Supplementary Information to:

The oxygen deficiency index blueprint allows an economic and quick scan via baseline assessment for forecasting the risk of seasonal oxygen deficiency in the North and Baltic Seas

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The following equations were tested with different weighing and consider the effects of stratification and NPP. Higher weights set more focus on the subindex, with the aim to impose higher impacts on the environment to developing ODZs. Each of the index was thoroughly tested with the same methods as the ODI33rev shown in the main manuscript. Additional information not included in the main manuscript can be found in the Tables and Figures below. We include a selection of sensor 2 data comparisons at each station, which has experienced the same procedures as sensor 1 measurements. Sensor 2 was not taken into consideration, since no sufficient data were available for analysis at each station (Marnet, 2018-2023).

Supplementary equations:

$$ODIhalf(x,y,t_0) = \sum\left(\frac{1}{2}I_{depth}(x,y,t_0), \frac{1}{2}I_{NPP}(x,y,t_0)\right) * I_{strat}(x,y,t_0), \quad \text{(equ s1)}$$

$$ODI25(x,y,t_0) = \sum\left(\frac{1}{4}I_{depth}(x,y,t_0), \frac{3}{4}I_{NPP}(x,y,t_0)\right) * I_{strat}(x,y,t_0), \quad \text{(equ s2)}$$

$$ODI33(x,y,t_0) = \sum\left(\frac{2}{3}I_{depth}(x,y,t_0), \frac{1}{3}I_{NPP}(x,y,t_0)\right) * I_{strat}(x,y,t_0), \quad \text{(equ s3)}$$

We also tested a seasonal version of the I_{NPP}, where we t_{seas} $lasts\ from\ 1st\ April\ to\ 30\ th\ September$ (184 days). Here we extracted the minimum (min) and maximum (max) values each year of every t_{seas}. The mean of the NPP is given by our $\overline{NPP}$ of our reference period of 30 days, simply because $I_{NPP}(t_{seas})$ would be always the same within the arch of the running simulation year, if we would use $\overline{NPP}\ (t_{seas})$.

$$I_{NPP}(t_{seas}) = \max\left(0, \min\left(1, \frac{\overline{NPP} - NPP_{min}}{NPP_{max} - NPP_{min}}\right)\right) \quad \text{(equ s4)}$$

And we also tested for a generic version of the I_{NPP}, with fixed min and max values (min(INPP) = 25 , max(INPP)=135) The mean of the NPP is given by our $\overline{NPP}$ of our reference period of 30 days, simply because $I_{NPP}(t_{fix})$ would be always the same within the arch of the running simulation year(s), if we would use $\overline{NPP}\ (t_{fix})$.

$$I_{NPP}(t_{fix}) = \max\left(0, \min\left(1, \frac{\overline{NPP} - NPP_{fmin}}{NPP_{fmax} - NPP_{fmin}}\right)\right) \quad \text{(equ s5)}$$

Supplementary tables and figures

Supplement Table 1: Monitoring Platforms/Stations in the North and Baltic Seas and both sensor depths, (Marnet, 2018-2023).

Station	Latitude	Longitude	Platform Name	Region	Depth s1 (sensor 1)	Depth s2 (sensor 2)
MePDS	12.7°E	54.7°N	Measuring Pile Darss Sill	Baltic Sea	19 m	19 m
ArkBB	13.867°E	54.883°N	Arkona Basin Buoy	Baltic Sea	40 m	40 m
FehBB	11.15°E	54.6°N	Fehmarn Belt Buoy	Baltic Sea	24 m	24 m
KielLH	10.267°E	54.5°N	Kiel Lighthouse	Baltic Sea	13 m	na
FinoPF1	6.583°E	54°N	FINO1 Platform	North Sea	25 m	na
FinoPF3	7.158°E	55.195°N	FINO3 Platform	North Sea	18 m	na
NSBII	6.333°E	55°N	North Sea Buoy II	North Sea	35 m	35 m
NSBIII	6.783°E	54.683°N	North Sea Buoy III	North Sea	35 m	35 m
TWEms	6.35°E	54.167°N	Unmanned Lightship TW Ems	North Sea	30 m	30 m
GB	7.45°E	54.1667°N	Unmanned Lightship German Bight	North Sea	30 m	30 m

Supplement Table 2: Sensor 1 – Correlation coefficients ODI vs Observations, at each station, and all lags, (Marnet, 2018-2023).

Station (sensor 1)	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
MePDS	ODI33rev	-0.32	-0.31	-0.30	-0.32	-0.36	-0.47	-0.50	**-0.51**	-0.44	-0.32	-0.12
ArkBB	ODI33rev	0.16	0.09	0.03	-0.02	-0.06	-0.06	-0.09	-0.18	**-0.28**	**-0.29**	-0.20
FehBB	ODI33rev	-0.35	-0.36	-0.37	-0.38	-0.43	-0.48	**-0.54**	-0.53	-0.50	-0.43	-0.32
KielLH	ODI33rev	-0.39	-0.45	-0.51	-0.55	-0.62	-0.66	**-0.70**	-0.69	-0.57	-0.40	-0.23
FinoPF1	ODI33rev	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	**-0.23**	-0.13	0.01
FinoPF3	ODI33rev	-0.32	-0.30	-0.28	-0.25	-0.33	**-0.40**	-0.35	-0.24	-0.05	0.13	0.20
NSBII	ODI33rev	-0.64	-0.66	-0.70	-0.71	-0.73	**-0.72**	-0.61	-0.49	-0.35	-0.17	0.03
NSBIII	ODI33rev	-0.47	-0.50	-0.52	-0.52	**-0.58**	-0.57	**-0.58**	-0.53	-0.38	-0.23	-0.08
TWEms	ODI33rev	-0.35	-0.39	-0.38	-0.35	-0.33	-0.39	**-0.41**	-0.39	-0.35	-0.14	0.01
GB	ODI33rev	-0.48	-0.49	-0.49	-0.50	**-0.53**	-0.51	-0.48	-0.38	-0.17	0.06	0.18

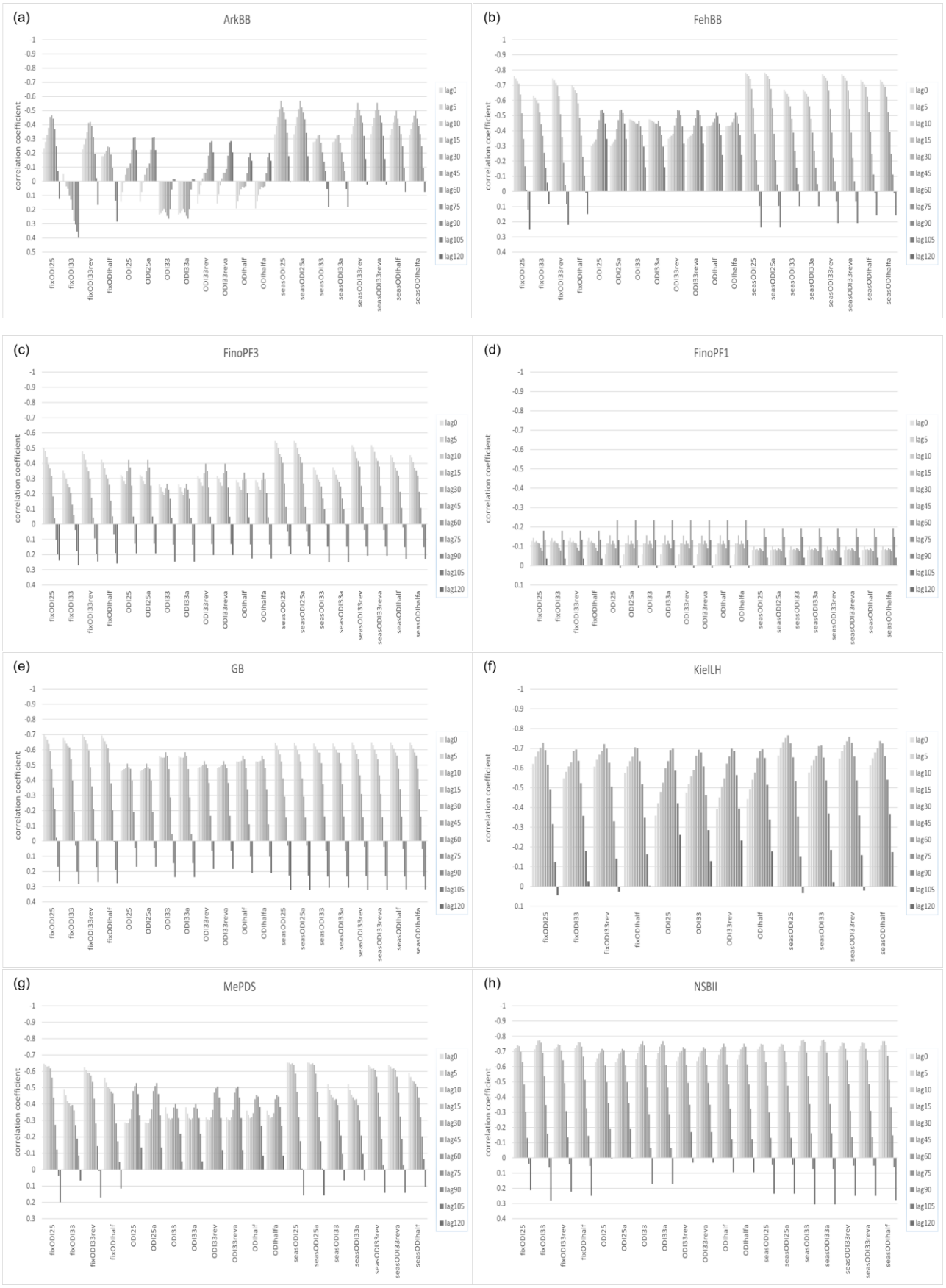
Supplement Table 3: Sensor 1 – Correlation coefficients ODI vs Observations, at each station, and all lags, (Marnet, 2018-2023).

