



Supplement of

Observations of strong turbulence and mixing impacting water exchange between two basins in the Baltic Sea

Julia Muchowski et al.

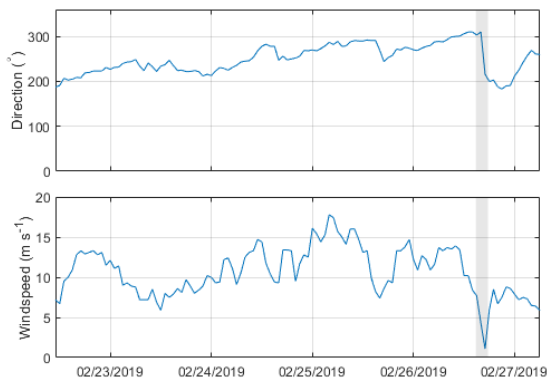
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Supplementary

- SV1: Video EL19 acoustic data collection continuously between 25 Feb. 2019, 18:30 UTC and 26 Feb. 2019, 16:00 UTC (transects T18-T37, Table ST1), collocated MSS data exist and are shown for T37 in Figures 2,4 as well as included in Figures 9,10.
- SV2: Video 1, EL20 acoustic data collection continuously between 4 March 2020, 21:30 UTC and 5 March 2020, 14:30 UTC (transects T28-T39, Table ST2), collocated MSS data exist and are included in Figures 9,10.
- SV3: Video 2, EL20 acoustic data collection continuously between 5 March 2020, 17:20 UTC and 6 March 2020, 04:30 UTC, transects only sampled with EK80 and ADCP, no collocated MSS data due to problems with MSS profiler.

SMHI wind data from station Örskär (60.5256 °N, 18.3729 °E) in the vicinity of the study region



15 **Figure S1: Measured wind direction and wind speed at SMHI station Örskär during the time of cruise EL19-IGV01. Grey shaded area marks time when transect T37 was measured, which is shown in Fig. 2 of the main manuscript.**

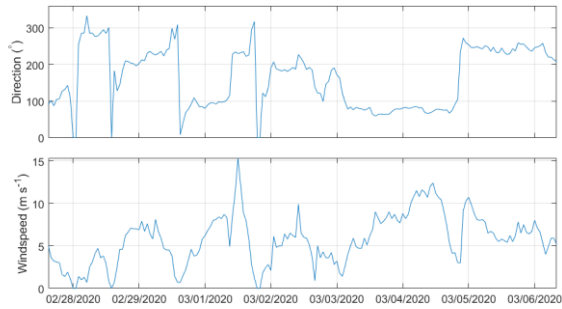


Figure S2: Measured wind direction and wind speed at SMHI station Örskär during the time of cruise EL20-IGV01.

20 ADCP mooring data collected during the times of all three movies are shown in Figures 7,8 for EL19 and EL20, respectively.

