CRUISE REPORT HYWIND TAMPEN DECEMBER 2025 AND MARCH 2026

Cruise no. 2025001020 and 2026001021

Cruise leader(s): Anne Christine Utne Palm (IMR)

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Summary (English):

Cruise with RV G.O. Sars, 6–18 December 2025 and 2-12 March 2026 at Hywind Tampen (HT). *Main aims:* (1) look for possible wake-effect on hydrography and plankton distribution, by ADCP moorings and transect with CTD and plankton stations, (2) asses sound pollution and its propagation, by hydrophone moorings, (3) assess pelagic fish distribution by acoustics transect, fish ground-truthing by trawling with DeepVision (camera in trawls, open cod-end) and eDNA, (4) look for reef-effect around suction anchors and chains, by conducting ROV transects, (5) deploying Landers (bottom-sat instrument riggs) in the two opened offshore wind (OW) area Vestavind F and Sørvest F.

Major activities: Deploy and retrieve 3 ADCP moorings: one inside HT (between turbine Hy03 and Hy02), one ~5 km South, one ~5 km North-East of HT. Deploy 2 hydrophone moorings on a ~600 m and ~2 km from HY10. The moorings were deployed during the December survey and retrieved during the March survey, except for the hydrophone mooring at ~600 m from turbine HY10. Further, we conducted multiple CTD transects (across-shelf and through HT), sampled nutrients and chlorophyll at all stations, plankton at 15 and eDNA at 10 stations. We performed acoustic transects around (flower) and across HT using the vessels multifrequency acoustics and ADCP, to look at fish distribution related to current and turbine structure. Reef-effect was studied by conducting transects around suction anchors and along the turbines anchor chains in addition to control transects. We further used the ROV to recover a lander frame lost on a previous cruise at HT, recover a ADCP rigg inside HT and to recover a lost trawl in Korsfjorden close to Bergen.

Preliminary results: Oceanography and plankton: prelimminary results unveil that the water column at HT was well-mixed inside and around HT. Stratification appears only at the deepest station ~400 m (colder, slightly saltier bottom water). A higher biomass of plankton in the upper 100 m, and no clear spatial trend in the limited dataset, species ID is pending. Overall, there zooplankton biomass was significantly lower in March compared to the December, proving that the spring blume had not yet started or effected the zooplankton. *Reef-effect:* The ROV transects showed that echinoderms and calcareous bristle worms dominated, but where much more common along the controle compared to the chain transects. Some invertebrates in particular squat lobster, hermit crabs, sea anemone where much more common along chain versus control transects. In general, demersal fish (tusk and ling) were abundant along the chain transect and more or less absent from the camera view at control transects. Saith was observed on both control and chain transects, as they are highly attracted to the camera light. Data is limited only seven out of the twelve planed transects was conducted. *Fish distribution:* In December the acoustics transects across HT showed reduced density/backscatter inside the farm (reductions ~0.3–1.7 dB), others showed accumulation/edge effects inside. This pattern was not seen during the March cruise, thus the preliminary study shows no clear attraction or repel effect to the OWF.

We unfortunately had to leave HT without one of the Hydrophone riggs (the on at 600 m from turbine Hy10), due to bad weather conditions. We hope to be able to pick this up in Nowember 2026.

Updated 2026 Sept. 21: Updated author list

Summary (Norwegian):

Cruise med RV G.O. Sars, 6.–18. desember 2025 og 2.–12. mars 2026 ved Hywind Tampen (HT). *Hovedmål:* (1) undersøke mulig wake-effekt på hydrografi og planktonfordeling ved hjelp av ADCP-rigger og transekter med CTD- og planktonstasjoner, (2) vurdere støyforurensning og utbredelsen av denne ved hjelp av hydrofonfortøyninger, (3) kartlegge pelagisk fiskefordeling ved akustiske transekter, og "ground-truthing" ved tråling med DeepVision (kamera i trål, med åpen sekk) og eDNA, (4) undersøke rev-effekt rundt sugeankre og kjettinger ved å gjennomføre ROV-transekter, (5) utplassere landere (instrument rigger plasert på bunnen) i de to åpne havvindområdene (OW) Vestavind F og Sørvest F.