Station (sensor 1)	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
ArkBB	fixODI25	-0.24	-0.28	-0.33	-0.38	-0.46	-0.47	-0.44	-0.37	-0.25	-0.07	0.13
FehBB	fixODI25	-0.76	-0.75	-0.73	-0.71	-0.64	-0.52	-0.35	-0.17	-0.01	0.12	0.25
FinoPF1	fixODI25	-0.13	-0.14	-0.12	-0.13	-0.12	-0.12	-0.09	-0.08	-0.18	-0.13	-0.04
FinoPF3	fixODI25	-0.50	-0.48	-0.44	-0.40	-0.37	-0.32	-0.18	-0.04	0.10	0.20	0.24
GB	fixODI25	-0.70	-0.69	-0.67	-0.64	-0.59	-0.47	-0.35	-0.21	-0.02	0.17	0.27
KielLH	fixODI25	-0.62	-0.66	-0.68	-0.70	-0.73	-0.69	-0.62	-0.49	-0.32	-0.12	0.05
MePDS	fixODI25	-0.65	-0.64	-0.63	-0.63	-0.62	-0.56	-0.44	-0.27	-0.12	0.04	0.20
NSBII	fixODI25	-0.72	-0.72	-0.74	-0.73	-0.70	-0.63	-0.48	-0.30	-0.13	0.04	0.21
NSBIII	fixODI25	-0.54	-0.55	-0.55	-0.55	-0.60	-0.54	-0.49	-0.40	-0.23	-0.06	0.05
TWEms	fixODI25	-0.60	-0.59	-0.55	-0.51	-0.39	-0.35	-0.31	-0.19	-0.15	-0.08	-0.01
ArkBB	fixODI33	-0.05	0.00	0.04	0.05	0.10	0.13	0.20	0.28	0.31	0.35	0.40
FehBB	fixODI33	-0.63	-0.62	-0.60	-0.58	-0.52	-0.44	-0.37	-0.26	-0.16	-0.06	0.08
FinoPF1	fixODI33	-0.13	-0.14	-0.12	-0.13	-0.12	-0.12	-0.09	-0.08	-0.18	-0.13	-0.04
FinoPF3	fixODI33	-0.36	-0.33	-0.30	-0.26	-0.24	-0.21	-0.13	-0.06	0.04	0.18	0.27
GB	fixODI33	-0.68	-0.66	-0.64	-0.62	-0.62	-0.54	-0.40	-0.19	0.03	0.20	0.28
KielLH	fixODI33	-0.55	-0.58	-0.61	-0.63	-0.69	-0.70	-0.64	-0.52	-0.36	-0.18	-0.02
MePDS	fixODI33	-0.49	-0.45	-0.42	-0.41	-0.39	-0.39	-0.36	-0.27	-0.19	-0.09	0.07
NSBII	fixODI33	-0.72	-0.74	-0.77	-0.77	-0.76	-0.69	-0.54	-0.35	-0.16	0.06	0.28
NSBIII	fixODI33	-0.59	-0.60	-0.59	-0.58	-0.64	-0.60	-0.55	-0.45	-0.28	-0.07	0.08
TWEms	fixODI33	-0.61	-0.59	-0.54	-0.49	-0.37	-0.32	-0.29	-0.21	-0.16	-0.04	0.02
ArkBB	fixODI33rev	-0.23	-0.26	-0.30	-0.35	-0.41	-0.42	-0.39	-0.31	-0.19	-0.02	0.17
FehBB	fixODI33rev	-0.75	-0.73	-0.72	-0.70	-0.63	-0.51	-0.36	-0.19	-0.04	0.08	0.22
FinoPF1	fixODI33rev	-0.13	-0.14	-0.12	-0.13	-0.12	-0.12	-0.09	-0.08	-0.18	-0.13	-0.04
FinoPF3	fixODI33rev	-0.48	-0.46	-0.42	-0.38	-0.35	-0.30	-0.17	-0.04	0.09	0.20	0.25
GB	fixODI33rev	-0.70	-0.69	-0.66	-0.64	-0.60	-0.49	-0.36	-0.21	-0.01	0.18	0.27
KielLH	fixODI33rev	-0.61	-0.64	-0.67	-0.69	-0.72	-0.70	-0.63	-0.51	-0.33	-0.14	0.03
MePDS	fixODI33rev	-0.62	-0.61	-0.59	-0.59	-0.58	-0.54	-0.43	-0.28	-0.14	0.01	0.17
NSBII	fixODI33rev	-0.72	-0.73	-0.75	-0.74	-0.71	-0.64	-0.49	-0.31	-0.14	0.04	0.22
NSBIII	fixODI33rev	-0.55	-0.56	-0.55	-0.55	-0.61	-0.55	-0.50	-0.41	-0.24	-0.06	0.06
TWEms	fixODI33rev	-0.60	-0.59	-0.55	-0.51	-0.39	-0.35	-0.31	-0.19	-0.15	-0.07	-0.00
ArkBB	fixODIhalf	-0.18	-0.18	-0.19	-0.22	-0.25	-0.24	-0.19	-0.10	-0.00	0.14	0.28
FehBB	fixODIhalf	-0.70	-0.69	-0.67	-0.65	-0.58	-0.49	-0.37	-0.23	-0.10	0.01	0.15
FinoPF1	fixODIhalf	-0.13	-0.14	-0.12	-0.13	-0.12	-0.12	-0.09	-0.08	-0.18	-0.13	-0.04
FinoPF3	fixODIhalf	-0.42	-0.40	-0.37	-0.33	-0.30	-0.26	-0.15	-0.05	0.07	0.19	0.26
GB	fixODIhalf	-0.70	-0.68	-0.66	-0.64	-0.61	-0.51	-0.38	-0.20	0.01	0.19	0.28
KielLH	fixODIhalf	-0.58	-0.61	-0.64	-0.66	-0.71	-0.70	-0.64	-0.52	-0.35	-0.16	-0.00
MePDS	fixODIhalf	-0.56	-0.53	-0.50	-0.50	-0.48	-0.47	-0.40	-0.28	-0.17	-0.05	0.12
NSBII	fixODIhalf	-0.72	-0.74	-0.76	-0.76	-0.73	-0.67	-0.51	-0.33	-0.15	0.05	0.25
NSBIII	fixODIhalf	-0.57	-0.58	-0.57	-0.57	-0.63	-0.58	-0.52	-0.43	-0.25	-0.06	0.07
TWEms	fixODIhalf	-0.61	-0.59	-0.55	-0.50	-0.38	-0.34	-0.31	-0.20	-0.15	-0.06	0.01
ArkBB	ODI25	0.15	0.08	0.01	-0.05	-0.09	-0.10	-0.13	-0.22	-0.31	-0.31	-0.22
FehBB	ODI25	-0.30	-0.31	-0.33	-0.34	-0.41	-0.47	-0.53	-0.54	-0.52	-0.45	-0.35
FinoPF1	ODI25	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI25	-0.32	-0.31	-0.29	-0.26	-0.35	-0.42	-0.37	-0.25	-0.05	0.13	0.19
GB	ODI25	-0.46	-0.47	-0.47	-0.48	-0.51	-0.49	-0.48	-0.40	-0.19	0.04	0.17
KielLH	ODI25	-0.36	-0.42	-0.48	-0.53	-0.60	-0.64	-0.69	-0.70	-0.59	-0.42	-0.26