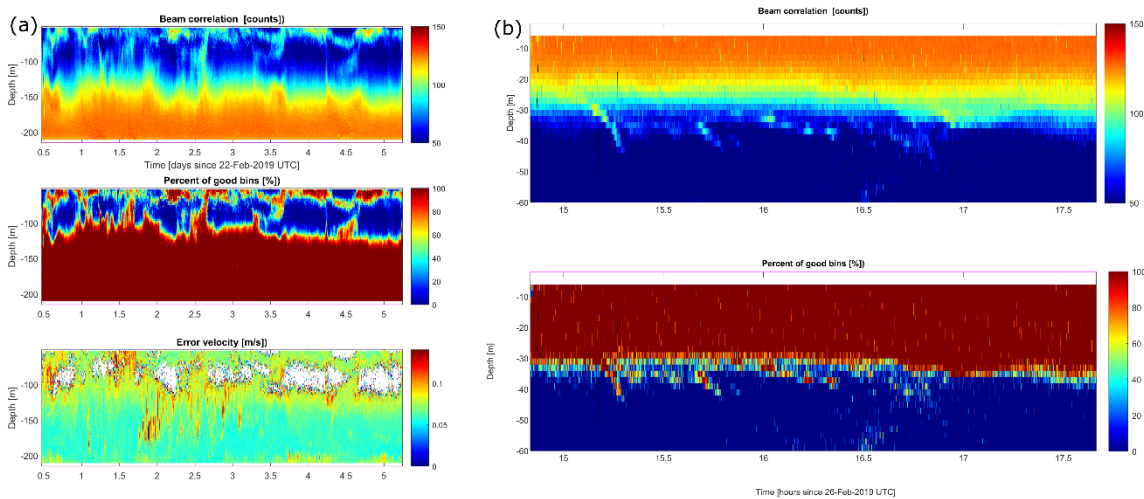


Figure S3: Validation parameters of mooring ADCP deployed during EL19 and ship ADCP during transect T37 shown in Figure 2.

Table S1: All MSS microstructure transects during EL19-IGV01.

ID	Profile	Location of transect	Start (UTC)	End (UTC)
T01	006-009	Test	21-Feb-2019 12:55:00	21-Feb-2019 13:40:00
T02	010-012	Standard	22-Feb-2019 12:33:34	22-Feb-2019 12:54:18
T03	013-015	Standard	22-Feb-2019 13:10:01	22-Feb-2019 13:30:54
T04	016-018	Standard	22-Feb-2019 13:46:57	22-Feb-2019 14:09:40
T05	019-020	NW01 to SE01	22-Feb-2019 16:07:30	22-Feb-2019 16:22:23
T06	021-024	Standard	23-Feb-2019 08:28:45	23-Feb-2019 09:00:56

T07	025-029	Standard	23-Feb-2019 09:25:52	23-Feb-2019 10:00:33
T08	030-035	Standard	23-Feb-2019 10:23:39	23-Feb-2019 11:11:31
T09	036-041	Standard	23-Feb-2019 12:56:54	23-Feb-2019 13:43:34
T10	042-048	Standard	23-Feb-2019 14:04:22	23-Feb-2019 14:51:04
T11	049	Standard	23-Feb-2019 15:09:51	23-Feb-2019 15:14:51
T12	050-057	Standard	24-Feb-2019 08:41:21	24-Feb-2019 09:38:34
T13	058-065	Standard	24-Feb-2019 10:01:54	24-Feb-2019 11:00:08
T14	066-071	Standard	24-Feb-2019 12:43:37	24-Feb-2019 13:31:14
T15	072-092	RidgeS to RidgeN	25-Feb-2019 11:14:27	25-Feb-2019 13:05:46
T16	093-103	ValleyS to ValleyN	25-Feb-2019 13:48:08	25-Feb-2019 15:17:17
T17	104-113	SE02 to NW02	25-Feb-2019 16:16:45	25-Feb-2019 17:12:58
T18	114-118	Standard	25-Feb-2019 18:38:21	25-Feb-2019 19:12:34
T19	119-122	Standard	25-Feb-2019 19:31:45	25-Feb-2019 20:00:54
T20	123-127	Standard	25-Feb-2019 20:21:55	25-Feb-2019 21:01:53
T21	128-132	Standard	25-Feb-2019 21:28:56	25-Feb-2019 22:04:28
T22	133-138	Standard	25-Feb-2019 22:24:56	25-Feb-2019 23:09:52
T23	139-143	Standard	25-Feb-2019 23:31:07	26-Feb-2019 00:09:35
T24	144-148	Standard	26-Feb-2019 00:30:28	26-Feb-2019 01:09:02
T25	149-152	Standard	26-Feb-2019 01:30:55	26-Feb-2019 02:02:23
T26	153-156	Standard	26-Feb-2019 02:22:47	26-Feb-2019 02:52:28
T27	157-160	Standard	26-Feb-2019 03:13:09	26-Feb-2019 03:45:20
T28	161-165	Standard	26-Feb-2019 04:07:01	26-Feb-2019 04:47:41
T29	166-170	Standard	26-Feb-2019 05:09:58	26-Feb-2019 05:49:42
T30	171-175	Standard	26-Feb-2019 06:11:46	26-Feb-2019 06:50:39
T31	176-181	Standard	26-Feb-2019 07:10:00	26-Feb-2019 07:52:07
T32	182-187	Standard	26-Feb-2019 08:13:35	26-Feb-2019 09:05:00
T33	188-193	Standard	26-Feb-2019 09:26:08	26-Feb-2019 10:11:14
T34	194-200	Standard	26-Feb-2019 10:32:29	26-Feb-2019 11:24:53
T35	201-205	Standard	26-Feb-2019 12:06:42	26-Feb-2019 12:48:37
T36	206-211	Standard	26-Feb-2019 13:08:10	26-Feb-2019 13:52:48
T37	212-230	Standard to FN	26-Feb-2019 14:54:21	26-Feb-2019 17:43:47

