Suomen ympäristökeskus
Finlands miljöcentral
Finnish Environment Institute

ILMATIETEEN LAITOS

CRUISE REPORT

R/V Aranda

Cruise 02/2026

Kevätseuranta 2026

13.4.2026 – 23.4.2026

This report is based on preliminary data and is subject to changes.

Objectives of the cruise

The objectives of the cruise were:

1) Monitoring of the Northern Baltic Proper, Åland sea and the Southern part of the Bothnian Sea. Measured parameters were inorganic nutrients, profiles of salinity and temperature (CTD), pH, oxygen and hydrogen-sulfide.
2) Deployments of wave buoys and other oceanographic instruments
3) Profiles of particles in the water
4) DNA filtration for determining both the prokaryote and eukaryote planktonic community

Table 1 The scientific crew

Name	On board	Organization
Kristian Spilling	13.4 – 24.4	Syke
Jere Riikonen	13.4 – 24.4	Syke
Anne-Mari Lehto	13.4 – 24.4	Syke
Riikka Mattson	13.4 – 24.4	Syke
Pia Varmanen	13.4 – 24.4	Syke
Ilkka Lastumäki	13.4 – 24.4	Syke
Susanna Hyvärinen	14.4 - 24.4	Syke
Okko Outinen	14.4 - 24.4	Syke
Antti Räike	14.4 - 24.4	Syke
Riikka Autio	13.4	Syke
Jarkko Moberg	13.4	Syke
Vivi Fleming	13.4	Syke
Aino Laine	13.4	Syke
Leif Schulman	13.4	Syke
Tero Eklin	13.4	Syke
Tuomo Roine	13.4 – 24.4	IL
Meri Smedberg	13.4 – 24.4	IL
Sami Rantapusa	14.4 - 24.4	IL
Joonas Virtasalo	13.4 – 24.4	GTK
Eero Asmala	13.4 – 24.4	GTK
Marine Poizat	14.4 - 24.4	GTK
Alina Kiedrynska	13.4 – 24.4	MIR/UW Poland
Michael Fetweis	13.4 – 24.4	RBINS, Belgium
Louise Delhaye	13.4 – 24.4	RBINS, Belgium
Saumya Silori	13.4 – 24.4	RBINS, Belgium

Evert Lund	13.4 – 24.4	Syke, civil service
Antti Lindtman	13.4	SDP
Tytti Tuppurainen	13.4	SDP
Siiri Kettunen	13.4	SDP

Cruise Route

We left Helsinki at 0900 local time on 13 April 2026, and sailed to the first sampling location in the middle of Gulf of Finland. After this we returned to Helsinki and arrived at 14.00 to let some persons off the ship and get fuel and supplies. We left again at 0900 on 14 April and made our way east in the Gulf of Finland before turning westwards. We sampled in the Northern Baltic Proper before sailing north through the Åland Sea and sampled on the western side of Bothnian Sea while moving northwards. After the northernmost point (BO3) in the Bothnian Bay, we sailed south on the eastern side of Bothnian Sea before entering the Archipelago Sea. After deployments around Utö island we had a final sampling location at the entrance of the Gulf of Finland (LL12).