MePDS	ODI25	-0.29	-0.28	-0.29	-0.31	-0.37	-0.48	-0.51	-0.53	-0.46	-0.33	-0.14
NSBII	ODI25	-0.63	-0.66	-0.68	-0.70	-0.72	-0.71	-0.61	-0.50	-0.36	-0.19	0.00
NSBIII	ODI25	-0.45	-0.49	-0.50	-0.51	-0.57	-0.55	-0.57	-0.52	-0.37	-0.24	-0.10
TWEms	ODI25	-0.33	-0.38	-0.37	-0.34	-0.33	-0.39	-0.42	-0.35	-0.35	-0.15	0.01
ArkBB	ODI25a	0.15	0.08	0.01	-0.05	-0.09	-0.10	-0.13	-0.22	-0.31	-0.31	-0.22
FehBB	ODI25a	-0.30	-0.31	-0.33	-0.34	-0.41	-0.47	-0.53	-0.54	-0.52	-0.45	-0.35
FinoPF1	ODI25a	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI25a	-0.32	-0.31	-0.29	-0.26	-0.35	-0.42	-0.37	-0.25	-0.05	0.13	0.19
GB	ODI25a	-0.46	-0.47	-0.47	-0.48	-0.51	-0.49	-0.48	-0.40	-0.19	0.04	0.17
MePDS	ODI25a	-0.29	-0.28	-0.29	-0.31	-0.37	-0.48	-0.51	-0.53	-0.46	-0.33	-0.14
NSBII	ODI25a	-0.63	-0.66	-0.68	-0.70	-0.72	-0.71	-0.61	-0.50	-0.36	-0.19	0.00
NSBIII	ODI25a	-0.45	-0.49	-0.50	-0.51	-0.57	-0.55	-0.57	-0.52	-0.37	-0.24	-0.10
TWEms	ODI25a	-0.33	-0.38	-0.37	-0.34	-0.33	-0.39	-0.42	-0.35	-0.35	-0.15	0.01
ArkBB	ODI33	0.23	0.23	0.21	0.19	0.22	0.24	0.26	0.19	0.06	-0.02	-0.02
FehBB	ODI33	-0.48	-0.47	-0.47	-0.46	-0.45	-0.45	-0.47	-0.43	-0.37	-0.30	-0.16
FinoPF1	ODI33	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI33	-0.26	-0.24	-0.21	-0.19	-0.24	-0.27	-0.23	-0.17	-0.04	0.13	0.25
GB	ODI33	-0.56	-0.55	-0.55	-0.55	-0.58	-0.56	-0.47	-0.29	-0.05	0.15	0.24
KielLH	ODI33	-0.48	-0.52	-0.56	-0.59	-0.66	-0.69	-0.68	-0.61	-0.46	-0.29	-0.13
MePDS	ODI33	-0.38	-0.34	-0.31	-0.31	-0.31	-0.38	-0.40	-0.37	-0.32	-0.22	-0.05
NSBII	ODI33	-0.65	-0.69	-0.73	-0.75	-0.77	-0.74	-0.61	-0.46	-0.29	-0.06	0.17
NSBIII	ODI33	-0.56	-0.58	-0.58	-0.57	-0.63	-0.61	-0.60	-0.53	-0.37	-0.17	-0.00
TWEms	ODI33	-0.44	-0.46	-0.42	-0.36	-0.32	-0.34	-0.36	-0.34	-0.33	-0.10	0.03
ArkBB	ODI33a	0.23	0.23	0.21	0.19	0.22	0.24	0.26	0.19	0.06	-0.02	-0.02
FehBB	ODI33a	-0.48	-0.47	-0.47	-0.46	-0.45	-0.45	-0.47	-0.43	-0.37	-0.30	-0.16
FinoPF1	ODI33a	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI33a	-0.26	-0.24	-0.21	-0.19	-0.24	-0.27	-0.23	-0.17	-0.04	0.13	0.25
GB	ODI33a	-0.56	-0.55	-0.55	-0.55	-0.58	-0.56	-0.47	-0.29	-0.05	0.15	0.24
MePDS	ODI33a	-0.38	-0.34	-0.31	-0.31	-0.31	-0.38	-0.40	-0.37	-0.32	-0.22	-0.05
NSBII	ODI33a	-0.65	-0.69	-0.73	-0.75	-0.77	-0.74	-0.61	-0.46	-0.29	-0.06	0.17
NSBIII	ODI33a	-0.56	-0.58	-0.58	-0.57	-0.63	-0.61	-0.60	-0.53	-0.37	-0.17	-0.00
TWEms	ODI33a	-0.44	-0.46	-0.42	-0.36	-0.32	-0.34	-0.36	-0.34	-0.33	-0.10	0.03
ArkBB	ODI33rev	0.16	0.09	0.03	-0.02	-0.06	-0.06	-0.09	-0.18	-0.28	-0.29	-0.20
FehBB	ODI33rev	-0.35	-0.36	-0.37	-0.38	-0.43	-0.48	-0.54	-0.53	-0.50	-0.43	-0.32
FinoPF1	ODI33rev	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI33rev	-0.32	-0.30	-0.28	-0.25	-0.33	-0.40	-0.35	-0.24	-0.05	0.13	0.20
GB	ODI33rev	-0.48	-0.49	-0.49	-0.50	-0.53	-0.51	-0.48	-0.38	-0.17	0.06	0.18
KielLH	ODI33rev	-0.39	-0.45	-0.51	-0.55	-0.62	-0.66	-0.70	-0.69	-0.57	-0.40	-0.23
MePDS	ODI33rev	-0.32	-0.31	-0.30	-0.32	-0.36	-0.47	-0.50	-0.51	-0.44	-0.32	-0.12
NSBII	ODI33rev	-0.64	-0.66	-0.70	-0.71	-0.73	-0.72	-0.61	-0.49	-0.35	-0.17	0.03
NSBIII	ODI33rev	-0.47	-0.50	-0.52	-0.52	-0.58	-0.57	-0.58	-0.53	-0.38	-0.23	-0.08
TWEms	ODI33rev	-0.35	-0.39	-0.38	-0.35	-0.33	-0.39	-0.41	-0.39	-0.35	-0.14	0.01
ArkBB	ODI33reva	0.16	0.09	0.03	-0.02	-0.06	-0.06	-0.09	-0.18	-0.28	-0.29	-0.20
FehBB	ODI33reva	-0.35	-0.36	-0.37	-0.38	-0.43	-0.48	-0.54	-0.53	-0.50	-0.43	-0.32
FinoPF1	ODI33reva	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODI33reva	-0.32	-0.30	-0.28	-0.25	-0.33	-0.40	-0.35	-0.24	-0.05	0.13	0.20
GB	ODI33reva	-0.48	-0.49	-0.49	-0.50	-0.53	-0.51	-0.48	-0.38	-0.17	0.06	0.18
MePDS	ODI33reva	-0.32	-0.31	-0.30	-0.32	-0.36	-0.47	-0.50	-0.51	-0.44	-0.32	-0.12
NSBII	ODI33reva	-0.64	-0.66	-0.70	-0.71	-0.73	-0.72	-0.61	-0.49	-0.35	-0.17	0.03

NSBIII	ODI33reva	-0.47	-0.50	-0.52	-0.52	-0.58	-0.57	-0.58	-0.53	-0.38	-0.23	-0.08
TWEms	ODI33reva	-0.35	-0.39	-0.38	-0.35	-0.33	-0.39	-0.41	-0.39	-0.35	-0.14	0.01
ArkBB	ODIhalf	0.19	0.14	0.09	0.06	0.04	0.05	0.04	-0.06	-0.17	-0.20	-0.15
FehBB	ODIhalf	-0.43	-0.43	-0.43	-0.44	-0.46	-0.48	-0.52	-0.50	-0.45	-0.37	-0.24
FinoPF1	ODIhalf	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODIhalf	-0.29	-0.28	-0.25	-0.23	-0.29	-0.34	-0.30	-0.21	-0.05	0.13	0.23
GB	ODIhalf	-0.52	-0.52	-0.52	-0.53	-0.56	-0.54	-0.48	-0.34	-0.11	0.10	0.21
KielLH	ODIhalf	-0.44	-0.49	-0.54	-0.58	-0.65	-0.69	-0.70	-0.65	-0.52	-0.34	-0.18
MePDS	ODIhalf	-0.36	-0.33	-0.32	-0.32	-0.35	-0.43	-0.46	-0.45	-0.38	-0.27	-0.08
NSBII	ODIhalf	-0.65	-0.68	-0.72	-0.73	-0.75	-0.73	-0.62	-0.48	-0.32	-0.12	0.09
NSBIII	ODIhalf	-0.52	-0.54	-0.55	-0.55	-0.61	-0.59	-0.59	-0.53	-0.38	-0.21	-0.05
TWEms	ODIhalf	-0.39	-0.42	-0.40	-0.36	-0.33	-0.37	-0.39	-0.35	-0.34	-0.13	0.02
ArkBB	ODIhalfa	0.19	0.14	0.09	0.06	0.04	0.05	0.04	-0.06	-0.17	-0.20	-0.15
FehBB	ODIhalfa	-0.43	-0.43	-0.43	-0.44	-0.46	-0.48	-0.52	-0.50	-0.45	-0.37	-0.24
FinoPF1	ODIhalfa	-0.06	-0.12	-0.12	-0.16	-0.11	-0.13	-0.11	-0.09	-0.23	-0.13	0.01
FinoPF3	ODIhalfa	-0.29	-0.28	-0.25	-0.23	-0.29	-0.34	-0.30	-0.21	-0.05	0.13	0.23
GB	ODIhalfa	-0.52	-0.52	-0.52	-0.53	-0.56	-0.54	-0.48	-0.34	-0.11	0.10	0.21
MePDS	ODIhalfa	-0.36	-0.33	-0.32	-0.32	-0.35	-0.43	-0.46	-0.45	-0.38	-0.27	-0.08
NSBII	ODIhalfa	-0.65	-0.68	-0.72	-0.73	-0.75	-0.73	-0.62	-0.48	-0.32	-0.12	0.09
NSBIII	ODIhalfa	-0.52	-0.54	-0.55	-0.55	-0.61	-0.59	-0.59	-0.53	-0.38	-0.21	-0.05
TWEms	ODIhalfa	-0.39	-0.42	-0.40	-0.36	-0.33	-0.37	-0.39	-0.35	-0.34	-0.13	0.02
ArkBB	seasODI25	-0.33	-0.39	-0.46	-0.51	-0.57	-0.52	-0.49	-0.44	-0.34	-0.18	0.01
FehBB	seasODI25	-0.78	-0.77	-0.76	-0.74	-0.68	-0.55	-0.38	-0.21	-0.05	0.10	0.24
FinoPF1	seasODI25	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI25	-0.55	-0.54	-0.50	-0.46	-0.44	-0.40	-0.27	-0.12	0.05	0.15	0.20
GB	seasODI25	-0.65	-0.63	-0.60	-0.57	-0.52	-0.41	-0.29	-0.15	0.03	0.23	0.32
KielLH	seasODI25	-0.66	-0.70	-0.73	-0.75	-0.77	-0.73	-0.65	-0.53	-0.35	-0.15	0.03
MePDS	seasODI25	-0.65	-0.65	-0.64	-0.65	-0.64	-0.59	-0.47	-0.32	-0.17	-0.01	0.16
NSBII	seasODI25	-0.71	-0.73	-0.75	-0.75	-0.71	-0.63	-0.48	-0.30	-0.13	0.05	0.24
NSBIII	seasODI25	-0.56	-0.56	-0.56	-0.56	-0.62	-0.57	-0.52	-0.43	-0.25	-0.08	0.03
TWEms	seasODI25	-0.58	-0.57	-0.53	-0.49	-0.35	-0.33	-0.29	-0.16	-0.12	-0.06	-0.02
ArkBB	seasODI25a	-0.33	-0.39	-0.46	-0.51	-0.57	-0.52	-0.49	-0.44	-0.34	-0.18	0.01
FehBB	seasODI25a	-0.78	-0.77	-0.76	-0.74	-0.68	-0.55	-0.38	-0.21	-0.05	0.10	0.24
FinoPF1	seasODI25a	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI25a	-0.55	-0.54	-0.50	-0.46	-0.44	-0.40	-0.27	-0.12	0.05	0.15	0.20
GB	seasODI25a	-0.65	-0.63	-0.60	-0.57	-0.52	-0.41	-0.29	-0.15	0.03	0.23	0.32
MePDS	seasODI25a	-0.65	-0.65	-0.64	-0.65	-0.64	-0.59	-0.47	-0.32	-0.17	-0.01	0.16
NSBII	seasODI25a	-0.71	-0.73	-0.75	-0.75	-0.71	-0.63	-0.48	-0.30	-0.13	0.05	0.24
NSBIII	seasODI25a	-0.56	-0.56	-0.56	-0.56	-0.62	-0.57	-0.52	-0.43	-0.25	-0.08	0.03
TWEms	seasODI25a	-0.58	-0.57	-0.53	-0.49	-0.35	-0.33	-0.29	-0.16	-0.12	-0.06	-0.02
ArkBB	seasODI33	-0.28	-0.28	-0.30	-0.32	-0.33	-0.27	-0.20	-0.14	-0.07	0.05	0.18
FehBB	seasODI33	-0.67	-0.66	-0.64	-0.62	-0.56	-0.48	-0.39	-0.27	-0.16	-0.05	0.10
FinoPF1	seasODI33	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI33	-0.38	-0.36	-0.33	-0.29	-0.28	-0.25	-0.17	-0.10	0.01	0.15	0.25
GB	seasODI33	-0.64	-0.62	-0.60	-0.58	-0.58	-0.51	-0.37	-0.16	0.07	0.23	0.31
KielLH	seasODI33	-0.58	-0.61	-0.64	-0.66	-0.71	-0.71	-0.65	-0.54	-0.37	-0.19	-0.02
MePDS	seasODI33	-0.52	-0.49	-0.46	-0.44	-0.43	-0.43	-0.39	-0.30	-0.21	-0.10	0.07
NSBII	seasODI33	-0.70	-0.74	-0.77	-0.78	-0.76	-0.69	-0.54	-0.35	-0.16	0.07	0.31
NSBIII	seasODI33	-0.60	-0.60	-0.59	-0.59	-0.65	-0.62	-0.57	-0.47	-0.29	-0.08	0.07