T38	231-236	SE03 to NW03	26-Feb-2019 18:46:41	26-Feb-2019 19:08:13
T39	237-242	EW01	26-Feb-2019 19:40:59	26-Feb-2019 20:07:02
T40	243-254	EW02	26-Feb-2019 20:43:11	26-Feb-2019 21:11:45
T41	255-260	EW03	26-Feb-2019 21:35:30	26-Feb-2019 21:56:06
T42	261-264	EW04	26-Feb-2019 22:20:08	26-Feb-2019 22:41:54
T43	265-269	Standard	26-Feb-2019 23:10:43	26-Feb-2019 23:51:28

Table S2: All MSS microstructure transects during EL20-IGV01.

ID	Profile		Location of transect	Date_Start_End (UTC)
T01	5,6,7,8		Standard	20200228_1405_1445
T02	9,10,11		Standard	20200228_1451_1519
T03	12,13,14		Standard	20200228_1523_1555
T04	15,16,17		Standard	20200228_1601_1629
T05	18 - 24		Standard	20200229_0821_0940

T06	25 - 29	Standard	20200229_1012_1103
T07	30 - 33	Standard	20200229_1206_1252
T08	34,35,36	Standard	20200229_1436_1520
T09	37,38	Standard	20200229_1530_1552
T10	39 - 43	Standard	20200301_1037_1132
T11	44 - 54	Standard	20200301_1244_1325
T12	55,56,57	UWR1	20200301_1440_1503
T13	58	UWR2	20200301_1513_1523
T14	59	UWR3	20200301_1525_1535
T15	60 - 64	Standard	20200302_0822_0918
T16	65,6	Standard	20200302_0942_1003
T17	67,68,69	Standard	20200302_1012_1059
T18	70,71	Standard	20200302_1109_1130
T19	72,73	Standard	20200302_1149_1206
T20	74,75	Standard	20200302_1214_1235
T21	76 - 81	SRUL1	20200302_1440_1536

T22	82 - 88	SRUL2	20200303_0903_1004
T23	89 - 101	SRUL3	20200303_1032_1151
T24	102-113	SRUL4	20200303_1225_1338
T25	114-116	SRUL5	20200303_1347_1447
T26	117-122	SRUL6	20200303_1511_1600
T27	123-125	SRUL7	20200303_1649_1710
T28	126-128	Standard	20200304_2139_2211
T29	129-136	Standard	20200304_2222_0022'
T30	137-140	Standard	20200305_0416_0457
T31	141-142	Standard	20200305_0514_0551
T32	144-150	Standard	20200305_0608_0738
T33	151,152	Reference standard	20200305_0740_0834
T34	153-156	Standard	20200305_0835_0920
T35	157-160	Standard	20200305_0941_1025
T36	161-163	Standard	20200305_1048_1122
T37	164-167	Standard	20200305_1140_1223
T38	168-170	Standard	20200305_1259_1338
T39	171,172	Standard	20200305_1403_1423

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Table S3: MSS casts near sill during EL19-IGV01. Used in Figures 9 and 10.