Hovedaktiviteter: Utplassere og hente inn 3 ADCP rigger: én inne i HT (mellom turbin Hy03 og Hy02), én ca. 5 km sør, og én ca. 5 km nordøst for HT. Utplassere 2 hydrofonfortøyninger på henholdsvis ca. 600 m og ca. 2 km fra HY10. Riggene ble satt ut under toktet i desember og hentet inn igjen under toktene i mars, med unntak av den ene hydrofonriggen ca. 600 m fra turbin HY10. Videre gjennomførte vi flere CTD-transekter (tvers over sokkelen og gjennom HT), hvor vi tok næringssalter, klorofyll på alle stasjoner, plankton på 15 stasjoner og eDNA på 10 stasjoner. Vi gjennomførte akustiske transekter rundt HT (blomstermønster), igjennom og på tvers av HT med G.O. Sars. Hvor vi brukte fartøyets multifrekvente akustikksystem og ADCP for å undersøke fiskefordeling i forhold til strøm og turbinstruktur. Rev-effekt ble undersøkt ved å gjennomføre ROV transekter rundt sugeankrene og langs turbinenes ankrekjettinger i tillegg til kontrolltransekter. Vi brukte også ROV for å hente opp en landerramme som vi mistet på et tidligere tokt ved HT, en ADCP-rigg inne i HT, samt for å hente opp en tapt trål i Korsfjorden nær Bergen.

Foreløpige resultat: Oseanografi og plankton: De foreløpige resultatene viste at vannsøylen ved HT var godt omblandet både inne i og rundt HT i desember og mars. Sjiktning forekom kun ved den dypeste stasjonen, ca. 400 m (kalde, svakt saltere bunnvannsmasser). Det var en høyere biomasse av plankton i de øverste 100 m, uten tydelige romlige trender i dette begrensede datasettet; artsbestemmelse pågår. Generelt var zooplanktonbiomassen

signifikant lavere i mars enn i desember, noe som viser at våroppblomstringen ennå ikke hadde startet. *Rev-effekt:* ROV-transektene viste at pigghuder og kalkrørsorm dominerte, men var mye mer vanlig langs kontrolltransektene sammenlignet med kjettingtransektene. Noen virvelløse dyr, spesielt hummer, eremittkreps og sjøanemone, var derimot mye vanligere langs kjetting - kontra kontrolltransektene. Stedvis var det rikelig med lange langs kjettingtransektene, mens disse var mer eller mindre fraværende fra på kontroll transektene. Likeledes ble brosme bare observert på kjettingtransektene og ved sugeanker. Sei ble observert på både kontroll- og kjedetransektene (noe mer hyppig på kontroll), men denne arten tiltrekkes av kameralyset fra ROVen. Dataene er begrenset – bare syv av de tolv planlagte transektene ble utført. *Fiskefordeling:* I desember viste de akustiske transektene på tvers av HT redusert tetthet av fisk inne i parken (reduksjoner på ca. 0,3–1,7 dB), mens andre transekter viste akkumulering/“edge effects” inne i parken. Dette mønsteret ble ikke observert under toktet i mars; den foreløpige analysen viser dermed ingen klar tiltrekkende eller frastøtende effekt av havvindparken (OWF).

Vi måtte dessverre forlate HT uten å få hentet opp én av hydrofonriggene (den på 600 m fra turbin Hy10) på grunn av dårlige værforhold. Vi håper å kunne hente denne opp i november 2026.