TWEms	seasODI33	-0.59	-0.57	-0.52	-0.45	-0.33	-0.28	-0.26	-0.19	-0.14	-0.01	0.02
ArkBB	seasODI33a	-0.28	-0.28	-0.30	-0.32	-0.33	-0.27	-0.20	-0.14	-0.07	0.05	0.18
FehBB	seasODI33a	-0.67	-0.66	-0.64	-0.62	-0.56	-0.48	-0.39	-0.27	-0.16	-0.05	0.10
FinoPF1	seasODI33a	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI33a	-0.38	-0.36	-0.33	-0.29	-0.28	-0.25	-0.17	-0.10	0.01	0.15	0.25
GB	seasODI33a	-0.64	-0.62	-0.60	-0.58	-0.58	-0.51	-0.37	-0.16	0.07	0.23	0.31
MePDS	seasODI33a	-0.52	-0.49	-0.46	-0.44	-0.43	-0.43	-0.39	-0.30	-0.21	-0.10	0.07
NSBII	seasODI33a	-0.70	-0.74	-0.77	-0.78	-0.76	-0.69	-0.54	-0.35	-0.16	0.07	0.31
NSBIII	seasODI33a	-0.60	-0.60	-0.59	-0.59	-0.65	-0.62	-0.57	-0.47	-0.29	-0.08	0.07
TWEms	seasODI33a	-0.59	-0.57	-0.52	-0.45	-0.33	-0.28	-0.26	-0.19	-0.14	-0.01	0.02
ArkBB	seasODI33rev	-0.33	-0.39	-0.45	-0.50	-0.56	-0.51	-0.46	-0.42	-0.32	-0.16	0.02
FehBB	seasODI33rev	-0.77	-0.76	-0.75	-0.73	-0.66	-0.54	-0.39	-0.22	-0.07	0.07	0.21
FinoPF1	seasODI33rev	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI33rev	-0.52	-0.51	-0.48	-0.44	-0.42	-0.38	-0.25	-0.11	0.04	0.15	0.21
GB	seasODI33rev	-0.65	-0.63	-0.60	-0.58	-0.54	-0.43	-0.31	-0.16	0.04	0.23	0.32
KielLH	seasODI33rev	-0.65	-0.69	-0.72	-0.74	-0.76	-0.73	-0.66	-0.54	-0.36	-0.16	0.02
MePDS	seasODI33rev	-0.64	-0.63	-0.62	-0.62	-0.61	-0.57	-0.47	-0.32	-0.19	-0.03	0.14
NSBII	seasODI33rev	-0.72	-0.74	-0.76	-0.75	-0.72	-0.64	-0.49	-0.31	-0.14	0.05	0.25
NSBIII	seasODI33rev	-0.56	-0.57	-0.57	-0.57	-0.63	-0.58	-0.53	-0.44	-0.26	-0.08	0.04
TWEms	seasODI33rev	-0.58	-0.57	-0.53	-0.48	-0.35	-0.32	-0.29	-0.16	-0.13	-0.06	-0.01
ArkBB	seasODI33reva	-0.33	-0.39	-0.45	-0.50	-0.56	-0.51	-0.46	-0.42	-0.32	-0.16	0.02
FehBB	seasODI33reva	-0.77	-0.76	-0.75	-0.73	-0.66	-0.54	-0.39	-0.22	-0.07	0.07	0.21
FinoPF1	seasODI33reva	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODI33reva	-0.52	-0.51	-0.48	-0.44	-0.42	-0.38	-0.25	-0.11	0.04	0.15	0.21
GB	seasODI33reva	-0.65	-0.63	-0.60	-0.58	-0.54	-0.43	-0.31	-0.16	0.04	0.23	0.32
MePDS	seasODI33reva	-0.64	-0.63	-0.62	-0.62	-0.61	-0.57	-0.47	-0.32	-0.19	-0.03	0.14
NSBII	seasODI33reva	-0.72	-0.74	-0.76	-0.75	-0.72	-0.64	-0.49	-0.31	-0.14	0.05	0.25
NSBIII	seasODI33reva	-0.56	-0.57	-0.57	-0.57	-0.63	-0.58	-0.53	-0.44	-0.26	-0.08	0.04
TWEms	seasODI33reva	-0.58	-0.57	-0.53	-0.48	-0.35	-0.32	-0.29	-0.16	-0.13	-0.06	-0.01
ArkBB	seasODIhalf	-0.33	-0.37	-0.42	-0.46	-0.50	-0.44	-0.39	-0.34	-0.25	-0.09	0.07
FehBB	seasODIhalf	-0.73	-0.72	-0.71	-0.69	-0.62	-0.52	-0.39	-0.25	-0.11	0.01	0.16
FinoPF1	seasODIhalf	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODIhalf	-0.45	-0.44	-0.41	-0.37	-0.35	-0.32	-0.21	-0.11	0.02	0.15	0.23
GB	seasODIhalf	-0.65	-0.63	-0.61	-0.58	-0.56	-0.48	-0.34	-0.16	0.05	0.23	0.32
KielLH	seasODIhalf	-0.61	-0.65	-0.68	-0.70	-0.74	-0.73	-0.66	-0.54	-0.37	-0.17	-0.00
MePDS	seasODIhalf	-0.59	-0.57	-0.54	-0.54	-0.52	-0.51	-0.44	-0.32	-0.20	-0.06	0.10
NSBII	seasODIhalf	-0.71	-0.74	-0.77	-0.77	-0.74	-0.67	-0.51	-0.33	-0.15	0.06	0.28
NSBIII	seasODIhalf	-0.58	-0.59	-0.58	-0.58	-0.64	-0.60	-0.56	-0.46	-0.28	-0.08	0.05
TWEms	seasODIhalf	-0.59	-0.58	-0.53	-0.47	-0.34	-0.31	-0.28	-0.17	-0.13	-0.04	-0.00
ArkBB	seasODIhalfa	-0.33	-0.37	-0.42	-0.46	-0.50	-0.44	-0.39	-0.34	-0.25	-0.09	0.07
FehBB	seasODIhalfa	-0.73	-0.72	-0.71	-0.69	-0.62	-0.52	-0.39	-0.25	-0.11	0.01	0.16
FinoPF1	seasODIhalfa	-0.08	-0.10	-0.08	-0.09	-0.08	-0.09	-0.08	-0.08	-0.19	-0.15	-0.04
FinoPF3	seasODIhalfa	-0.45	-0.44	-0.41	-0.37	-0.35	-0.32	-0.21	-0.11	0.02	0.15	0.23
GB	seasODIhalfa	-0.65	-0.63	-0.61	-0.58	-0.56	-0.48	-0.34	-0.16	0.05	0.23	0.32
MePDS	seasODIhalfa	-0.59	-0.57	-0.54	-0.54	-0.52	-0.51	-0.44	-0.32	-0.20	-0.06	0.10
NSBII	seasODIhalfa	-0.71	-0.74	-0.77	-0.77	-0.74	-0.67	-0.51	-0.33	-0.15	0.06	0.28
NSBIII	seasODIhalfa	-0.58	-0.59	-0.58	-0.58	-0.64	-0.60	-0.56	-0.46	-0.28	-0.08	0.05
TWEms	seasODIhalfa	-0.59	-0.58	-0.53	-0.47	-0.34	-0.31	-0.28	-0.17	-0.13	-0.04	-0.00


(a)
ArkBB
(b)
FehBB
(c)
FinoPF3
(d)
FinoPF1
(e)
GB
(f)
KielLH
(g)
MePDS
(h)
NSBII
correlation coefficient
lag0
lag5
lag10
lag15
lag30
lag45
lag60
lag75
lag90
lag105
lag120
fixODI25
fixODI33
fixODI33rev
fixODIhalf
ODI25
ODI25a
ODI33
ODI33a
ODI33rev
ODI33reva
ODIhalf
ODIhalfa
seasODI25
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seasODI33a
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seasODI33reva
seasODIhalf
seasODIhalfa

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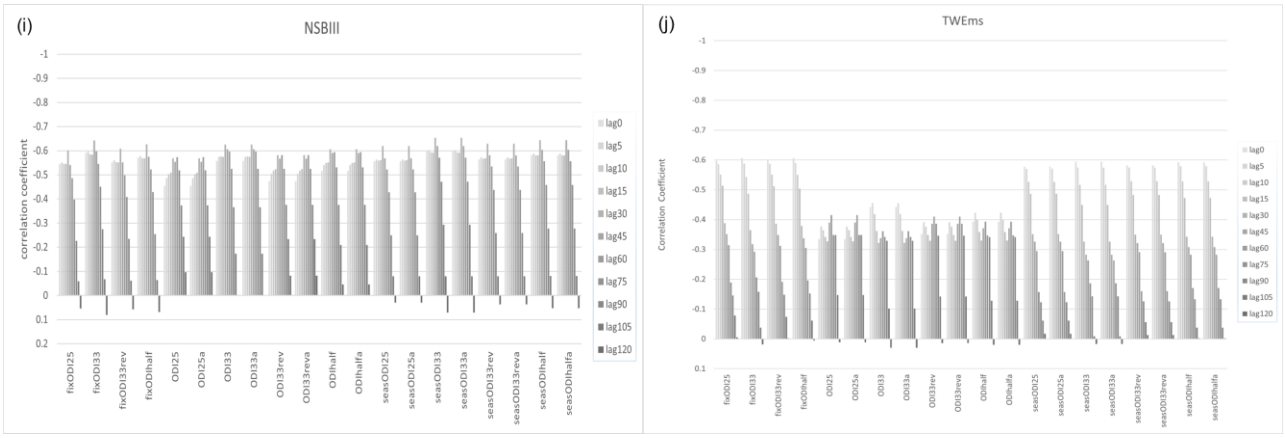


Supplement Figure 1 (a-i): Correlation Coefficients according to Supplement Table 3, for each station (Marnet, 2018-2023) and each ODI configuration over all lags; negative and positive values of the correlation coefficient on the y axis are shown in reverse order. Diagrams illustrate the potential of the ODI to forecasting seasonal ODZs according to their correlation values (further discussed in the main manuscript).