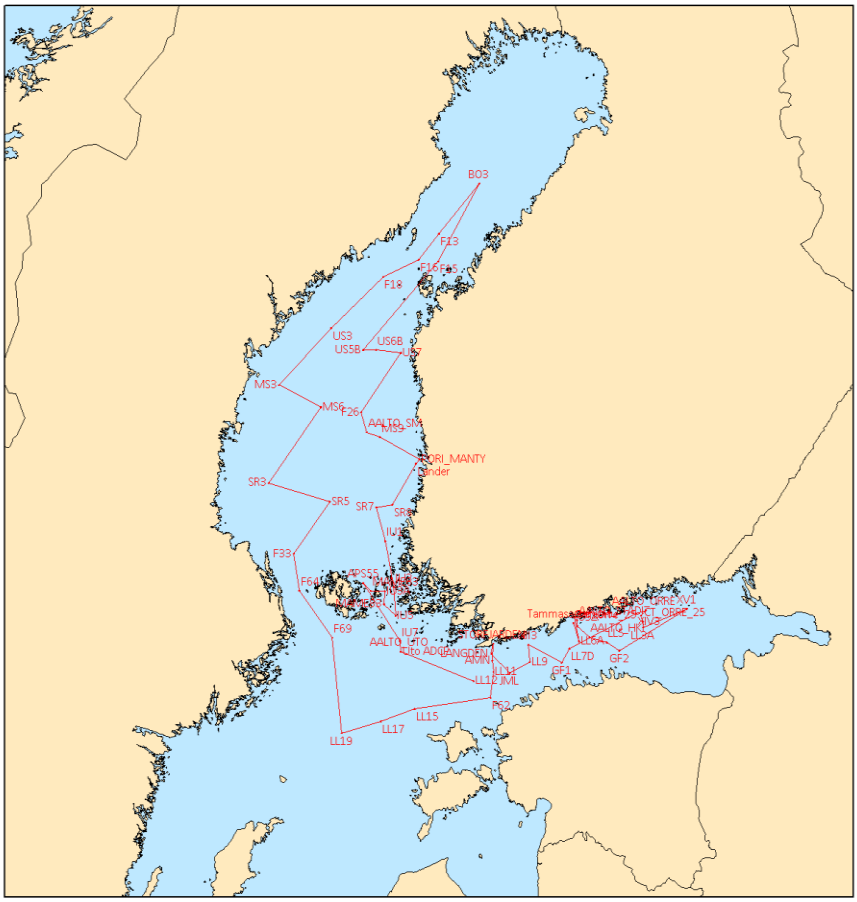

Fig 1 Cruise route

Observations

The spring bloom was well underway in most of the sampled areas. In most of Gulf of Finland, we were sampling after the main peak of the bloom but were sampling the peak in the easternmost parts with Chla concentrations above 20 µg L^{-1}. Judging from the concentrations of nitrate and phosphate remaining in the surface, the Gulf of Finland was clearly N-limited, whereas Northern

Baltic Proper, Åland and Archipelago Sea as well as the Bothnian Sea were N-limited. The Bothnian Bay was as expected P-limited on the other hand (Fig 2). The ongoing spring bloom was also reflected in the pH and O2 as these are directly influenced by photosynthesis, which adds oxygen to the water and reduces pCO2 concentrations that drives the pH higher (Fig 3). The concentration of chlorophyll a (Chla) as the main photosynthetic pigment, had a similar pattern (Fig 4).

The bottom conditions with respect to oxygen, inorganic nutrients and hydrogen-sulfide concentration was as expected for the time of year, with anoxic conditions in the Northern Baltic Proper and parts of the Gulf of Finland (Fig 5). The Gulf of Bothnia was well oxygenated down to the bottom. The bottom conditions were also reflected in the nitrogen species available (Fig 6). Overall, the cruise covered a heterogenous Baltic Sea, with large variability between subbasins (Fig 7).

