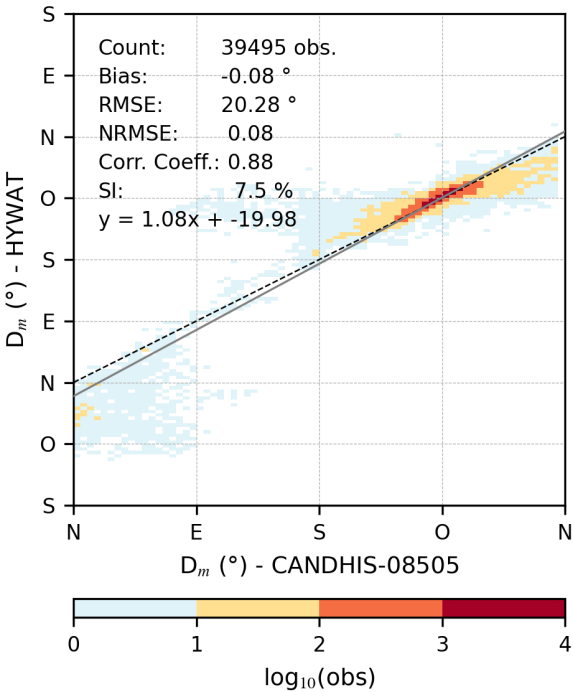


Figure 206 – Diagramme de dispersion pour D_m .

4.54 Bouée 08504 : Ile d'Yeu Nord

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
21-06-2005	30-12-2025	14.0 m	46.83	-2.30	Non

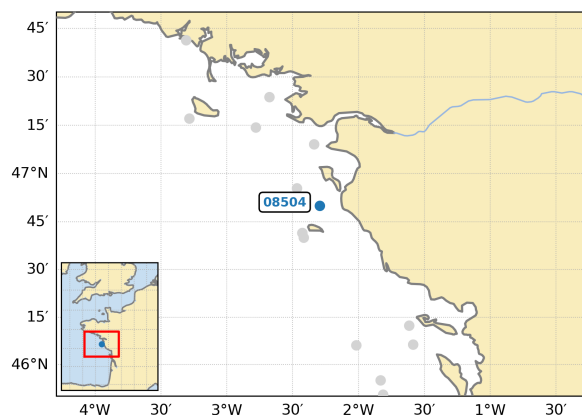
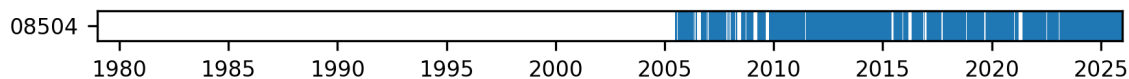


Figure 207 – Position géographique de la bouée 08504.

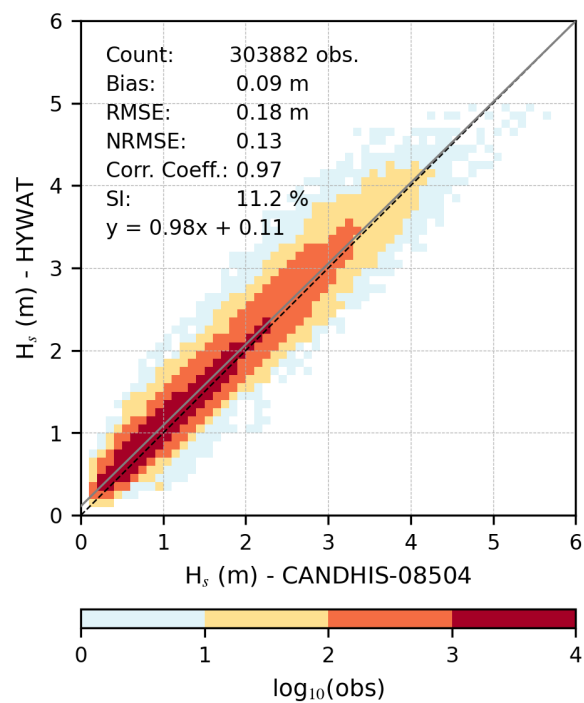


Figure 208 – Diagramme de dispersion pour H_s .

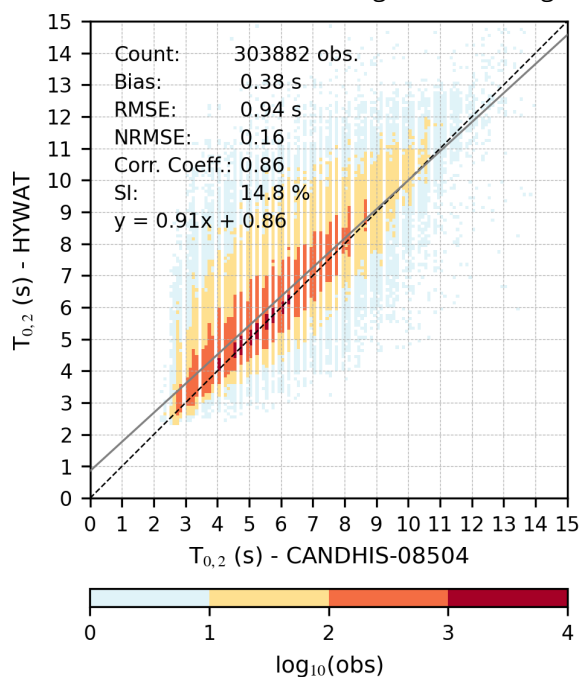


Figure 209 – Diagramme de dispersion pour T_{02} .

4.55 Bouée 08502 : Ile d'Yeu

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
06-06-1998	03-02-2000	32.0 m	46.69	-2.43	Oui

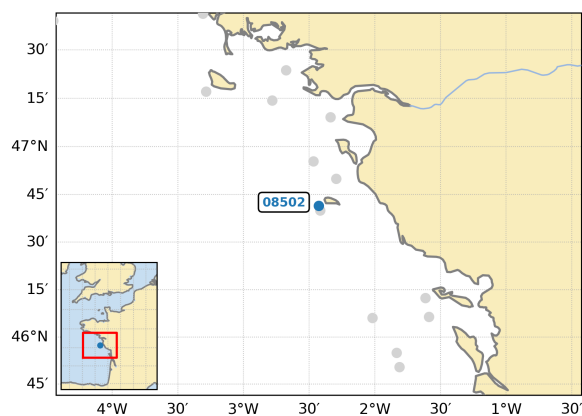
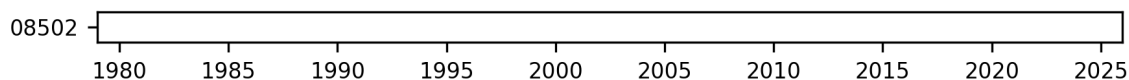


Figure 210 – Position géographique de la bouée 08502.