Supplement Table 4: Sensor 1 – Per Year clustered Correlation coefficients ODI vs Observations, at KielLH station, and all lags.

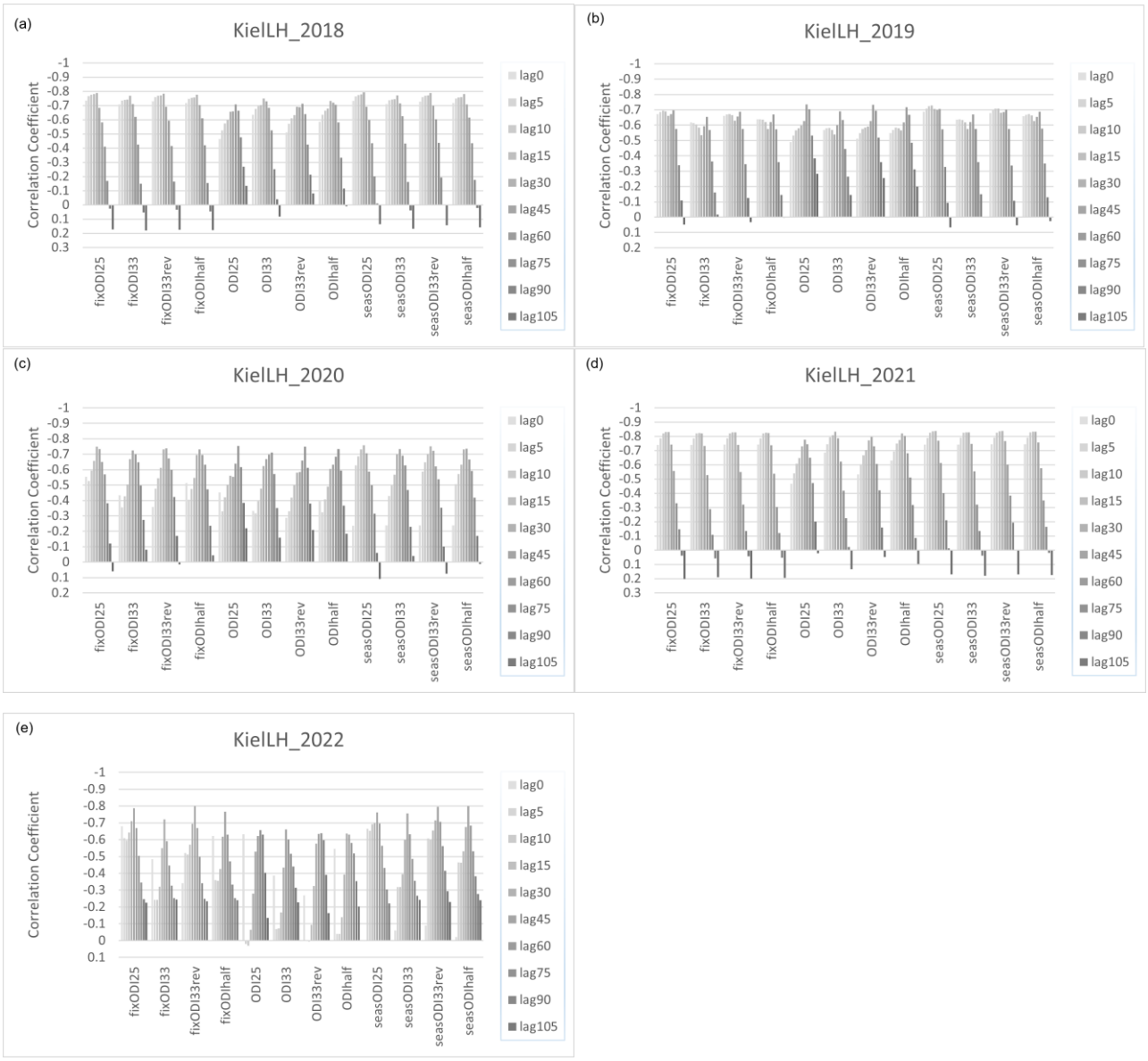
station_2018	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
KielLH	fixODI25	-0.73	-0.77	-0.78	-0.78	-0.79	-0.68	-0.58	-0.41	-0.17	0.03	0.17
KielLH	fixODI33	-0.71	-0.73	-0.74	-0.74	-0.77	-0.71	-0.62	-0.42	-0.15	0.05	0.18
KielLH	fixODI33rev	-0.73	-0.76	-0.77	-0.77	-0.78	-0.69	-0.59	-0.42	-0.16	0.03	0.17
KielLH	fixODIhalf	-0.72	-0.75	-0.75	-0.76	-0.78	-0.70	-0.61	-0.42	-0.16	0.05	0.18
KielLH	ODI25	-0.46	-0.53	-0.57	-0.60	-0.66	-0.66	-0.71	-0.67	-0.48	-0.27	-0.13
KielLH	ODI33	-0.64	-0.68	-0.70	-0.70	-0.75	-0.73	-0.68	-0.52	-0.25	-0.04	0.08
KielLH	ODI33rev	-0.51	-0.57	-0.61	-0.63	-0.69	-0.69	-0.71	-0.64	-0.43	-0.21	-0.08
KielLH	ODIhalf	-0.59	-0.63	-0.66	-0.68	-0.73	-0.72	-0.71	-0.58	-0.33	-0.12	0.01
KielLH	seasODI25	-0.73	-0.76	-0.77	-0.78	-0.79	-0.69	-0.60	-0.44	-0.20	-0.01	0.14
KielLH	seasODI33	-0.71	-0.74	-0.74	-0.75	-0.77	-0.71	-0.62	-0.43	-0.16	0.04	0.17
KielLH	seasODI33rev	-0.73	-0.76	-0.77	-0.77	-0.79	-0.70	-0.60	-0.44	-0.19	0.00	0.14
KielLH	seasODIhalf	-0.72	-0.75	-0.76	-0.76	-0.78	-0.71	-0.62	-0.44	-0.18	0.02	0.16

station_2019	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
KielLH	fixODI25	-0.67	-0.69	-0.69	-0.69	-0.66	-0.67	-0.70	-0.58	-0.34	-0.11	0.05
KielLH	fixODI33	-0.62	-0.61	-0.60	-0.58	-0.54	-0.59	-0.65	-0.57	-0.36	-0.16	-0.02
KielLH	fixODI33rev	-0.66	-0.67	-0.67	-0.66	-0.63	-0.66	-0.69	-0.58	-0.35	-0.12	0.03
KielLH	fixODIhalf	-0.64	-0.64	-0.64	-0.62	-0.58	-0.62	-0.67	-0.57	-0.36	-0.15	0.00
KielLH	ODI25	-0.49	-0.53	-0.57	-0.58	-0.60	-0.63	-0.74	-0.70	-0.53	-0.38	-0.28
KielLH	ODI33	-0.57	-0.58	-0.58	-0.57	-0.54	-0.60	-0.69	-0.63	-0.45	-0.27	-0.14
KielLH	ODI33rev	-0.51	-0.55	-0.58	-0.58	-0.59	-0.63	-0.73	-0.69	-0.52	-0.36	-0.26
KielLH	ODIhalf	-0.55	-0.57	-0.58	-0.58	-0.57	-0.62	-0.72	-0.67	-0.48	-0.31	-0.20
KielLH	seasODI25	-0.69	-0.71	-0.72	-0.73	-0.71	-0.70	-0.71	-0.57	-0.33	-0.09	0.07
KielLH	seasODI33	-0.64	-0.64	-0.63	-0.62	-0.57	-0.62	-0.67	-0.57	-0.36	-0.15	0.00
KielLH	seasODI33rev	-0.68	-0.70	-0.71	-0.71	-0.68	-0.69	-0.70	-0.58	-0.34	-0.11	0.05
KielLH	seasODIhalf	-0.66	-0.67	-0.67	-0.66	-0.63	-0.65	-0.69	-0.58	-0.35	-0.13	0.03