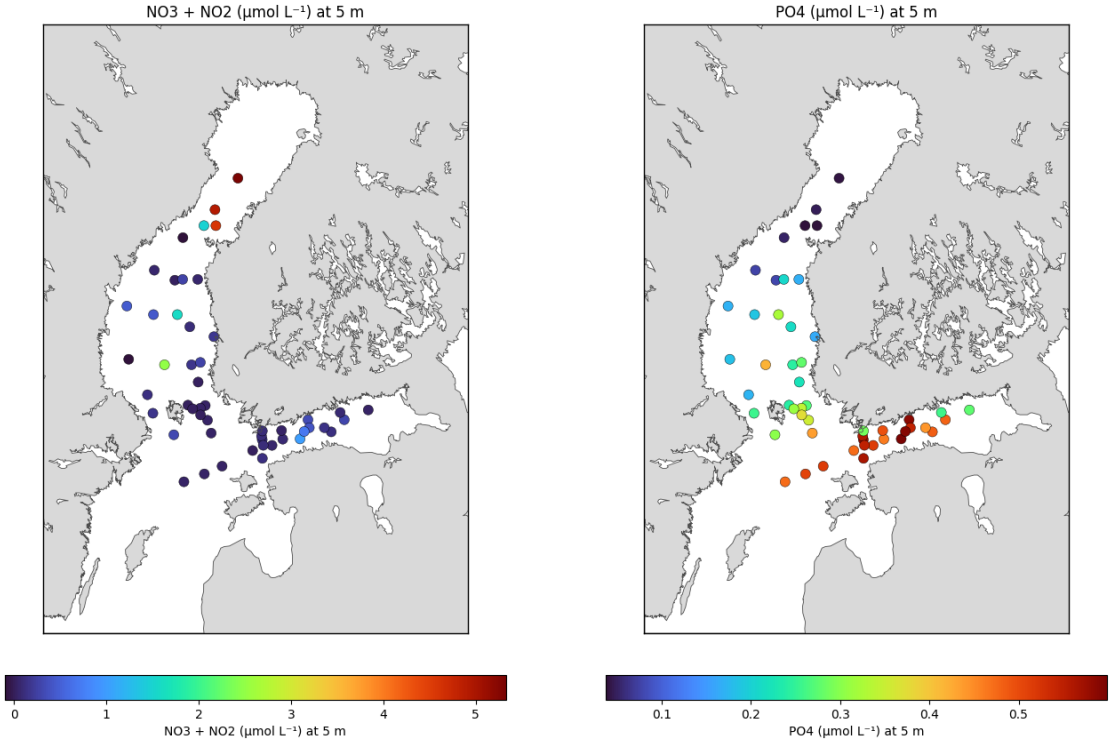

Fig 2- The concentration of nitrate + nitrite left and phosphate right at 5 m depth in the sampling stations.

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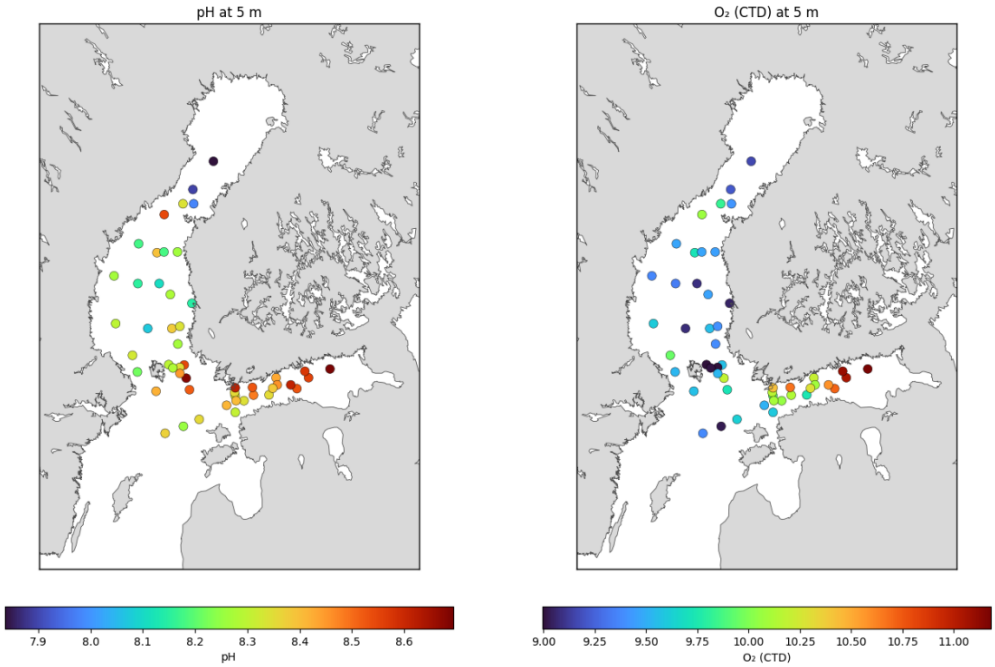

Fig 3. The pH (left) and dissolved oxygen (right) at 5 m depth.