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1. Background

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Hywind Tampen is the first floating windfarm in Norwegian waters. With its 11 turbines it is among the biggest, floating wind farms in the world. It is built and operated by Equinor and supports oil and gas installations

Gullfaks and Snorre with renewable energy. It was constructed during 2022-2023 and holds a

total capacity of 88 MW. For more details on Hywind Tampen, structure and design look at (rapport Equinor,

2019).

1.1. The Hywind Tampen turbine structure

(text and figures taken from Equinor report: Hywind Tampen PUD del II – Konsekvensutredning).

The wind turbines are standard offshore wind turbines placed on a floating concrete base (Fig. 1). The blades are produced in fiberglass/epoxy. The turbines have a total height of approximately 190 meters from the bottom of the chassis to the centre of the nacelle. The distance between the sea surface and the blade tip is approx. 23 meters. The rotor has a diameter of 167 metres. Each wind turbine is anchored to the seabed with three anchor lines consisting of steel wire and chain (138 mm). Each of the anchor lines extend approximately 800 meters from the installations and is moored to suction anchors on the seabed. A total of 19 suction anchors of which 9 act as common anchors for 2 or 3 turbines.

The wind turbines are linked together with power cables that run between the turbines (internal cables). The power cables hit the seabed 400 - 500 meters from the turbine. Where the power cables hit the seabed, a small anchor will be installed to hold the cables in place. The internal cables that link two wind turbines together will be around 2 km long. The export cables are static cables that are buried.

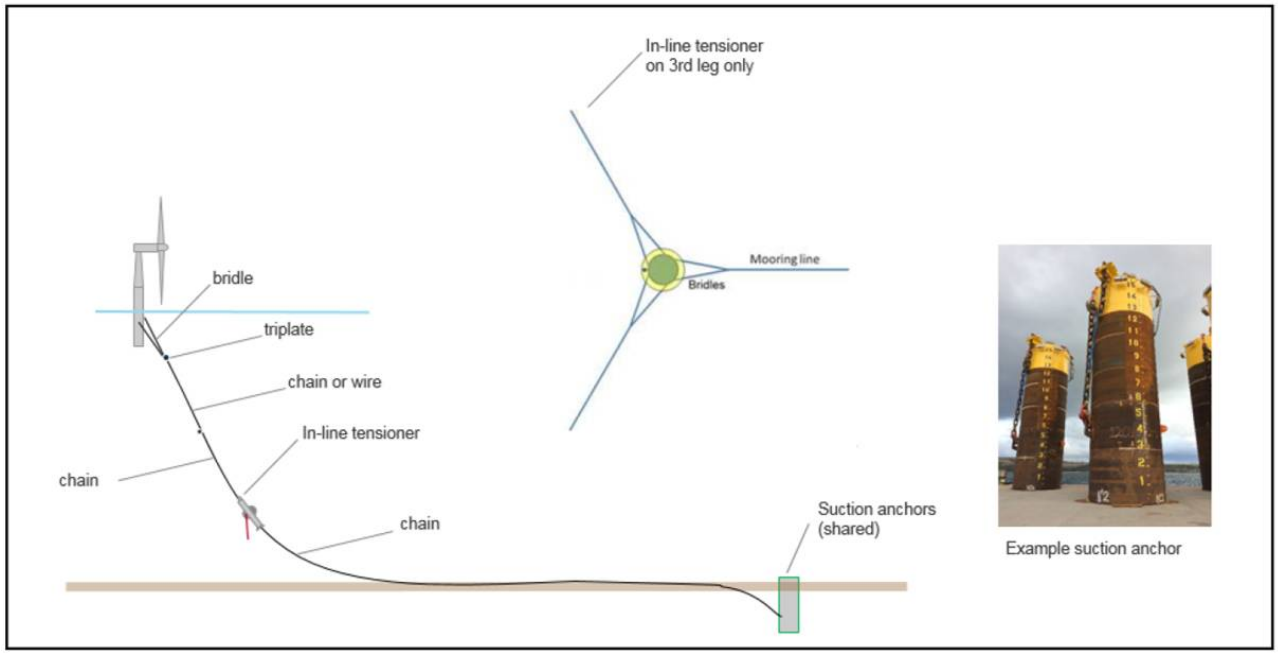


Figure 1: Illustration of anchoring of Hywind Tampen turbine copied from Equinor report: Hywind Tampen PUD del II – Konsekvensutredning 2019.