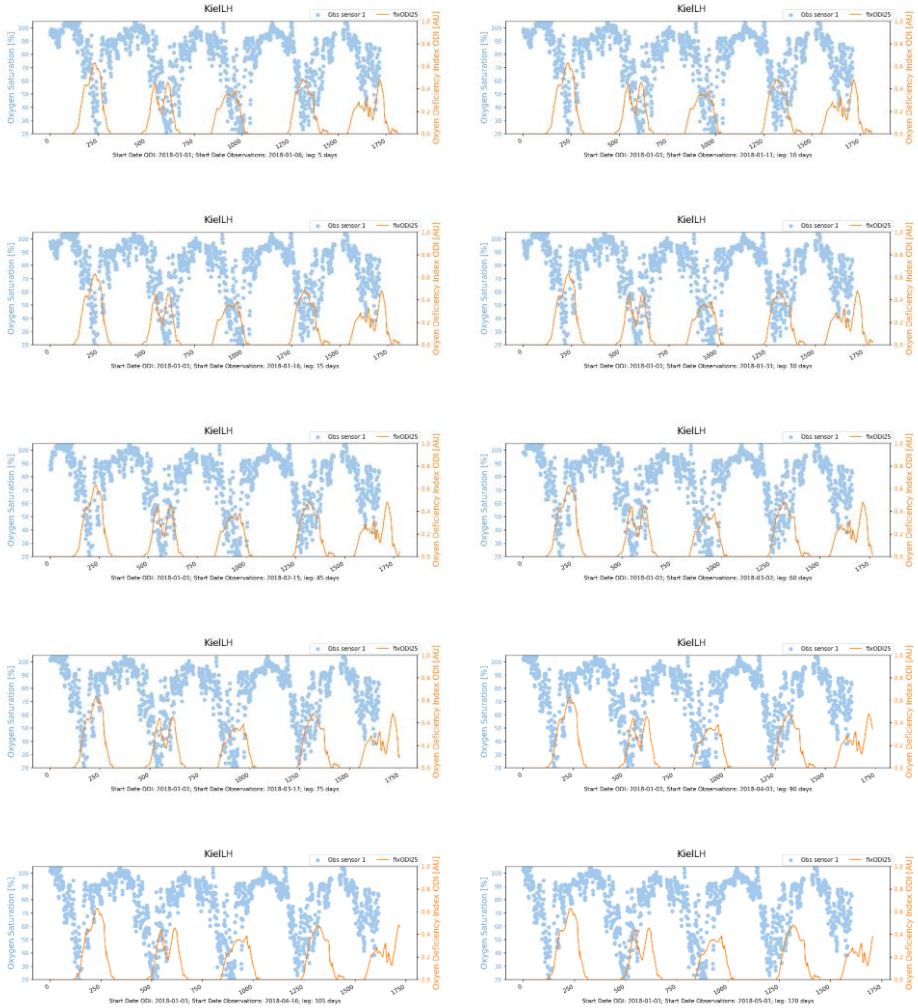
station_2020	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
KielLH	fixODI25	-0.55	-0.53	-0.59	-0.66	-0.75	-0.73	-0.65	-0.57	-0.38	-0.12	0.06
KielLH	fixODI33	-0.43	-0.36	-0.43	-0.50	-0.67	-0.72	-0.70	-0.65	-0.50	-0.27	-0.08
KielLH	fixODI33rev	-0.36	-0.48	-0.55	-0.61	-0.73	-0.74	-0.67	-0.60	-0.42	-0.17	0.01
KielLH	fixODIhalf	-0.51	-0.40	-0.47	-0.55	-0.70	-0.73	-0.69	-0.63	-0.47	-0.24	-0.04
KielLH	ODI25	-0.45	-0.33	-0.42	-0.50	-0.56	-0.55	-0.64	-0.75	-0.62	-0.39	-0.22
KielLH	ODI33	-0.33	-0.32	-0.40	-0.48	-0.62	-0.67	-0.70	-0.71	-0.57	-0.35	-0.16
KielLH	ODI33rev	-0.29	-0.33	-0.42	-0.50	-0.58	-0.59	-0.66	-0.75	-0.61	-0.38	-0.21
KielLH	ODIhalf	-0.40	-0.32	-0.41	-0.49	-0.61	-0.63	-0.68	-0.73	-0.59	-0.37	-0.18
KielLH	seasODI25	-0.24	-0.63	-0.69	-0.73	-0.76	-0.71	-0.59	-0.50	-0.31	-0.06	0.11
KielLH	seasODI33	-0.24	-0.43	-0.50	-0.57	-0.70	-0.73	-0.69	-0.63	-0.47	-0.23	-0.04
KielLH	seasODI33rev	-0.24	-0.59	-0.65	-0.70	-0.75	-0.72	-0.62	-0.54	-0.35	-0.10	0.07
KielLH	seasODIhalf	-0.24	-0.51	-0.57	-0.63	-0.73	-0.74	-0.67	-0.59	-0.42	-0.17	0.01

station_2021	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
KielLH	fixODI25	-0.74	-0.79	-0.82	-0.83	-0.83	-0.74	-0.56	-0.33	-0.15	0.04	0.20
KielLH	fixODI33	-0.74	-0.79	-0.82	-0.82	-0.82	-0.73	-0.53	-0.29	-0.11	0.06	0.19
KielLH	fixODI33rev	-0.74	-0.79	-0.82	-0.83	-0.83	-0.74	-0.55	-0.32	-0.14	0.04	0.20
KielLH	fixODIhalf	-0.74	-0.79	-0.82	-0.83	-0.82	-0.74	-0.54	-0.30	-0.12	0.05	0.19
KielLH	ODI25	-0.47	-0.54	-0.61	-0.65	-0.73	-0.78	-0.75	-0.65	-0.47	-0.20	0.02
KielLH	ODI33	-0.69	-0.75	-0.79	-0.81	-0.83	-0.79	-0.62	-0.42	-0.23	-0.02	0.13
KielLH	ODI33rev	-0.53	-0.60	-0.67	-0.70	-0.77	-0.80	-0.73	-0.61	-0.42	-0.16	0.05
KielLH	ODIhalf	-0.63	-0.69	-0.75	-0.77	-0.82	-0.80	-0.68	-0.51	-0.32	-0.09	0.10
KielLH	seasODI25	-0.74	-0.79	-0.83	-0.84	-0.84	-0.77	-0.61	-0.40	-0.21	-0.01	0.17
KielLH	seasODI33	-0.74	-0.79	-0.82	-0.83	-0.83	-0.75	-0.55	-0.32	-0.14	0.04	0.18
KielLH	seasODI33rev	-0.74	-0.79	-0.83	-0.84	-0.84	-0.77	-0.60	-0.38	-0.19	0.00	0.17
KielLH	seasODIhalf	-0.75	-0.79	-0.83	-0.83	-0.83	-0.76	-0.58	-0.35	-0.16	0.02	0.18

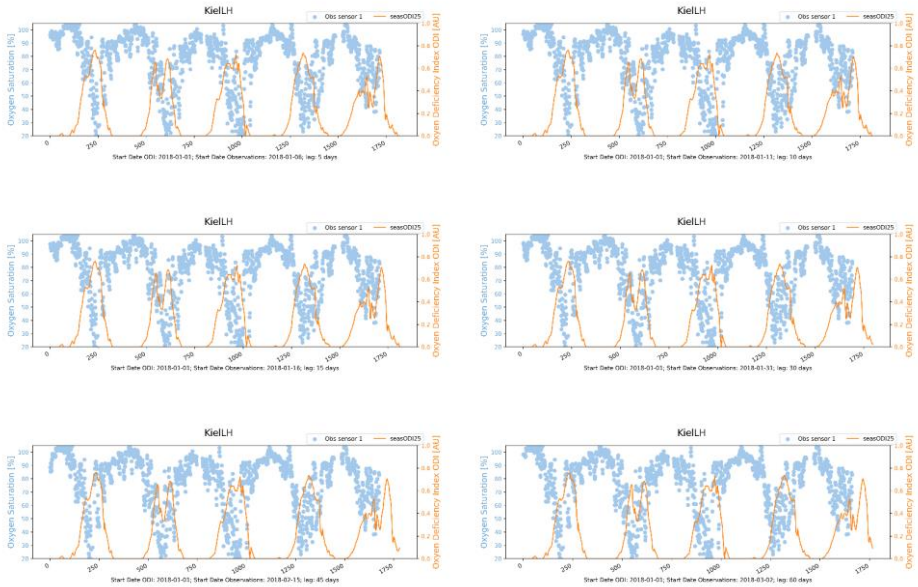
station_2022	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
KielLH	fixODI25	-0.68	-0.61	-0.60	-0.64	-0.71	-0.79	-0.67	-0.50	-0.35	-0.25	-0.23
KielLH	fixODI33	-0.48	-0.24	-0.24	-0.32	-0.55	-0.72	-0.59	-0.45	-0.33	-0.25	-0.24
KielLH	fixODI33rev	-0.34	-0.52	-0.51	-0.57	-0.69	-0.80	-0.67	-0.50	-0.34	-0.25	-0.23
KielLH	fixODIhalf	-0.62	-0.36	-0.36	-0.43	-0.62	-0.77	-0.63	-0.47	-0.33	-0.25	-0.24
KielLH	ODI25	-0.63	0.02	0.03	-0.07	-0.28	-0.53	-0.62	-0.66	-0.63	-0.40	-0.14
KielLH	ODI33	-0.39	-0.07	-0.07	-0.17	-0.43	-0.66	-0.60	-0.52	-0.44	-0.32	-0.23
KielLH	ODI33rev	-0.27	0.00	0.01	-0.09	-0.32	-0.58	-0.64	-0.64	-0.60	-0.39	-0.16
KielLH	ODIhalf	-0.55	-0.04	-0.04	-0.14	-0.39	-0.64	-0.63	-0.58	-0.52	-0.35	-0.20
KielLH	seasODI25	0.00	-0.67	-0.65	-0.69	-0.70	-0.76	-0.70	-0.56	-0.43	-0.30	-0.22
KielLH	seasODI33	-0.06	-0.32	-0.32	-0.40	-0.60	-0.76	-0.63	-0.49	-0.36	-0.27	-0.24
KielLH	seasODI33rev	-0.09	-0.61	-0.60	-0.66	-0.71	-0.80	-0.71	-0.56	-0.42	-0.29	-0.23
KielLH	seasODIhalf	-0.02	-0.46	-0.46	-0.53	-0.68	-0.80	-0.68	-0.53	-0.38	-0.28	-0.24

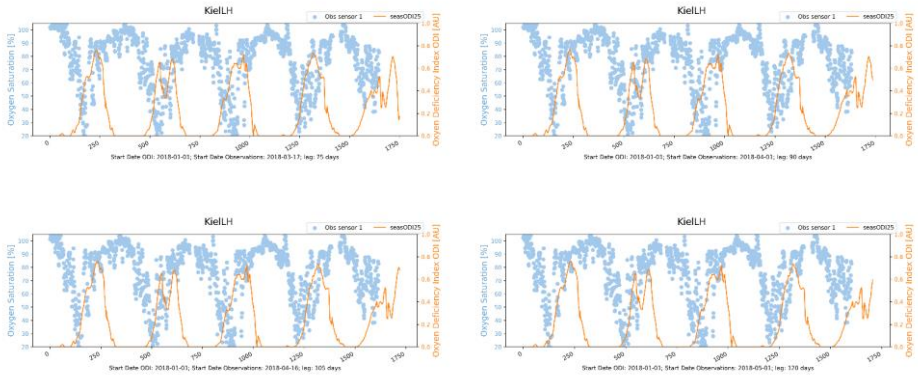


Supplement Figure 2: Supplement Figure 3 (a-e): One Year clustered Correlation Coefficients according to Supplement Table 4, at station KielLH and each ODI configuration over all lags; negative and positive values of the correlation coefficient on the y axis are shown in reverse order.


KielLH
Obs sensor 1
fixODI25
Oxygen Saturation [%]
Oxygen Deficiency Index ODI [AU]

90


KielLH
Obs sensor 1
seasODI25
Oxygen Saturation [%]
Oxygen Deficiency Index ODI [AU]



Supplement Figure 3: The20 panels above show the whole 5-year time-series of a fixODI25 and seasODI25 configuration compared to the data: Figures are sorted by station, and grouped by ODI configuration; each ODI cluster is showing the shifted lags, from lag5 to lag120; (Marnet, 2018-2023):

Supplement Table 5: Sensor 2 – Correlation coefficients ODI vs Observations, at each station (Marnet, 2018-2023), and all lags.