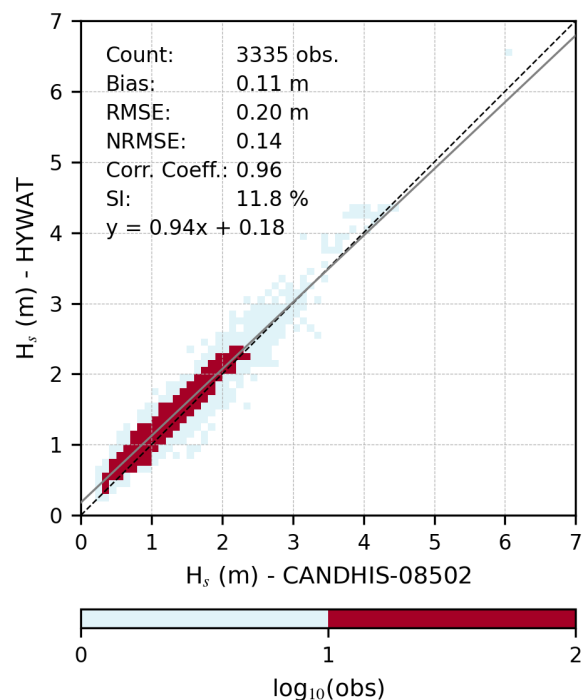


Figure 211 – Diagramme de dispersion pour H_s .

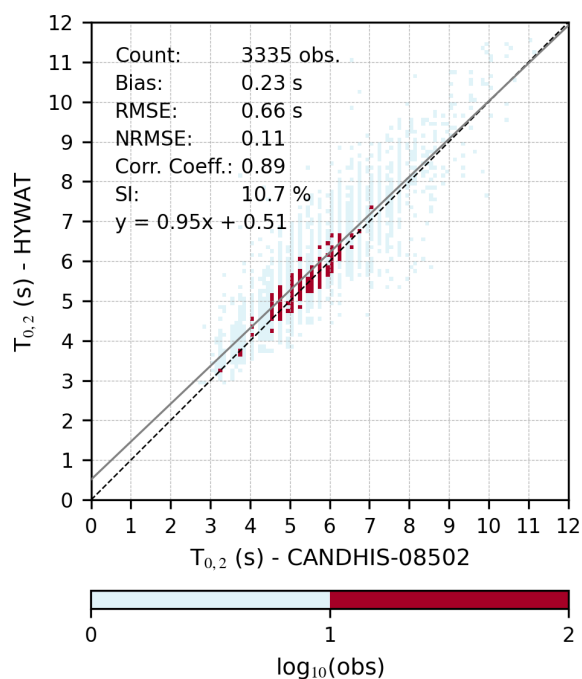


Figure 212 – Diagramme de dispersion pour $T_{0.2}$.

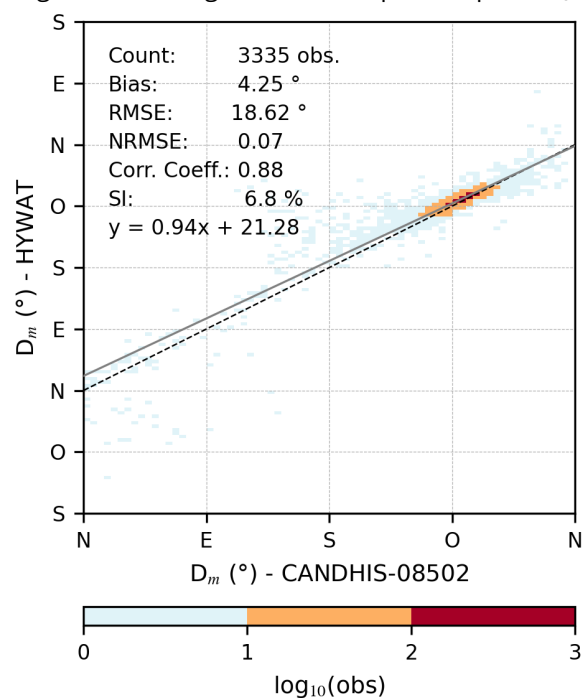


Figure 213 – Diagramme de dispersion pour D_m .

4.56 Bouée 08503 : Ile d'Yeu

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
31-07-2000	21-01-2005	32.0 m	46.69	-2.43	Non

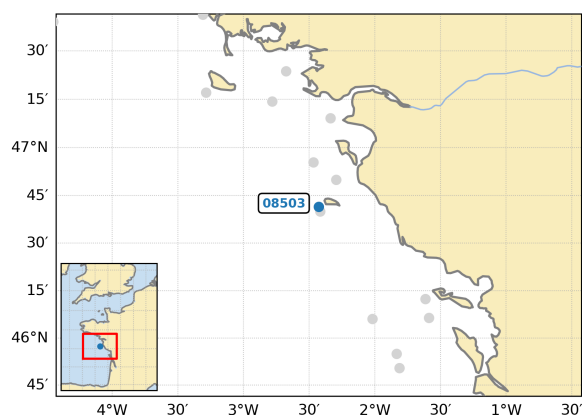
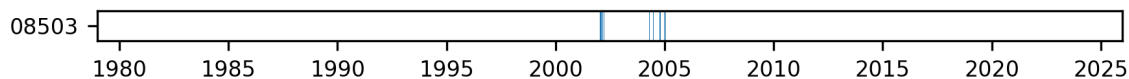


Figure 214 – Position géographique de la bouée 08503.

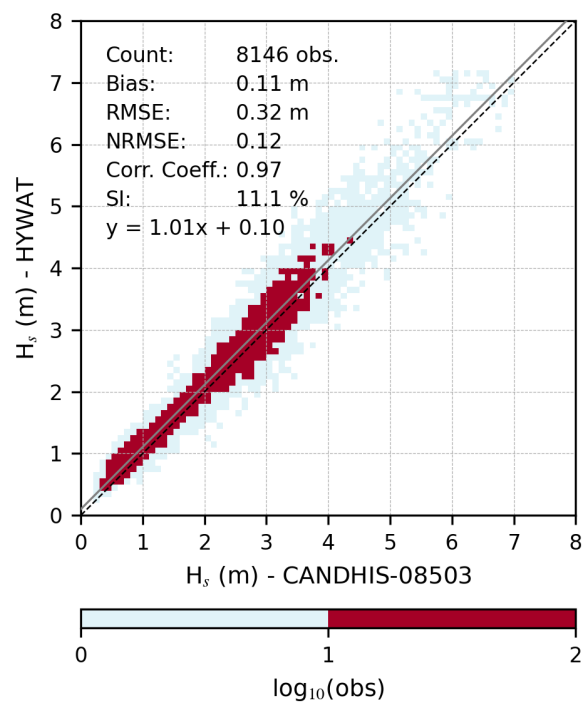


Figure 215 – Diagramme de dispersion pour H_s .

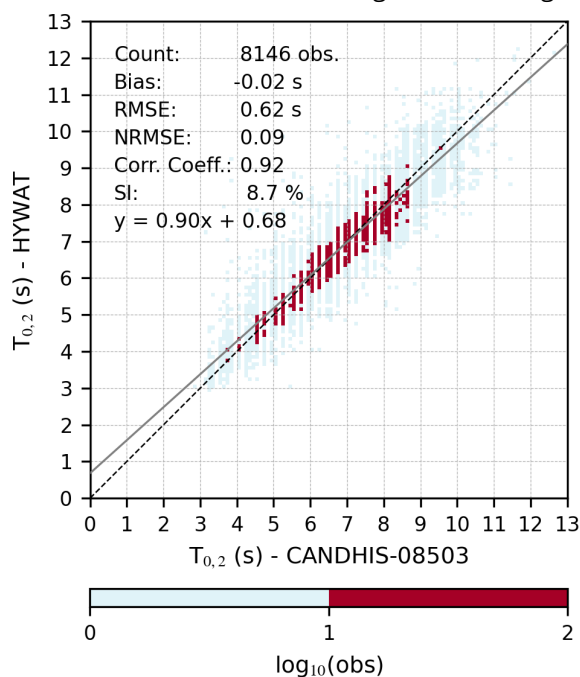


Figure 216 – Diagramme de dispersion pour $T_{0.2}$.