MSS	date	time	lon	lat	transect
22	23-Feb-19	8:38:56	18.94017	60.26873	6
23	23-Feb-19	8:48:14	18.936	60.26999	6
24	23-Feb-19	8:55:56	18.93232	60.27114	6
26	23-Feb-19	9:30:55	18.94202	60.26794	7
27	23-Feb-19	9:39:26	18.93925	60.269	7
28	23-Feb-19	9:47:15	18.9367	60.26973	7
29	23-Feb-19	9:55:33	18.93197	60.27116	7
31	23-Feb-19	10:33:53	18.94113	60.26834	8
32	23-Feb-19	10:42:51	18.93876	60.26912	8
33	23-Feb-19	10:51:29	18.93686	60.2697	8
34	23-Feb-19	10:59:10	18.93344	60.27073	8
35	23-Feb-19	11:06:31	18.93041	60.27168	8
38	23-Feb-19	13:11:52	18.94176	60.26825	9

39	23-Feb-19	13:20:53	18.93903	60.26905	9
40	23-Feb-19	13:29:14	18.93619	60.26987	9
41	23-Feb-19	13:38:34	18.93254	60.27105	9
44	23-Feb-19	14:16:21	18.94155	60.2682	10
45	23-Feb-19	14:24:43	18.93962	60.26894	10
46	23-Feb-19	14:32:58	18.93651	60.26979	10
47	23-Feb-19	14:39:38	18.93426	60.27052	10
48	23-Feb-19	14:46:04	18.93185	60.27125	10
52	24-Feb-19	8:58:28	18.94233	60.26793	12
53	24-Feb-19	9:06:26	18.93943	60.2689	12
54	24-Feb-19	9:13:29	18.93766	60.26942	12
55	24-Feb-19	9:20:35	18.93643	60.26972	12
56	24-Feb-19	9:27:00	18.93428	60.27045	12
57	24-Feb-19	9:33:34	18.93112	60.2715	12
59	24-Feb-19	10:10:49	18.94311	60.26761	13
60	24-Feb-19	10:19:47	18.94014	60.26875	13
62	24-Feb-19	10:40:18	18.93884	60.26901	13
64	24-Feb-19	10:48:23	18.93621	60.26983	13
65	24-Feb-19	10:55:08	18.93348	60.27066	13
68	24-Feb-19	13:01:00	18.94075	60.26859	14
69	24-Feb-19	13:09:09	18.93831	60.2693	14
70	24-Feb-19	13:18:16	18.93531	60.2702	14
71	24-Feb-19	13:26:14	18.93266	60.27101	14
76	25-Feb-19	11:45:12	18.93221	60.26777	15
77	25-Feb-19	11:56:10	18.93478	60.27123	15
96	25-Feb-19	14:07:59	18.92976	60.2682	16
97	25-Feb-19	14:17:47	18.93193	60.27169	16
116	25-Feb-19	18:54:27	18.94059	60.2685	18
117	25-Feb-19	19:01:37	18.93657	60.2699	18
118	25-Feb-19	19:07:34	18.93318	60.27092	18
120	25-Feb-19	19:41:05	18.94306	60.26784	19
121	25-Feb-19	19:49:16	18.93768	60.26954	19
122	25-Feb-19	19:55:54	18.93378	60.27086	19
125	25-Feb-19	20:39:34	18.93736	60.26971	20
126	25-Feb-19	20:46:42	18.93277	60.27109	20
129	25-Feb-19	21:37:13	18.94333	60.26762	21
130	25-Feb-19	21:44:53	18.93847	60.26923	21