Station (sensor 2)	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
MePDS	ODI33rev	-0.29	-0.28	-0.27	-0.29	-0.34	-0.45	-0.48	**-0.49**	-0.43	-0.31	-0.12
ArkBB	ODI33rev	0.27	0.20	0.13	0.07	-0.02	-0.08	-0.19	-0.30	**-0.36**	-0.27	-0.09
FehBB	ODI33rev	-0.49	-0.47	-0.44	-0.41	-0.50	-0.61	**-0.66**	-0.53	-0.43	-0.25	0.04
NSBII	ODI33rev	-0.58	-0.60	-0.62	-0.64	-0.67	**-0.68**	-0.61	-0.53	-0.36	-0.18	-0.04
NSBIII	ODI33rev	-0.63	-0.63	-0.62	-0.60	**-0.69**	-0.68	-0.65	-0.50	-0.27	-0.09	0.10
GB	ODI33rev	-0.15	-0.19	-0.24	-0.29	-0.45	-0.54	**-0.60**	-0.50	-0.24	-0.02	0.02

105 **Supplement Table 3: Sensor 2 - Correlation coefficients ODI vs Observations, at each station (Marnet, 2018-2023), and all lags**

Station (sensor 2)	ODI	lag0	lag5	lag10	lag15	lag30	lag45	lag60	lag75	lag90	lag105	lag120
ArkBB	fixODI25	-0.18	-0.25	-0.32	-0.38	-0.46	-0.42	-0.37	-0.31	-0.20	-0.02	0.14
FehBB	fixODI25	-0.67	-0.67	-0.66	-0.64	-0.62	-0.45	-0.03	0.29	0.41	0.45	0.53
GB	fixODI25	-0.51	-0.52	-0.52	-0.50	-0.49	-0.38	-0.27	-0.18	-0.05	0.08	0.10
MePDS	fixODI25	-0.63	-0.62	-0.61	-0.62	-0.60	-0.55	-0.43	-0.26	-0.12	0.04	0.20
NSBII	fixODI25	-0.75	-0.75	-0.76	-0.75	-0.70	-0.62	-0.43	-0.22	-0.03	0.12	0.23
NSBIII	fixODI25	-0.71	-0.69	-0.65	-0.62	-0.67	-0.57	-0.43	-0.25	-0.02	0.16	0.28
ArkBB	fixODI33	-0.03	0.03	0.07	0.10	0.17	0.26	0.39	0.46	0.47	0.50	0.49
FehBB	fixODI33	-0.59	-0.58	-0.56	-0.54	-0.53	-0.43	-0.03	0.12	0.14	0.20	0.32
GB	fixODI33	-0.41	-0.41	-0.42	-0.42	-0.53	-0.51	-0.39	-0.19	-0.01	0.07	0.07
MePDS	fixODI33	-0.47	-0.43	-0.39	-0.38	-0.36	-0.38	-0.35	-0.26	-0.18	-0.09	0.07
NSBII	fixODI33	-0.68	-0.70	-0.72	-0.73	-0.72	-0.66	-0.50	-0.31	-0.13	0.08	0.27
NSBIII	fixODI33	-0.72	-0.71	-0.67	-0.65	-0.73	-0.64	-0.49	-0.29	-0.05	0.15	0.28
ArkBB	fixODI33rev	-0.17	-0.22	-0.28	-0.33	-0.39	-0.34	-0.27	-0.20	-0.10	0.07	0.21
FehBB	fixODI33rev	-0.66	-0.66	-0.65	-0.63	-0.61	-0.45	-0.03	0.27	0.36	0.41	0.49
GB	fixODI33rev	-0.49	-0.50	-0.50	-0.49	-0.50	-0.40	-0.29	-0.18	-0.04	0.08	0.10
MePDS	fixODI33rev	-0.61	-0.59	-0.57	-0.57	-0.56	-0.52	-0.42	-0.27	-0.14	0.01	0.17
NSBII	fixODI33rev	-0.74	-0.74	-0.76	-0.75	-0.71	-0.63	-0.44	-0.23	-0.05	0.12	0.24
NSBIII	fixODI33rev	-0.71	-0.69	-0.65	-0.62	-0.68	-0.58	-0.44	-0.26	-0.02	0.16	0.28
ArkBB	fixODIhalf	-0.12	-0.11	-0.12	-0.14	-0.13	-0.06	0.04	0.13	0.20	0.31	0.39
FehBB	fixODIhalf	-0.64	-0.64	-0.62	-0.60	-0.59	-0.45	-0.03	0.21	0.25	0.31	0.41
GB	fixODIhalf	-0.46	-0.47	-0.47	-0.46	-0.52	-0.45	-0.34	-0.19	-0.03	0.08	0.08
MePDS	fixODIhalf	-0.54	-0.51	-0.48	-0.47	-0.46	-0.45	-0.39	-0.27	-0.17	-0.05	0.12
NSBII	fixODIhalf	-0.72	-0.73	-0.74	-0.74	-0.71	-0.64	-0.47	-0.26	-0.08	0.10	0.25
NSBIII	fixODIhalf	-0.72	-0.70	-0.66	-0.64	-0.71	-0.61	-0.47	-0.28	-0.04	0.16	0.28
ArkBB	ODI25	0.26	0.19	0.11	0.05	-0.05	-0.11	-0.23	-0.35	-0.39	-0.30	-0.12
FehBB	ODI25	-0.47	-0.45	-0.42	-0.40	-0.50	-0.61	-0.66	-0.53	-0.44	-0.28	0.01
GB	ODI25	-0.13	-0.18	-0.23	-0.28	-0.43	-0.52	-0.58	-0.51	-0.26	-0.03	0.02
MePDS	ODI25	-0.26	-0.26	-0.26	-0.28	-0.35	-0.46	-0.49	-0.51	-0.45	-0.33	-0.14
NSBII	ODI25	-0.58	-0.60	-0.62	-0.63	-0.66	-0.67	-0.61	-0.54	-0.36	-0.20	-0.07
NSBIII	ODI25	-0.62	-0.62	-0.61	-0.58	-0.68	-0.67	-0.65	-0.51	-0.28	-0.11	0.08
ArkBB	ODI25a	0.26	0.19	0.11	0.05	-0.05	-0.11	-0.23	-0.35	-0.39	-0.30	-0.12
FehBB	ODI25a	-0.47	-0.45	-0.42	-0.40	-0.50	-0.61	-0.66	-0.53	-0.44	-0.28	0.01
GB	ODI25a	-0.13	-0.18	-0.23	-0.28	-0.43	-0.52	-0.58	-0.51	-0.26	-0.03	0.02