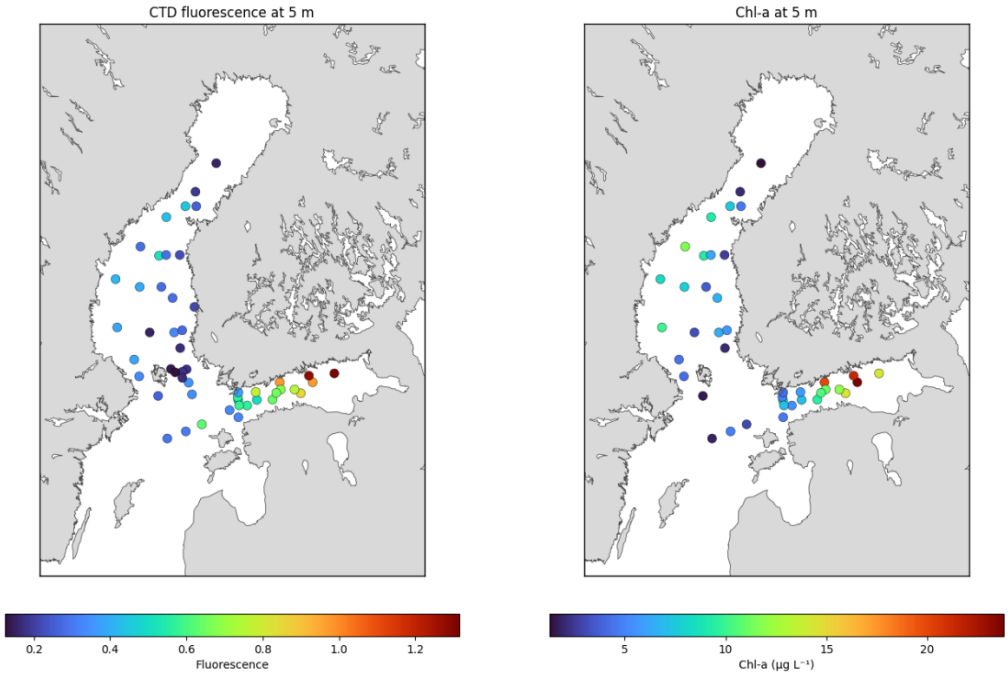

Fig 4. The chlorophyll a (Chla) fluorescence left and direct measured Chla (right)

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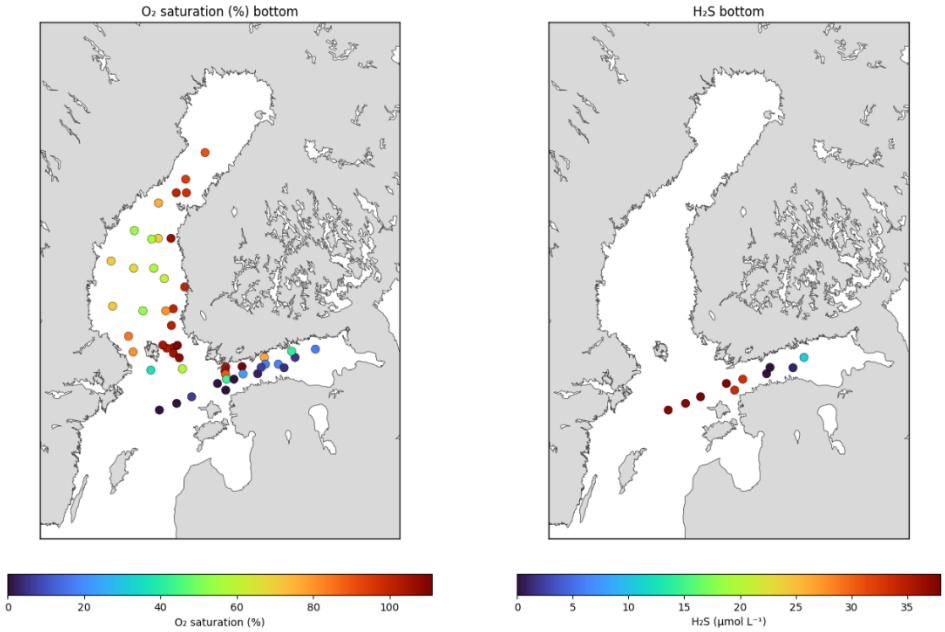