4.57 Bouée 08501 : Ile d'Yeu

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
15-09-1992	08-06-1998	47.0 m	46.67	-2.42	Non

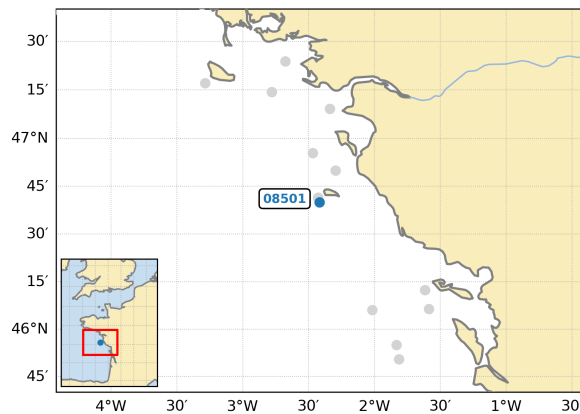
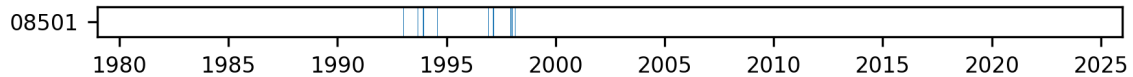


Figure 217 – Position géographique de la bouée 08501.

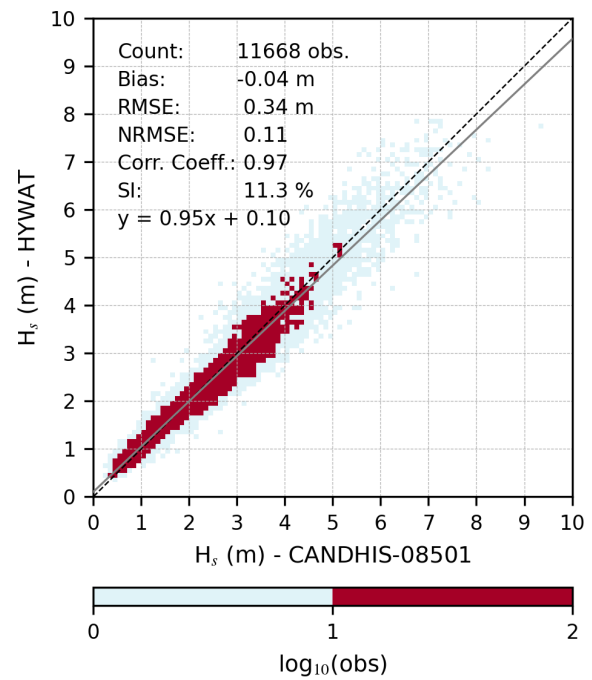


Figure 218 – Diagramme de dispersion pour H_s .

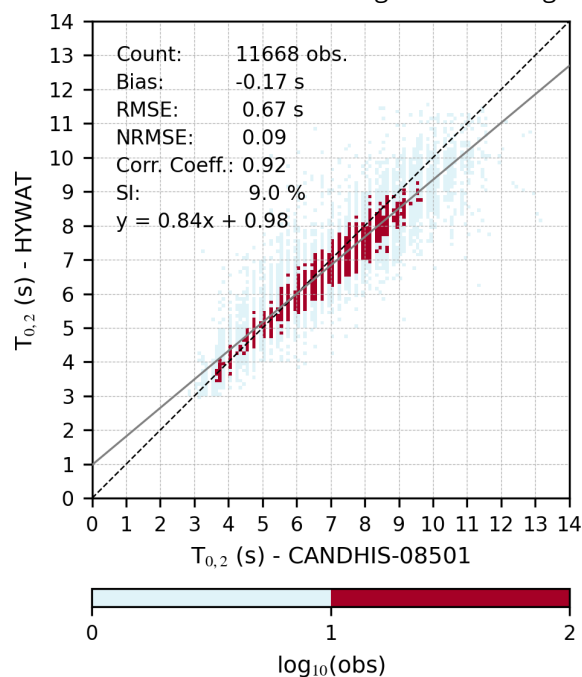


Figure 219 – Diagramme de dispersion pour $T_{0.2}$.

4.58 Bouée 01702 : Oléron

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
20-09-2001	01-12-2003	20.0 m	46.11	-1.59	Non

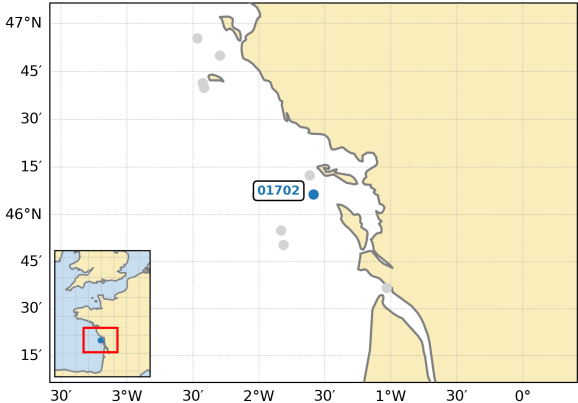
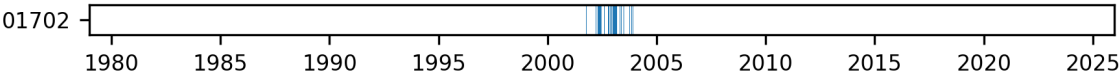


Figure 220 – Position géographique de la bouée 01702.

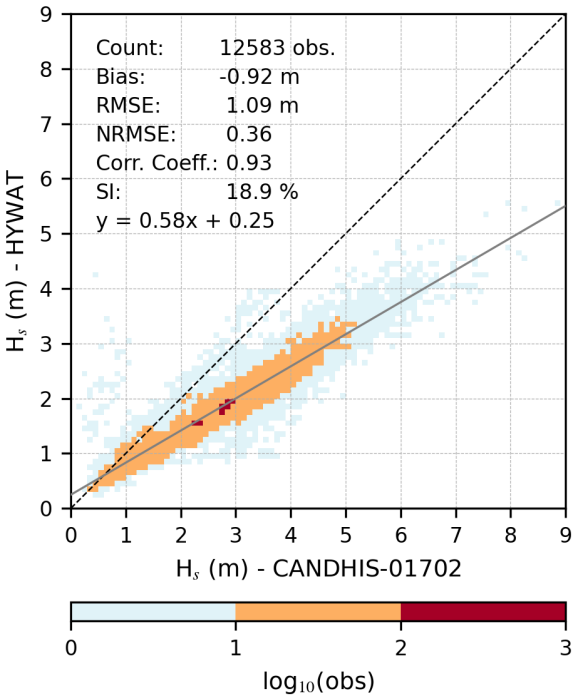


Figure 221 – Diagramme de dispersion pour H_s .