135	25-Feb-19	22:42:05	18.94086	60.26844	22
136	25-Feb-19	22:49:29	18.93785	60.26918	22
137	25-Feb-19	22:56:12	18.93447	60.27026	22
138	25-Feb-19	23:04:52	18.93007	60.27228	22
141	25-Feb-19	23:49:16	18.94022	60.26884	23
142	25-Feb-19	23:57:14	18.93554	60.27004	23
146	26-Feb-19	0:47:57	18.94105	60.26824	24
148	26-Feb-19	1:04:02	18.93106	60.27148	24
150	26-Feb-19	1:39:54	18.94244	60.26789	25
151	26-Feb-19	1:50:52	18.93624	60.2701	25
155	26-Feb-19	2:40:59	18.93513	60.27006	26
156	26-Feb-19	2:47:28	18.93088	60.27173	26
158	26-Feb-19	3:22:48	18.94325	60.26771	27
159	26-Feb-19	3:32:26	18.93609	60.27003	27
160	26-Feb-19	3:40:20	18.93085	60.27176	27
163	26-Feb-19	4:22:55	18.93916	60.26895	28
164	26-Feb-19	4:31:09	18.93398	60.27076	28
167	26-Feb-19	5:18:16	18.94351	60.26757	29
168	26-Feb-19	5:26:47	18.93731	60.26964	29
169	26-Feb-19	5:33:35	18.93202	60.27112	29
173	26-Feb-19	6:29:38	18.93785	60.26953	30
174	26-Feb-19	6:36:43	18.9327	60.27071	30
178	26-Feb-19	7:27:09	18.93906	60.269	31
180	26-Feb-19	7:38:00	18.93199	60.27116	31
184	26-Feb-19	8:32:25	18.94206	60.26796	32
185	26-Feb-19	8:41:15	18.93787	60.26954	32
186	26-Feb-19	8:49:08	18.93293	60.27042	32
187	26-Feb-19	9:00:00	18.93	60.27247	32
190	26-Feb-19	9:42:03	18.94212	60.26816	33
191	26-Feb-19	9:50:16	18.93644	60.26993	33
192	26-Feb-19	9:56:48	18.9323	60.27074	33
193	26-Feb-19	10:06:14	18.92977	60.27281	33
196	26-Feb-19	10:48:54	18.942	60.26806	34
197	26-Feb-19	10:56:27	18.93906	60.26903	34
198	26-Feb-19	11:03:21	18.93573	60.27012	34
199	26-Feb-19	11:09:30	18.93224	60.27107	34
200	26-Feb-19	11:19:53	18.92998	60.27312	34

203	26-Feb-19	12:26:52	18.93751	60.26972	35
204	26-Feb-19	12:34:06	18.93168	60.27122	35
208	26-Feb-19	13:24:47	18.94056	60.26855	36
209	26-Feb-19	13:32:17	18.936	60.26999	36
210	26-Feb-19	13:38:44	18.93265	60.27086	36
211	26-Feb-19	13:47:48	18.92925	60.2722	36
213	26-Feb-19	15:03:59	18.94261	60.26789	37
214	26-Feb-19	15:12:38	18.93592	60.26999	37
215	26-Feb-19	15:19:22	18.93139	60.27135	37
266	26-Feb-19	23:20:22	18.94164	60.26817	43
268	26-Feb-19	23:35:33	18.93098	60.27127	43

Table S4: MSS casts near sill during EL20-IGV01. Used in Figures 9 and 10.