Fig 5. The oxygen saturation (left) and hydrogen-sulfide concentration (right) measured 1 m above the seafloor.

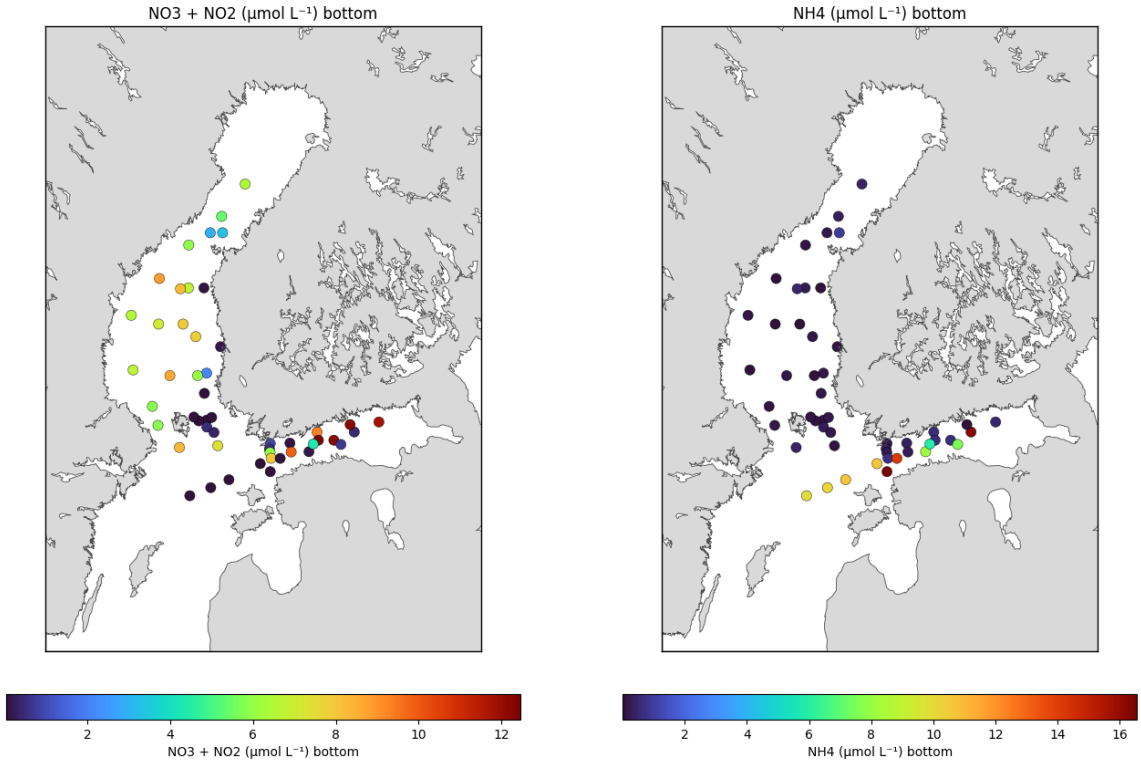

Fig 6. Nitrate + nitrite (left) and ammonium (right) measured 1 m above the seafloor.