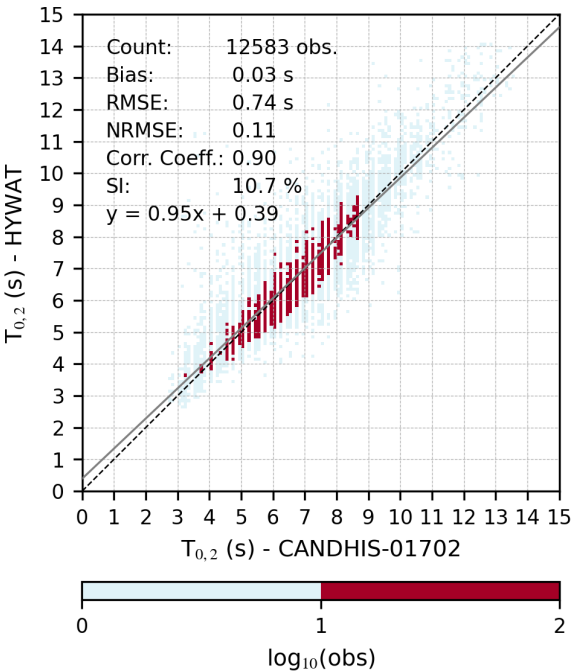


Figure 222 – Diagramme de dispersion pour $T_{0.2}$.

4.59 Bouée 01704 : Oléron Large

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
03-07-2014	30-12-2025	50.0 m	45.92	-1.83	Oui

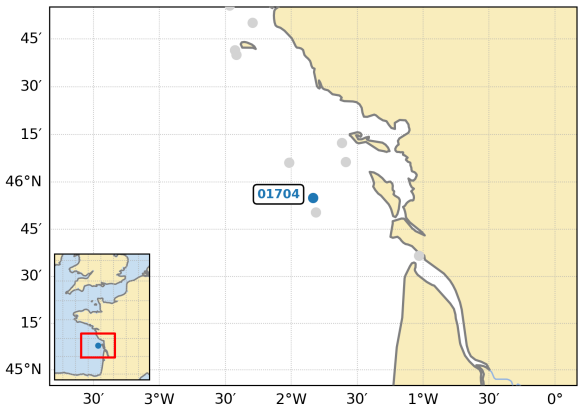
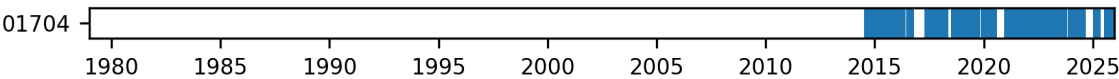


Figure 223 – Position géographique de la bouée 01704.

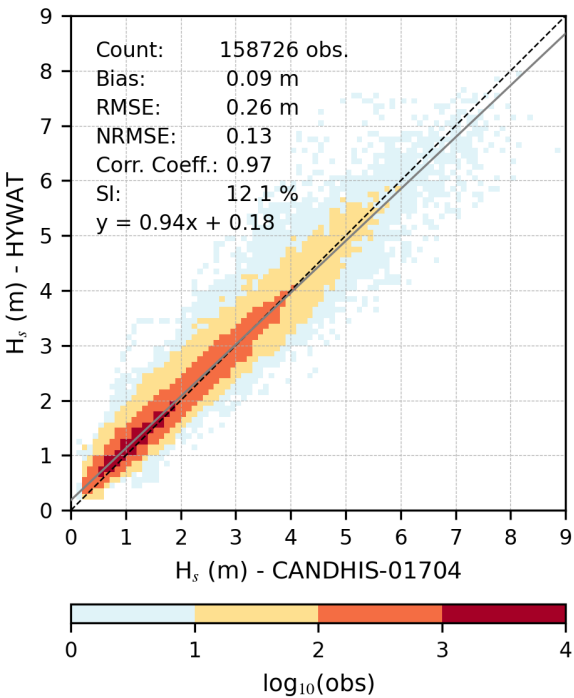


Figure 224 – Diagramme de dispersion pour H_s .

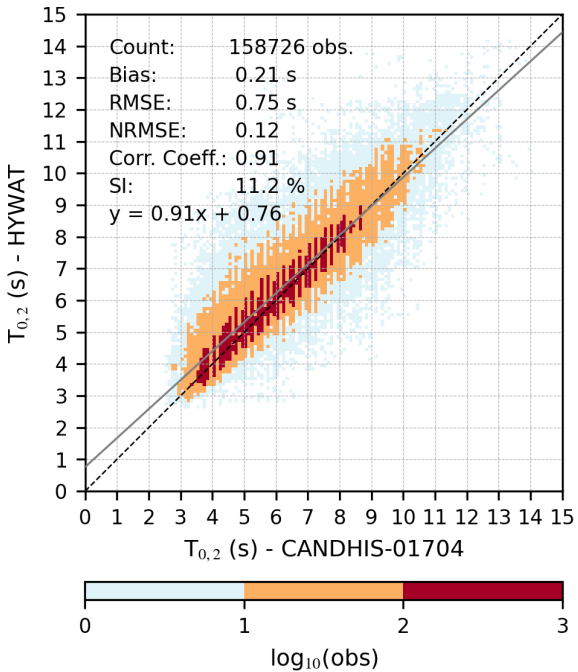


Figure 225 – Diagramme de dispersion pour $T_{0.2}$.

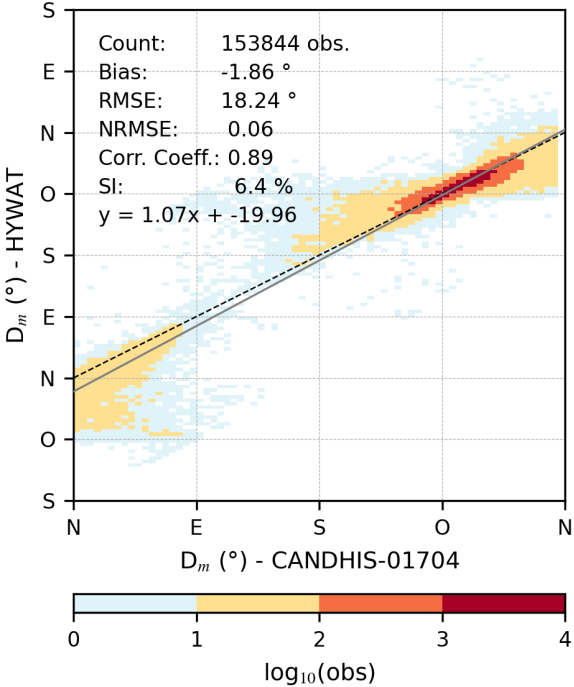


Figure 226 – Diagramme de dispersion pour D_m .

4.60 Bouée 01703 : Oléron (SHOM)

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
02-01-2010	08-04-2011	53.0 m	45.84	-1.81	Oui

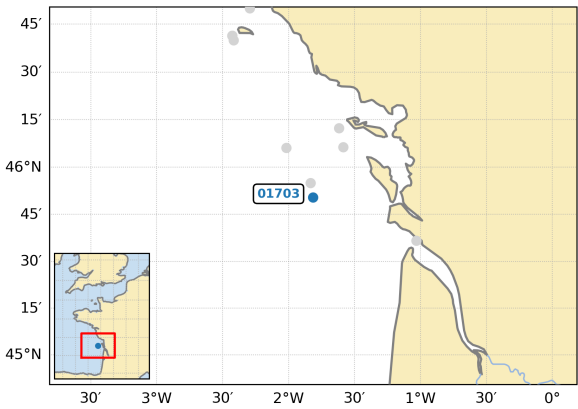
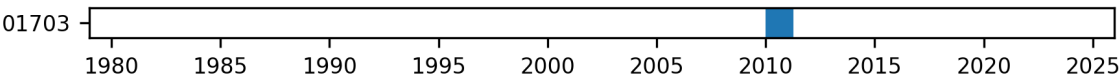


Figure 227 – Position géographique de la bouée 01703.