1.2. Aim of cruises

These two cruises are following ups of previous yearly cruises in 2023 (Utne-Palm et al. 2023) and in 2024 (Utne-Palm et al. 2024). There is little knowledge related to how floating wind farms effect the marine environment, as this technology is still relatively new, and HT being the largest floating OW in the world. Thus, data gathered on these cruises is novel. Further, sixteen of the twenty selected OW sites in Norway are in deep water area where floating turbines are needed. Thus, any knowledge we can get from HT regarding environmental effects is of great value to the development of offshore wind in Norway. Offshore wind impacts the maritime environment, primarily through underwater noise from constructions and turbine operation, changes to wind-driven ocean currents (*wake-effect*), electromagnetic fields from subsea cables, habitat alterations (*reef-effect*), and chemical and solid discharges, from corrosion (microplastic from turbine blades) and the continuous leaching of heavy metals from anti-fouling and galvanic protection systems. We have aimed at covering as many as possible of these factors on our cruises.

Wake-effect: The windfarm removes wind, causing a wake, that may affect the water stratification and current system in the area around HT. That in turn might affect plankton distribution. To study this effect, we conducted several CTD transects across the windfarm and shelf area. On selected stations (15 in total), we also took water-bottle samples for nutrients and chlorophyll a as well as plankton samples (WP2 plankton net), on the March cruise eDNA was also taken at these 10 stations. Throughout the cruise, we collected current measurements using the vessel-mounted ADCP. We further deployed and retrieved 3 ADCP moorings; one within HT, one south and one north of HT.

Underwater noise: We deploy two hydrophone moorings one at 600 m and on at 2 km distance to turbine 10 (Hy10). The hydrophone data from these two moorings will be used to evaluate sound propagation models for HT (part of the NFR project *WindSys*). All moorings were deployed on the December cruise and was to be picked up on the March cruise.

Fish distribution: Thus, to look at possible attraction or avoidance effects on pelagic fish distribution, we conducted several acoustics transects through and around the wind farm with RV G.O. Sars aiming at completing several transect from ~5 nm outside and through HT following the same flower-like transect that we used in previous years.

For ground truthing of acoustic findings we use a trawl with an open cod-end equipped with a camera (*DeepVision*), and we sample *eDNA* from different depths.

Reef-effect: Our aim was to gain more knowledge about the effects of floating offshore wind farms on the bottom environment. The wind turbines at Hywind Tampen are secured to the soft bottom by suction anchors and chains. All subsea hard structure: the anchors, chains and the submerged part (90 m) of the turbine pilar, introduce a new type of habitat in this softbottom area. A habitat that we expect will be colonized by hard bottom species, resulting in additional food sources and shelter for higher trophic levels (Lindboom et al. 2011). Studies have shown that ecosystem processes and properties can be sensitive to changes in food web generated by OWF installations (Burkhard et al., 2011).

G.O. Sars is not allowed closer then 500m to the turbines, thus, in 2023 we used an acoustic kayak drone within the 500 m range to the wind turbines. With the kayak drone we managed to get as close as ca 20 m to the turbines, however, this was not close enough for the acoustic to cover the fundament and the area close by where we expect to find fish aggregations (*Reef-effect*). In 2023 we also conducted ROV transects along six anchor chains and 3 suction-anchors including control transect (no structure), to look for possible reef effect around the bottom mounted structure. During the 2025 and 2026 cruise we aimed at repeating these transects to look for possible changes in fauna around the structure after three years of operation.