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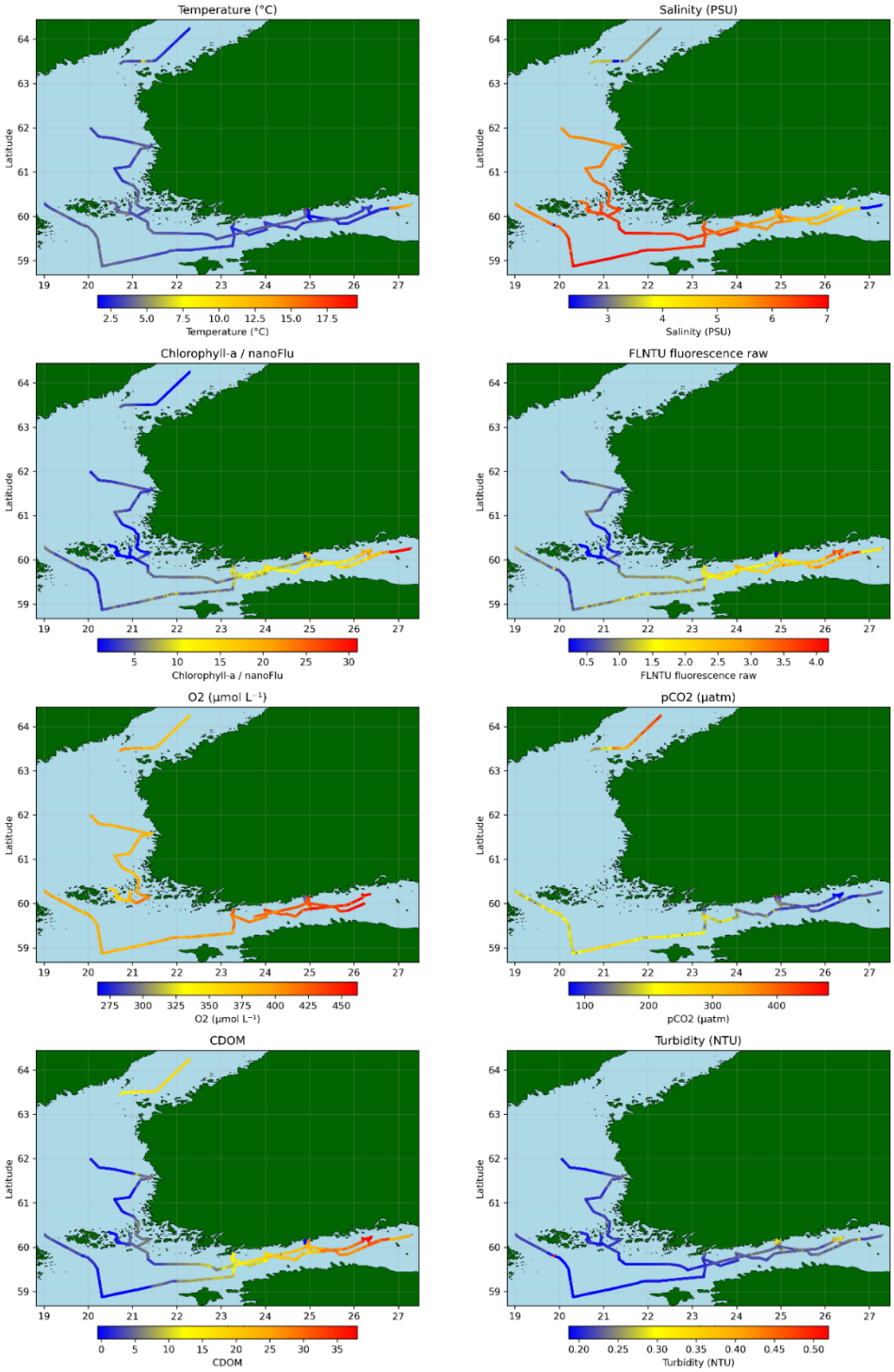

Fig 7. Information from the flowthrough system that captures different variables from 3 m depth intake. Part of the track is missing due to technical problems. This is raw data that might change after quality control.