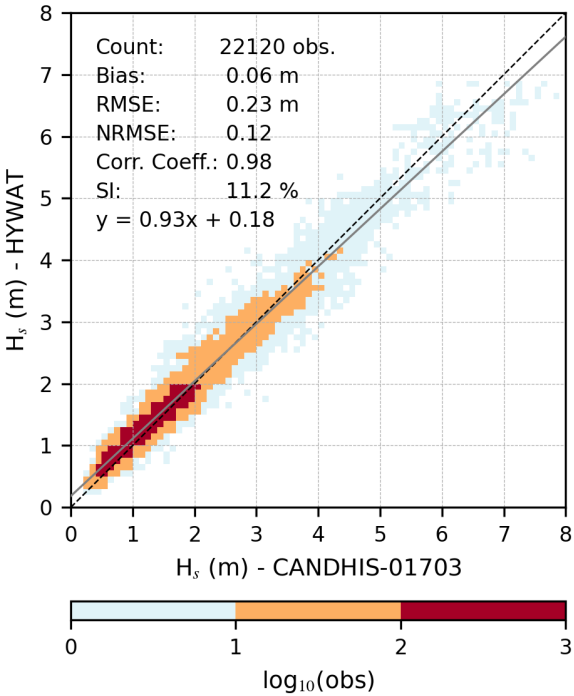


Figure 228 – Diagramme de dispersion pour H_s .

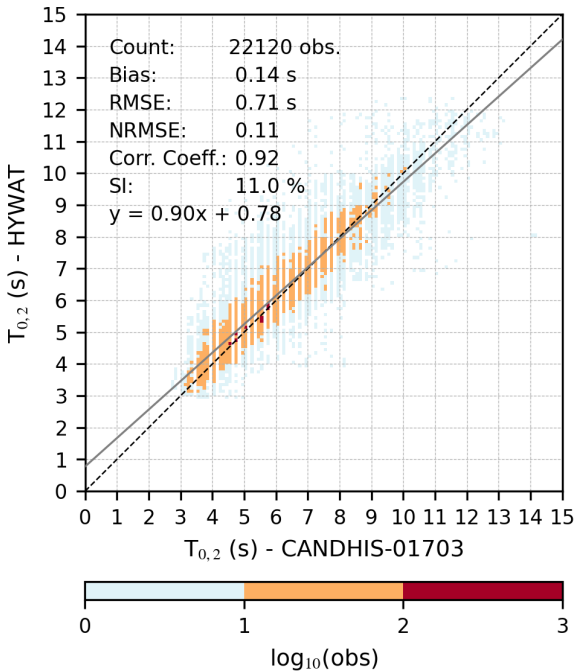


Figure 229 – Diagramme de dispersion pour $T_{0.2}$.

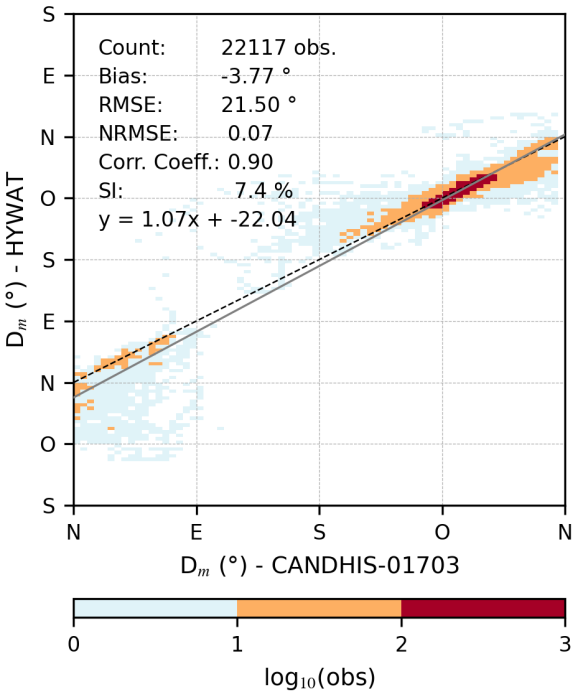


Figure 230 – Diagramme de dispersion pour D_m .

4.61 Bouée 01705 : Royan

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
16-02-2019	30-12-2025	14.0 m	45.61	-1.03	Oui

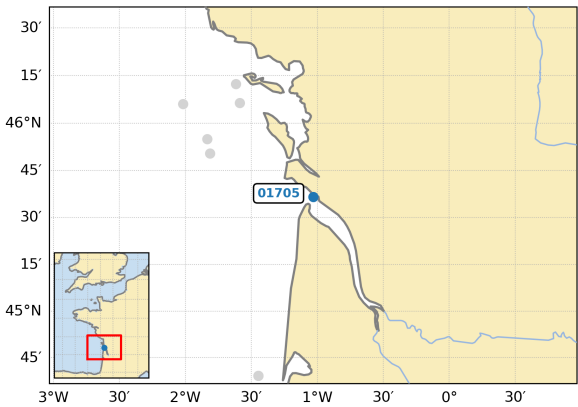
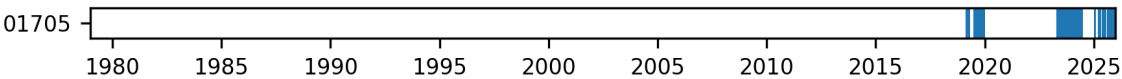


Figure 231 – Position géographique de la bouée 01705.

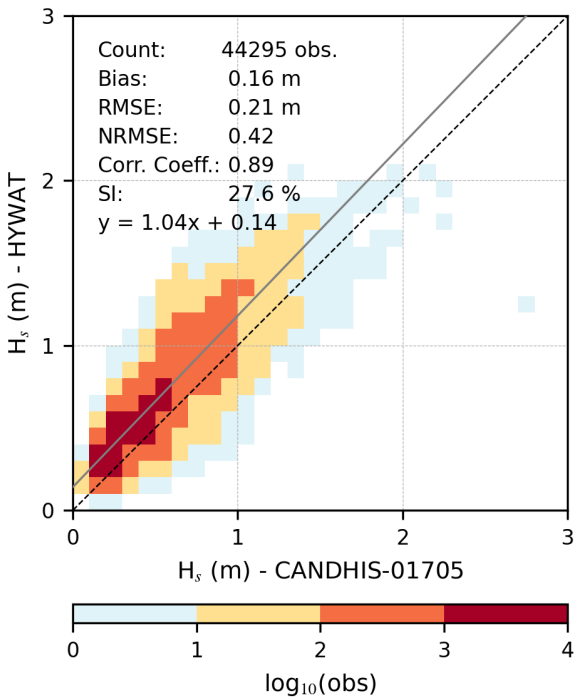


Figure 232 – Diagramme de dispersion pour H_s .

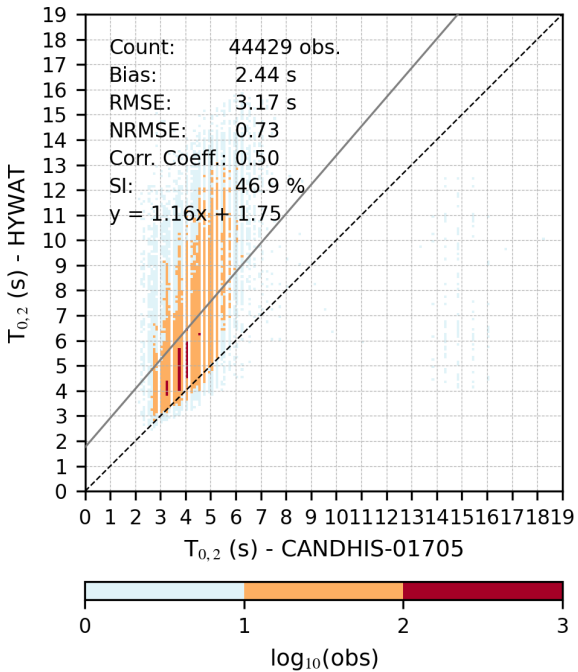


Figure 233 – Diagramme de dispersion pour $T_{0.2}$.