MSS	date	time	lon	lat	transect
8	28-Feb-20	14:40:31	18.93839	60.26909	1
9	28-Feb-20	14:56:46	18.92882	60.27219	2
10	28-Feb-20	15:07:03	18.93641	60.2697	2
11	28-Feb-20	15:14:39	18.94185	60.2679	2
14	28-Feb-20	15:50:33	18.93887	60.26907	3
15	28-Feb-20	16:06:24	18.92865	60.2722	4
16	28-Feb-20	16:17:09	18.93729	60.26961	4
22	29-Feb-20	9:15:24	18.93896	60.26892	5
23	29-Feb-20	9:25:02	18.93319	60.27073	5
24	29-Feb-20	9:35:54	18.92985	60.27354	5
26	29-Feb-20	10:28:20	18.9429	60.26759	6
27	29-Feb-20	10:38:22	18.93697	60.26943	6
28	29-Feb-20	10:46:53	18.93212	60.2709	6
30	29-Feb-20	12:11:58	18.93003	60.27174	7
41	1-Mar-20	11:07:11	18.9429	60.26788	10
42	1-Mar-20	11:19:09	18.93701	60.26969	10
43	1-Mar-20	11:27:58	18.93248	60.27104	10
49	1-Mar-20	13:04:48	18.94325	60.2673	11
50	1-Mar-20	13:07:48	18.94152	60.26819	11
51	1-Mar-20	13:10:43	18.93977	60.26865	11
52	1-Mar-20	13:13:42	18.93793	60.26929	11
53	1-Mar-20	13:16:47	18.93589	60.26996	11

54	1-Mar-20	13:20:24	18.93345	60.2708	11
62	2-Mar-20	8:51:41	18.94133	60.26816	15
63	2-Mar-20	9:03:35	18.93456	60.27031	15
64	2-Mar-20	9:13:41	18.92901	60.27227	15
65	2-Mar-20	9:47:13	18.93592	60.26971	16
68	2-Mar-20	10:43:10	18.93337	60.27083	17
69	2-Mar-20	10:54:45	18.92883	60.27283	17
70	2-Mar-20	11:14:26	18.93136	60.27187	18
71	2-Mar-20	11:25:59	18.93977	60.26884	18
72	2-Mar-20	11:54:01	18.93656	60.26978	19
73	2-Mar-20	12:01:23	18.93204	60.27109	19
74	2-Mar-20	12:19:07	18.93039	60.27208	20
75	2-Mar-20	12:30:01	18.93715	60.26956	20
126	4-Mar-20	21:44:36	18.94218	60.26765	28
127	4-Mar-20	21:55:11	18.93765	60.26894	28
128	4-Mar-20	22:06:17	18.93259	60.27094	28
129	4-Mar-20	22:27:19	18.93149	60.27159	29
130	4-Mar-20	22:34:12	18.93654	60.26974	29
131	4-Mar-20	22:42:34	18.94151	60.26819	29
132	4-Mar-20	23:06:41	18.93789	60.26936	40
133	4-Mar-20	23:16:01	18.93326	60.27043	40
135	5-Mar-20	0:06:54	18.93649	60.26961	42
136	5-Mar-20	0:17:28	18.93043	60.27158	43
139	5-Mar-20	4:43:12	18.9391	60.26894	30
140	5-Mar-20	4:52:11	18.9349	60.2703	30
142	5-Mar-20	5:33:24	18.94198	60.26798	31
145	5-Mar-20	6:25:47	18.94303	60.26763	32
146	5-Mar-20	6:35:26	18.93723	60.26945	32
147	5-Mar-20	6:43:01	18.93281	60.27085	32
149	5-Mar-20	7:20:18	18.9411	60.26832	44
150	5-Mar-20	7:33:09	18.93255	60.27095	44
155	5-Mar-20	9:05:06	18.93841	60.26923	34
156	5-Mar-20	9:15:56	18.93202	60.27126	34
159	5-Mar-20	10:11:54	18.93568	60.27	35
160	5-Mar-20	10:20:00	18.93033	60.27169	35
162	5-Mar-20	11:05:15	18.94082	60.26839	36
163	5-Mar-20	11:17:24	18.93281	60.27087	36

166	5-Mar-20	12:08:06	18.93815	60.26917	37
167	5-Mar-20	12:18:57	18.93203	60.27112	37
169	5-Mar-20	13:18:03	18.94338	60.26769	38
170	5-Mar-20	13:33:28	18.93241	60.271	38

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