MePDS	ODI25a	-0.26	-0.26	-0.26	-0.28	-0.35	-0.46	-0.49	-0.51	-0.45	-0.33	-0.14
NSBII	ODI25a	-0.58	-0.60	-0.62	-0.63	-0.66	-0.67	-0.61	-0.54	-0.36	-0.20	-0.07
NSBIII	ODI25a	-0.62	-0.62	-0.61	-0.58	-0.68	-0.67	-0.65	-0.51	-0.28	-0.11	0.08
ArkBB	ODI33	0.32	0.30	0.28	0.26	0.25	0.24	0.22	0.15	0.07	0.10	0.20
FehBB	ODI33	-0.50	-0.49	-0.46	-0.43	-0.48	-0.59	-0.65	-0.45	-0.24	-0.08	0.13
GB	ODI33	-0.19	-0.22	-0.25	-0.29	-0.50	-0.61	-0.58	-0.38	-0.11	0.01	0.02
MePDS	ODI33	-0.35	-0.31	-0.28	-0.28	-0.29	-0.36	-0.39	-0.36	-0.31	-0.22	-0.05
NSBII	ODI33	-0.55	-0.59	-0.63	-0.65	-0.70	-0.71	-0.62	-0.51	-0.34	-0.12	0.10
NSBIII	ODI33	-0.67	-0.67	-0.65	-0.63	-0.73	-0.70	-0.61	-0.44	-0.20	0.00	0.17
ArkBB	ODI33a	0.32	0.30	0.28	0.26	0.25	0.24	0.22	0.15	0.07	0.10	0.20
FehBB	ODI33a	-0.50	-0.49	-0.46	-0.43	-0.48	-0.59	-0.65	-0.45	-0.24	-0.08	0.13
GB	ODI33a	-0.19	-0.22	-0.25	-0.29	-0.50	-0.61	-0.58	-0.38	-0.11	0.01	0.02
MePDS	ODI33a	-0.35	-0.31	-0.28	-0.28	-0.29	-0.36	-0.39	-0.36	-0.31	-0.22	-0.05
NSBII	ODI33a	-0.55	-0.59	-0.63	-0.65	-0.70	-0.71	-0.62	-0.51	-0.34	-0.12	0.10
NSBIII	ODI33a	-0.67	-0.67	-0.65	-0.63	-0.73	-0.70	-0.61	-0.44	-0.20	0.00	0.17
ArkBB	ODI33rev	0.27	0.20	0.13	0.07	-0.02	-0.08	-0.19	-0.30	-0.36	-0.27	-0.09
FehBB	ODI33rev	-0.49	-0.47	-0.44	-0.41	-0.50	-0.61	-0.66	-0.53	-0.43	-0.25	0.04
GB	ODI33rev	-0.15	-0.19	-0.24	-0.29	-0.45	-0.54	-0.60	-0.50	-0.24	-0.02	0.02
MePDS	ODI33rev	-0.29	-0.28	-0.27	-0.29	-0.34	-0.45	-0.48	-0.49	-0.43	-0.31	-0.12
NSBII	ODI33rev	-0.58	-0.60	-0.62	-0.64	-0.67	-0.68	-0.61	-0.53	-0.36	-0.18	-0.04
NSBIII	ODI33rev	-0.63	-0.63	-0.62	-0.60	-0.69	-0.68	-0.65	-0.50	-0.27	-0.09	0.10
ArkBB	ODI33reva	0.27	0.20	0.13	0.07	-0.02	-0.08	-0.19	-0.30	-0.36	-0.27	-0.09
FehBB	ODI33reva	-0.49	-0.47	-0.44	-0.41	-0.50	-0.61	-0.66	-0.53	-0.43	-0.25	0.04
GB	ODI33reva	-0.15	-0.19	-0.24	-0.29	-0.45	-0.54	-0.60	-0.50	-0.24	-0.02	0.02
MePDS	ODI33reva	-0.29	-0.28	-0.27	-0.29	-0.34	-0.45	-0.48	-0.49	-0.43	-0.31	-0.12
NSBII	ODI33reva	-0.58	-0.60	-0.62	-0.64	-0.67	-0.68	-0.61	-0.53	-0.36	-0.18	-0.04
NSBIII	ODI33reva	-0.63	-0.63	-0.62	-0.60	-0.69	-0.68	-0.65	-0.50	-0.27	-0.09	0.10
ArkBB	ODIhalf	0.30	0.24	0.19	0.14	0.08	0.04	-0.06	-0.16	-0.23	-0.16	0.00
FehBB	ODIhalf	-0.51	-0.49	-0.46	-0.43	-0.50	-0.60	-0.66	-0.52	-0.35	-0.17	0.09
GB	ODIhalf	-0.17	-0.20	-0.25	-0.29	-0.48	-0.58	-0.60	-0.45	-0.19	-0.01	0.02
MePDS	ODIhalf	-0.33	-0.30	-0.28	-0.29	-0.32	-0.41	-0.44	-0.43	-0.37	-0.27	-0.08
NSBII	ODIhalf	-0.57	-0.60	-0.63	-0.65	-0.68	-0.69	-0.61	-0.53	-0.35	-0.15	0.02
NSBIII	ODIhalf	-0.65	-0.65	-0.64	-0.62	-0.71	-0.69	-0.64	-0.48	-0.24	-0.05	0.13
ArkBB	ODIhalfa	0.30	0.24	0.19	0.14	0.08	0.04	-0.06	-0.16	-0.23	-0.16	0.00
FehBB	ODIhalfa	-0.51	-0.49	-0.46	-0.43	-0.50	-0.60	-0.66	-0.52	-0.35	-0.17	0.09
GB	ODIhalfa	-0.17	-0.20	-0.25	-0.29	-0.48	-0.58	-0.60	-0.45	-0.19	-0.01	0.02
MePDS	ODIhalfa	-0.33	-0.30	-0.28	-0.29	-0.32	-0.41	-0.44	-0.43	-0.37	-0.27	-0.08
NSBII	ODIhalfa	-0.57	-0.60	-0.63	-0.65	-0.68	-0.69	-0.61	-0.53	-0.35	-0.15	0.02
NSBIII	ODIhalfa	-0.65	-0.65	-0.64	-0.62	-0.71	-0.69	-0.64	-0.48	-0.24	-0.05	0.13
ArkBB	seasODI25	-0.38	-0.45	-0.52	-0.58	-0.63	-0.57	-0.52	-0.49	-0.41	-0.26	-0.10
FehBB	seasODI25	-0.71	-0.71	-0.69	-0.67	-0.63	-0.46	-0.01	0.32	0.44	0.48	0.55
GB	seasODI25	-0.50	-0.50	-0.49	-0.47	-0.48	-0.39	-0.28	-0.18	-0.03	0.10	0.11
MePDS	seasODI25	-0.64	-0.63	-0.62	-0.63	-0.62	-0.57	-0.46	-0.30	-0.16	0.00	0.16
NSBII	seasODI25	-0.73	-0.74	-0.76	-0.75	-0.69	-0.59	-0.39	-0.19	-0.01	0.14	0.26
NSBIII	seasODI25	-0.72	-0.71	-0.67	-0.64	-0.70	-0.60	-0.46	-0.27	-0.03	0.15	0.25
ArkBB	seasODI25a	-0.38	-0.45	-0.52	-0.58	-0.63	-0.57	-0.52	-0.49	-0.41	-0.26	-0.10
FehBB	seasODI25a	-0.71	-0.71	-0.69	-0.67	-0.63	-0.46	-0.01	0.32	0.44	0.48	0.55
GB	seasODI25a	-0.50	-0.50	-0.49	-0.47	-0.48	-0.39	-0.28	-0.18	-0.03	0.10	0.11
MePDS	seasODI25a	-0.64	-0.63	-0.62	-0.63	-0.62	-0.57	-0.46	-0.30	-0.16	0.00	0.16

NSBII	seasODI25a	-0.73	-0.74	-0.76	-0.75	-0.69	-0.59	-0.39	-0.19	-0.01	0.14	0.26
NSBIII	seasODI25a	-0.72	-0.71	-0.67	-0.64	-0.70	-0.60	-0.46	-0.27	-0.03	0.15	0.25
ArkBB	seasODI33	-0.38	-0.39	-0.41	-0.44	-0.44	-0.35	-0.25	-0.18	-0.11	0.03	0.14
FehBB	seasODI33	-0.64	-0.63	-0.61	-0.58	-0.57	-0.44	-0.01	0.17	0.18	0.24	0.35
GB	seasODI33	-0.38	-0.38	-0.38	-0.39	-0.52	-0.54	-0.41	-0.19	0.00	0.07	0.07
MePDS	seasODI33	-0.50	-0.46	-0.43	-0.42	-0.40	-0.41	-0.38	-0.29	-0.20	-0.09	0.07
NSBII	seasODI33	-0.64	-0.67	-0.71	-0.72	-0.71	-0.65	-0.49	-0.31	-0.14	0.08	0.29
NSBIII	seasODI33	-0.72	-0.71	-0.68	-0.66	-0.75	-0.67	-0.51	-0.30	-0.07	0.14	0.26
ArkBB	seasODI33a	-0.38	-0.39	-0.41	-0.44	-0.44	-0.35	-0.25	-0.18	-0.11	0.03	0.14
FehBB	seasODI33a	-0.64	-0.63	-0.61	-0.58	-0.57	-0.44	-0.01	0.17	0.18	0.24	0.35
GB	seasODI33a	-0.38	-0.38	-0.38	-0.39	-0.52	-0.54	-0.41	-0.19	0.00	0.07	0.07
MePDS	seasODI33a	-0.50	-0.46	-0.43	-0.42	-0.40	-0.41	-0.38	-0.29	-0.20	-0.09	0.07
NSBII	seasODI33a	-0.64	-0.67	-0.71	-0.72	-0.71	-0.65	-0.49	-0.31	-0.14	0.08	0.29
NSBIII	seasODI33a	-0.72	-0.71	-0.68	-0.66	-0.75	-0.67	-0.51	-0.30	-0.07	0.14	0.26
ArkBB	seasODI33rev	-0.39	-0.45	-0.52	-0.57	-0.62	-0.56	-0.50	-0.47	-0.39	-0.24	-0.08
FehBB	seasODI33rev	-0.71	-0.70	-0.69	-0.67	-0.63	-0.46	-0.01	0.30	0.40	0.44	0.52
GB	seasODI33rev	-0.48	-0.48	-0.48	-0.46	-0.50	-0.42	-0.31	-0.18	-0.02	0.10	0.11
MePDS	seasODI33rev	-0.62	-0.61	-0.60	-0.60	-0.59	-0.55	-0.45	-0.31	-0.18	-0.02	0.14
NSBII	seasODI33rev	-0.71	-0.73	-0.75	-0.75	-0.69	-0.60	-0.41	-0.21	-0.03	0.13	0.27
NSBIII	seasODI33rev	-0.72	-0.71	-0.67	-0.65	-0.71	-0.62	-0.47	-0.27	-0.04	0.15	0.26
ArkBB	seasODI33reva	-0.39	-0.45	-0.52	-0.57	-0.62	-0.56	-0.50	-0.47	-0.39	-0.24	-0.08
FehBB	seasODI33reva	-0.71	-0.70	-0.69	-0.67	-0.63	-0.46	-0.01	0.30	0.40	0.44	0.52
GB	seasODI33reva	-0.48	-0.48	-0.48	-0.46	-0.50	-0.42	-0.31	-0.18	-0.02	0.10	0.11
MePDS	seasODI33reva	-0.62	-0.61	-0.60	-0.60	-0.59	-0.55	-0.45	-0.31	-0.18	-0.02	0.14
NSBII	seasODI33reva	-0.71	-0.73	-0.75	-0.75	-0.69	-0.60	-0.41	-0.21	-0.03	0.13	0.27
NSBIII	seasODI33reva	-0.72	-0.71	-0.67	-0.65	-0.71	-0.62	-0.47	-0.27	-0.04	0.15	0.26
ArkBB	seasODIhalf	-0.40	-0.45	-0.50	-0.55	-0.58	-0.50	-0.44	-0.38	-0.31	-0.16	-0.01
FehBB	seasODIhalf	-0.69	-0.68	-0.66	-0.64	-0.61	-0.45	-0.01	0.25	0.30	0.35	0.44
GB	seasODIhalf	-0.44	-0.44	-0.44	-0.43	-0.51	-0.48	-0.36	-0.19	-0.01	0.09	0.09
MePDS	seasODIhalf	-0.57	-0.54	-0.52	-0.51	-0.50	-0.49	-0.43	-0.31	-0.19	-0.06	0.11
NSBII	seasODIhalf	-0.68	-0.71	-0.73	-0.74	-0.70	-0.62	-0.45	-0.25	-0.08	0.11	0.28
NSBIII	seasODIhalf	-0.72	-0.71	-0.68	-0.66	-0.73	-0.64	-0.49	-0.29	-0.05	0.15	0.26
ArkBB	seasODIhalfa	-0.40	-0.45	-0.50	-0.55	-0.58	-0.50	-0.44	-0.38	-0.31	-0.16	-0.01
FehBB	seasODIhalfa	-0.69	-0.68	-0.66	-0.64	-0.61	-0.45	-0.01	0.25	0.30	0.35	0.44
GB	seasODIhalfa	-0.44	-0.44	-0.44	-0.43	-0.51	-0.48	-0.36	-0.19	-0.01	0.09	0.09
MePDS	seasODIhalfa	-0.57	-0.54	-0.52	-0.51	-0.50	-0.49	-0.43	-0.31	-0.19	-0.06	0.11
NSBII	seasODIhalfa	-0.68	-0.71	-0.73	-0.74	-0.70	-0.62	-0.45	-0.25	-0.08	0.11	0.28
NSBIII	seasODIhalfa	-0.72	-0.71	-0.68	-0.66	-0.73	-0.64	-0.49	-0.29	-0.05	0.15	0.26

References:

MARNET: Oceanographic data from North West Shelf and from the Baltic Sea, dod@bsh.de [dataset], 2018-2023.