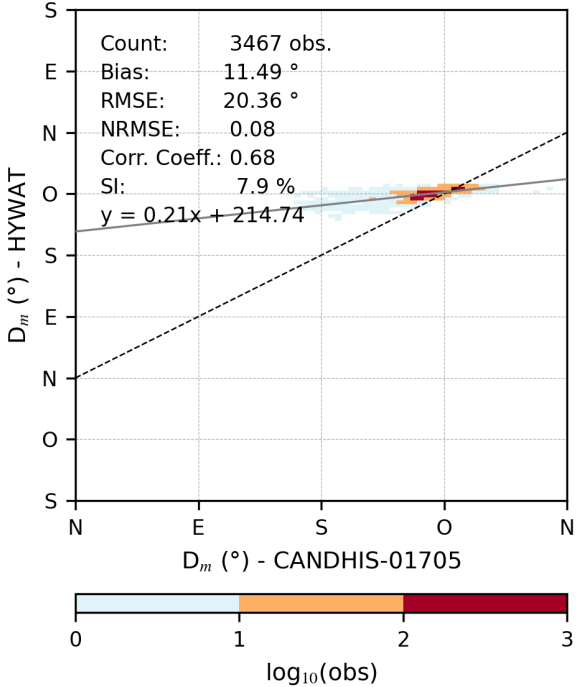


Figure 234 – Diagramme de dispersion pour D_m .

4.62 Bouée 03302 : Cap Ferret

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
28-08-2001	30-12-2025	54.0 m	44.65	-1.45	Oui

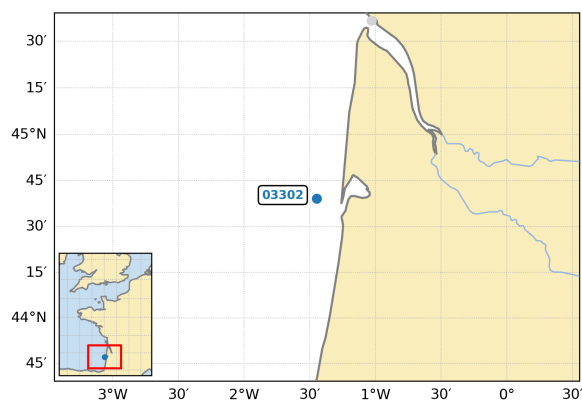
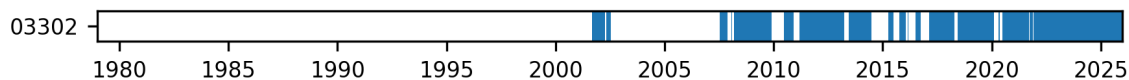


Figure 235 – Position géographique de la bouée 03302.

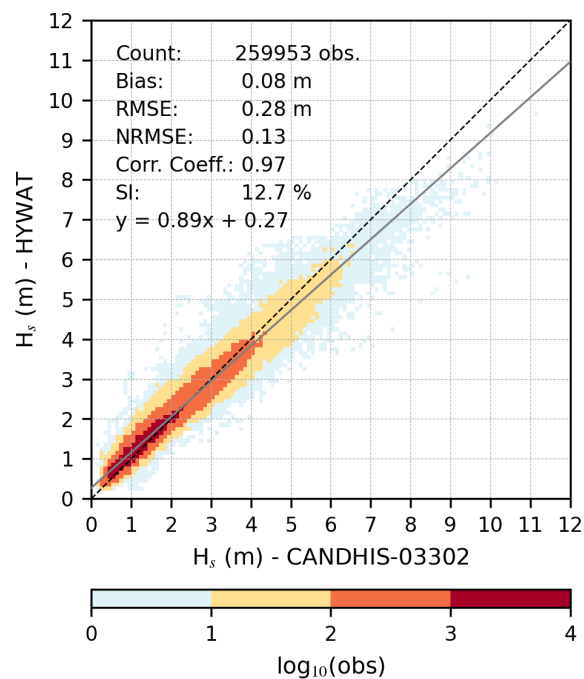


Figure 236 – Diagramme de dispersion pour H_s .

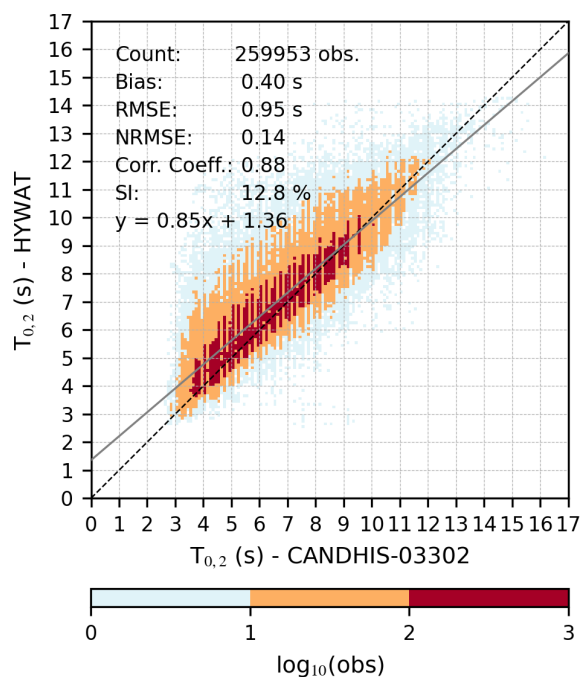


Figure 237 – Diagramme de dispersion pour $T_{0,2}$.

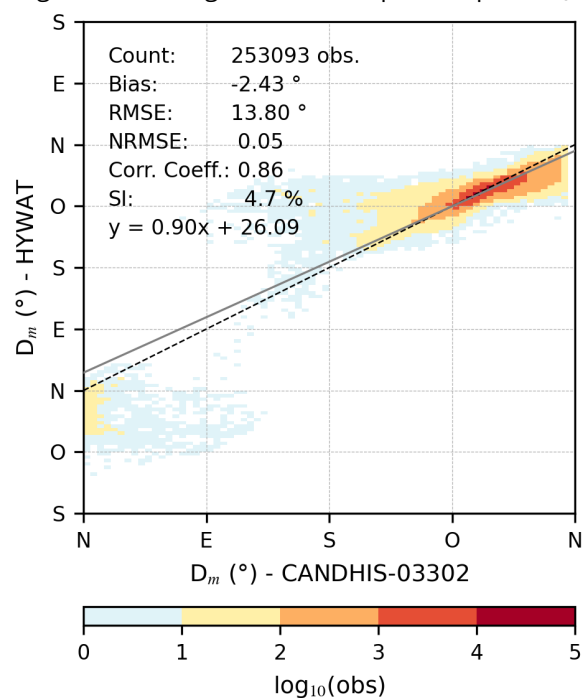


Figure 238 – Diagramme de dispersion pour D_m .