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Conclusions

We were sampling at the peak or right after the peak of the spring bloom in the Gulf of Finland. Further north in the Bothnian Sea, there were relatively little nutrients left in the surface waters, but less developed bloom there. Overall we had great weather during the whole cruise and everything went smoothly.

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Annex 2. List of sampled stations of the cruise

INDEX	STATION	latitude	longitude	depth	DATE	time	ctd	pH	ox	nu	ph	zo	be	chl	oil	tox	secchi
TammasaarenlaituriTammasaarenlaitu		60.09313	24.89785		2026-04-13	06.49											
2026010071	LL6A	59.91693	25.03008	75	2026-04-13	08.16	x	x	x	x				x			x
TammasaarenlaituriTammasaarenlaitu		60.15012	24.92130		2026-04-13	11.37											
2026010072	AALTO_STADI	60.12347	24.97383	21	2026-04-14	07.11											
2026010073	39A	60.06685	24.98023	43	2026-04-14	08.24	x	x	x	x				x			
2026010074	AALTO_HKI	59.96512	25.23655	54	2026-04-14	12.29											
2026010075	LL5	59.91685	25.59683	69	2026-04-14	13.50	x	x	x	x				x			x
2026010076	GF2	59.83857	25.85677	85	2026-04-14	17.06	x	x	x	x				x			
2026010077	XV1	60.25043	27.24933	52	2026-04-14	23.41	x	x	x	x	x			x			
2026010078	LL3A	60.06730	26.34672	69	2026-04-15	03.48	x	x	x	x	x			x			
2026010079	CT_ORRE_25	60.12603	26.33652		2026-04-15	05.58											
2026010080	Gof_Orre_25	60.18268	26.29878	57	2026-04-15	09.29											
2026010081	AALTO_ORRE	60.23337	26.39223	28	2026-04-15	10.55											
2026010082	XIV3	60.20320	26.19283	76	2026-04-15	12.02	x	x	x	x				x			x
2026010083	LL7D	59.84640	24.83807	103	2026-04-15	18.46	x	x	x	x	x			x			
2026010084	GF1	59.70503	24.68235	84	2026-04-15	21.23	x	x	x	x	x			x			
2026010085	XII3	59.86423	23.98548	37	2026-04-16	01.16	x	x	x	x				x			
2026010086	LL9	59.70013	24.03033	66	2026-04-16	03.12	x	x	x	x	x			x			
2026010087	JML	59.58192	23.62693	80	2026-04-16	05.44	x	x	x	x				x			x
2026010088	LANGDEN	59.75682	23.23175	47	2026-04-16	09.25	x	x	x	x	x			x			x
2026010089	STORFJARDEN	59.85600	23.26325	34	2026-04-16	11.22	x	x	x	x				x			x
2026010090	AMN	59.69047	23.25707	55	2026-04-16	13.56	x	x	x	x				x			x
2026010091	LL11	59.58343	23.29682	67	2026-04-16	15.35	x	x	x	x				x			x
2026010092	F62	59.33362	23.26347	97	2026-04-16	18.05	x	x	x	x				x			
2026010093	LL15	59.18330	21.74680	131	2026-04-17	00.28	x	x	x	x				x			
2026010094	LL17	59.03335	21.07952	171	2026-04-17	04.32	x	x	x	x	x			x			x
2026010095	LL19	58.88070	20.31078	169	2026-04-17	09.55	x	x	x	x				x			x
2026010096	F69	59.78328	19.93000	191	2026-04-17	17.16	x	x	x	x				x			
2026010097	F64	60.18893	19.14250	287	2026-04-17	22.48	x	x	x	x	x			x			
2026010098	F33	60.53328	18.93752	135	2026-04-18	04.00	x	x	x	x				x			
2026010099	SR5	61.08332	19.57960	125	2026-04-18	09.10	x	x	x	x	x			x			x
2026010100	SR3	61.18335	18.23002	72	2026-04-18	15.32	x	x	x	x				x			x
2026010101	MS6	61.98367	19.16347	72	2026-04-18	22.12	x	x	x	x				x			
2026010102	MS3	62.13450	18.16292	83	2026-04-19	02.13	x	x	x	x				x			