4.63 Bouée 06401 : Bayonne

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
09-11-1989	25-07-1994	20.0 m	43.55	-1.54	Non

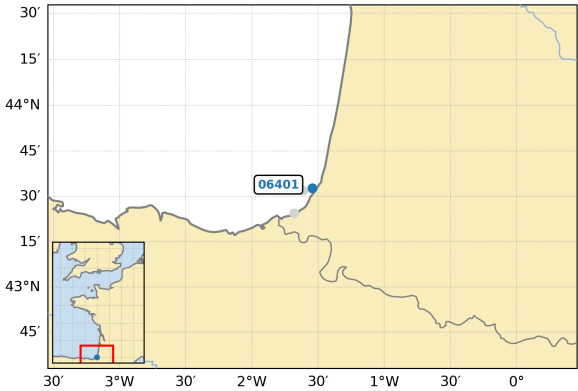
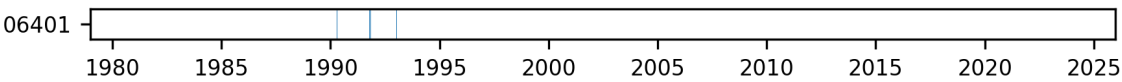


Figure 239 – Position géographique de la bouée 06401.

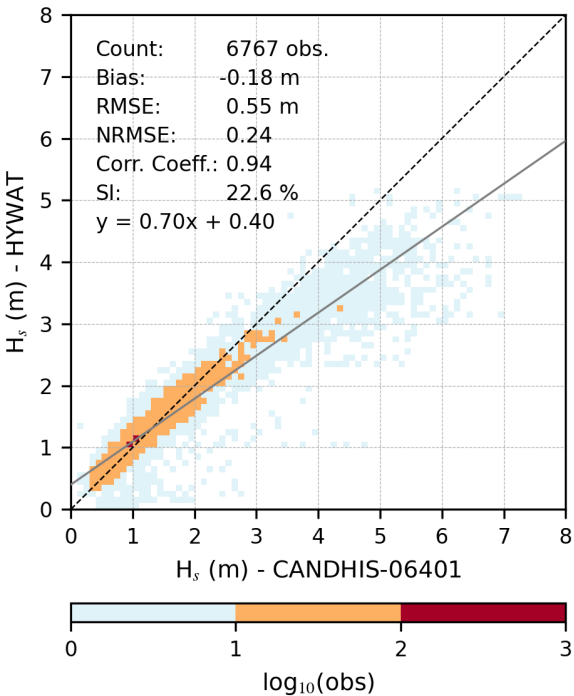


Figure 240 – Diagramme de dispersion pour H_s .

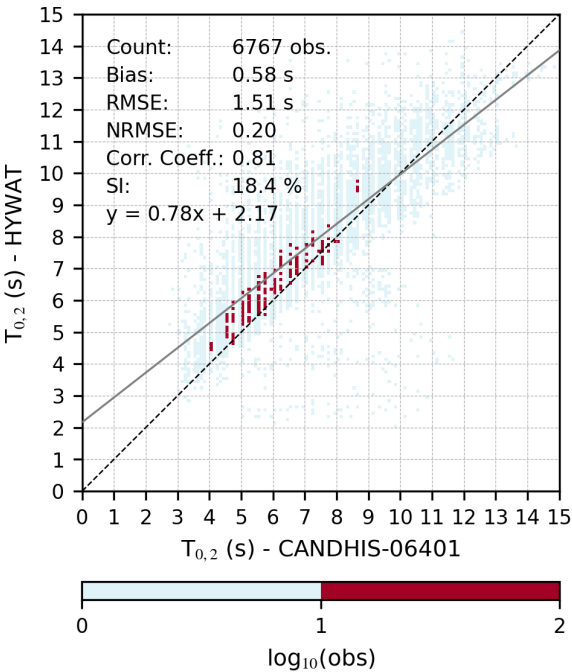


Figure 241 – Diagramme de dispersion pour $T_{0.2}$.

4.64 Bouée 06402 : Anglet

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
24-11-2009	30-12-2025	50.0 m	43.53	-1.61	Oui

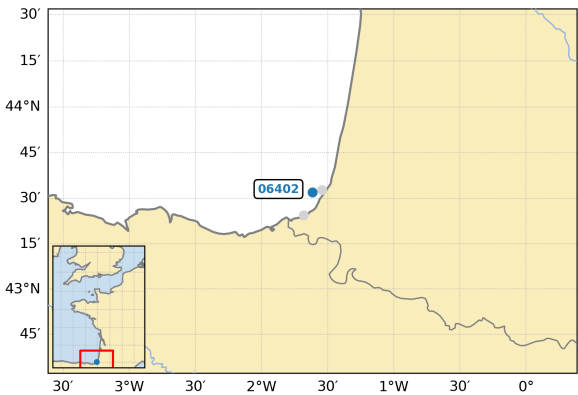
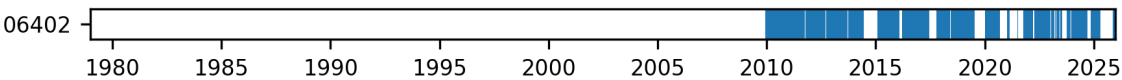


Figure 242 – Position géographique de la bouée 06402.

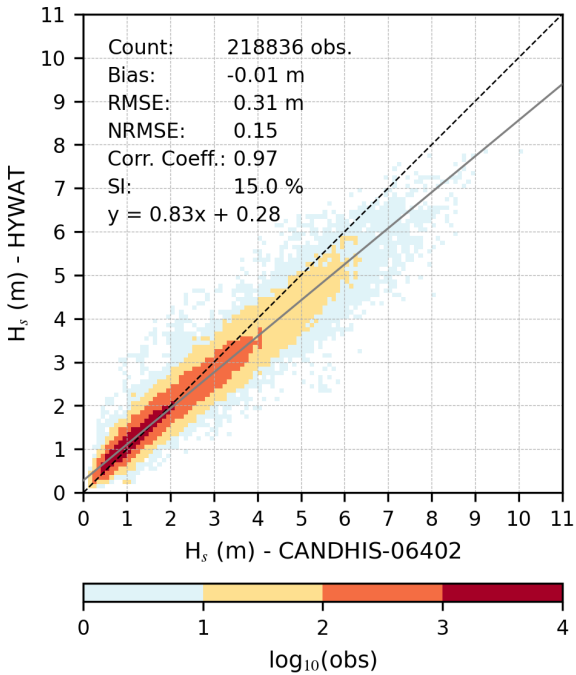


Figure 243 – Diagramme de dispersion pour H_s .

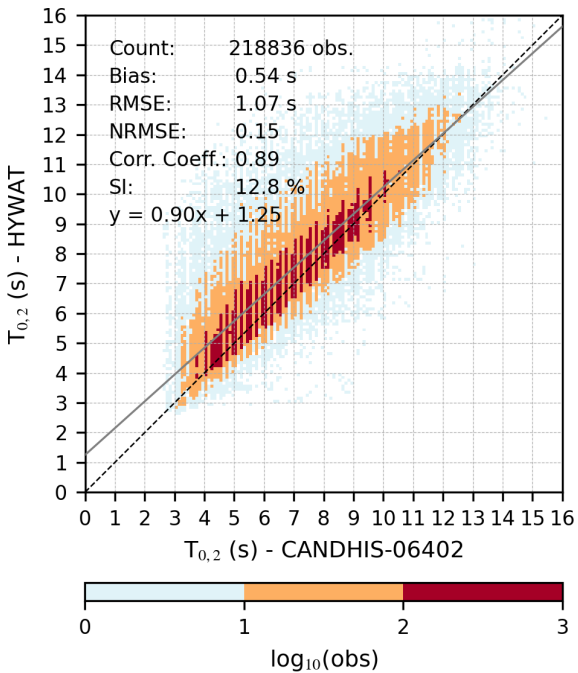


Figure 244 – Diagramme de dispersion pour $T_{0,2}$.

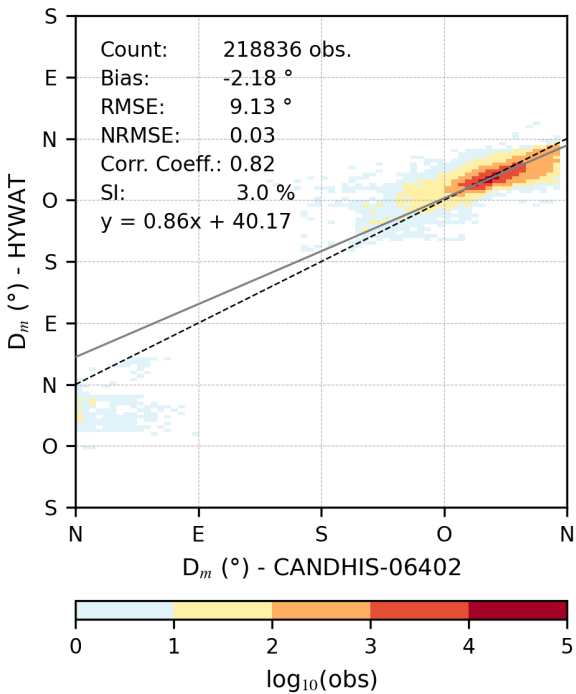


Figure 245 – Diagramme de dispersion pour D_m .

4.65 Bouée 06403 : Saint-Jean-de-Luz

Début de campagne	Fin de campagne	Profondeur	Latitude	Longitude	Directionnelle
24-04-2013	25-12-2025	20.0 m	43.41	-1.68	Oui

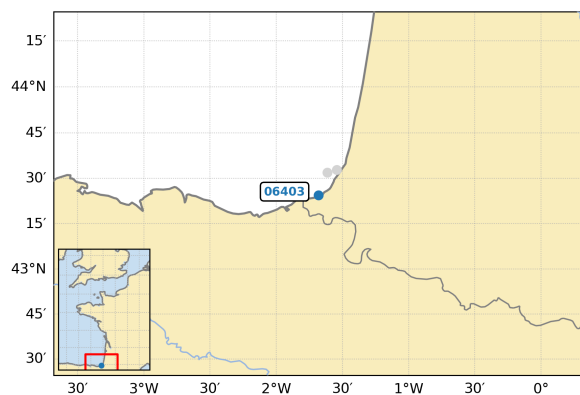
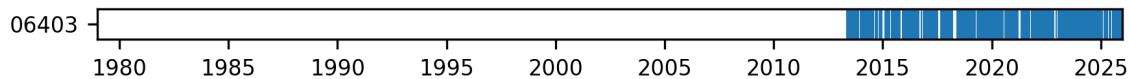


Figure 246 – Position géographique de la bouée 06403.

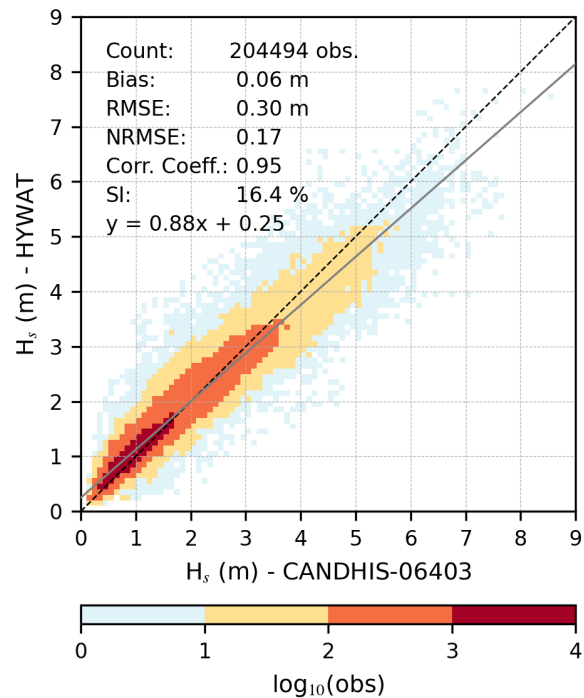


Figure 247 – Diagramme de dispersion pour H_s .

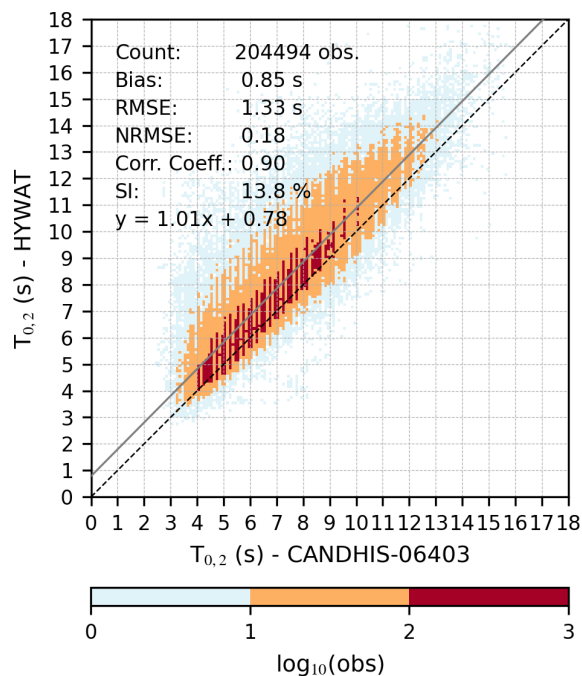


Figure 248 – Diagramme de dispersion pour $T_{0.2}$.

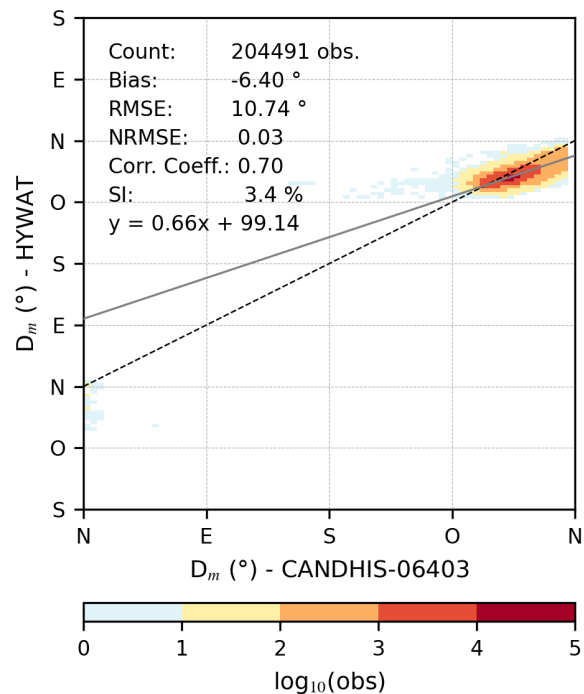


Figure 249 – Diagramme de dispersion pour D_m .