INDEX	STATION	latitude	longitude	depth	DATE	time	ctd	pH	ox	nu	ph	zo	be	chl	oil	tox	secchi
2026010103	US3	62.75878	19.19592	176	2026-04-19	07.49	x	x	x	x				x			x
2026010104	F18	63.31435	20.27267	103	2026-04-19	15.55	x	x	x	x				x			
2026010105	F16	63.51685	21.06278	48	2026-04-19	19.46	x	x	x	x	x			x			
2026010106	F13	63.78355	21.47952	64	2026-04-19	23.36	x	x	x	x				x			
2026010107	BO3	64.30202	22.34310	109	2026-04-20	04.04	x	x	x	x	x			x			x
2026010108	F15	63.51665	21.51300	48	2026-04-20	12.05	x	x	x	x				x			x
2026010109	US5B	62.58615	19.96873	221	2026-04-20	21.04	x	x	x	x	x			x			
2026010110	US6B	62.60018	20.26295	81	2026-04-21	00.35	x	x	x	x				x			
2026010111	US7	62.60015	20.82963	27	2026-04-21	03.20	x	x	x	x				x			
2026010112	F26	61.98362	20.06290	138	2026-04-21	08.12	x	x	x	x				x			x
2026010113	AALTO_SM	61.80020	20.23297	107	2026-04-21	12.07											x
2026010114	MS9	61.76683	20.53052	101	2026-04-21	13.57	x	x	x	x				x			x
2026010115	PORI_MANTY	61.59068	21.43827	13	2026-04-21	19.06	x	x	x	x				x			
2026010116	Lander	61.54920	21.36627	18	2026-04-21	20.01											
2026010117	SR8	61.12647	20.93003	47	2026-04-22	01.22	x	x	x	x				x			
2026010118	SR7	61.08348	20.59653	78	2026-04-22	03.23	x	x	x	x				x			
2026010119	IU1	60.76697	20.84653	33	2026-04-22	06.33	x	x	x	x				x			x
2026010120	IU3	60.33338	21.11323	51	2026-04-22	11.19	x	x	x	x				x			x
2026010121	IU5	60.05813	21.19837	89	2026-04-22	14.51	x	x	x	x				x			x
2026010122	MAME83	60.15698	20.93637	56	2026-04-22	17.43	x	x	x	x				x			
2026010123	IU3A	60.28333	20.93005	28	2026-04-23	03.31	x	x	x	x				x			
2026010124	MAME63	60.27107	20.63938	37	2026-04-23	07.04	x	x	x	x				x			x
2026010125	APS55	60.33977	20.46152	55	2026-04-23	09.16	x	x	x	x				x			x
2026010126	IU7	59.81523	21.33648	92	2026-04-23	14.34	x	x	x	x	x			x			
2026010127	Uto ADCP	59.71475	21.37040	74	2026-04-23	17.08											
2026010128	AALTO_UTO	59.71720	21.36648	71	2026-04-23	18.01											
2026010129	LL12	59.48352	22.89668	82	2026-04-23	23.51	x	x	x	x	x			x			

Parameters: ox = oxygen, nu = nutrients, ph = phytoplankton, zo = zooplankton, be = benthos, chl = chlorophyll a, oil = dissolved oil, tox = phytotoxins.