As part of the *WindSys* project we have deployed what we call an ObsFAD at HT, an observation rigg holding an echosounder, CTD, hydrophone, telemetry and a Fish Aggregation Device (set of underwater buoys at ~25 m depth). Hopefully this device will aggregate pelagic fish, and allow behavioural studies related to the temporal variations in windfarm noise. For the *WindSys* project, where Equinor is a collaborator, we have also deployed a Lander at HT. This lander holds, a bottom mounted multibeam echosounder, ADCP, hydrophones, CTD, oxygen – and turbidity sensors. Thus, the Lander will give us the possibility to observe fish behaviour related to sound and other environmental factors. Data is downloaded once a year from these to platforms, next time is November 2026.

2. Activity

2.1. Hywind Tampen (7 to 17th of December)

A detailed logbook of all activities during the cruise is available in Appendix (6. All stations).

Given bad weather predictions, with only a narrow window of less strong wind, over the next 1-2 days, we steamed directly to HT to deploy ADCP's and hydrophones, hoping for the sea to calm down for ROV deployment. Or plan 1 was to conduct the follow up ROV transect along the chain and suction anchors at HT, and to retrieve a Lander frame that we had left on the bottom inside HT on a previous cruise. To be able to use ROV *Freyja* we need calm weather (< 2m waves). The Tampen area is known for its rough seas and wind, so we had to use any calmer window efficiently.

2.1.1 Deployment of Hydrophones and ADCP moorings

Before entering Hywind Tampen we contacted Equinor to open our working licences at HT. We started with deploying the two hydrophone moorings. Hydrophone mooring 1 was sat at 600 m from Hywind Turbine 10 (Hy10). Hydrophone mooring 2 was placed at 1400 m from Hydrophone 1 and 2000 m from Hy10at (positions are given in Table 1). This was followed by the deployment of the three ADCP moorings. ADCP1 was deployed within HT between Hy02 and Hy03, close to suction anchor no. 7 (SA07). ADCP2 was deployed ~5km south of turbine no. 6 (Hy06), and ADCP3 was deployed ~5km north-east of turbine no. 1 (Hy01). Positions of the ADCP moorings corresponded to our earlier deployments in March 2023.

After deployment all 5 moorings were added to Barentswatch, and information on position and type of equipment was sent to Equinor, and fishers organisations.

Hydrophone mooring design

The hydrophone mooring consisted of two hydrophones and CTD mounted in a float and attached by rope to an acoustic release which is attached by chain to a bottom anchor in form of two train wheels (Appendix fig. 4 and 5). Hydrophone mooring 1 holds two Aural M3 hydrophones, while Hydrophone mooring 2 holds two SoundTrap hydrophones.

ADCP mooring design

The moorings consisted of a Signature250 ADCP mounted in a float and attached by rope to an acoustic release which is attached by chain to a bottom anchor in form of train wheels (see Appendix 1, 2 and 3). ADCP's have a CTD on their mooring, clamped onto the rope below the ADCP. The mooring is equipped with an acoustic release. The acoustic triggers act as transponders. When desired, we can send a signal from G.O. Sars and measure distances.

Table1. ADCP and Hydrophone mooring positions.

Mooring	Latitude (DDM)	Longitude (DDM)	~ bottom depth (m)	Comment

ADCP1	61° 20.79'N	2° 15.61'E	292	Close to suction-anchor no. 7 (SA07)
ADCP2	61° 15.38'N	2° 17.35'E	250	5km south of turbine no. 6 (HY06)
ADCP3	61° 23.35'N	2° 20.07'E	315	5km north-east of turbine no. 1 (Hy01)
Hydrophone 1 two Aural M3	61° 20.56'N	2° 13.67'E	287	~ 600 m from turbine no. 10 (Hy10)
Hydrophone 2 Two sound-traps	61°20.36' N	2° 12.17' E	282	~2000 m from turbine no. 10 (Hy10)

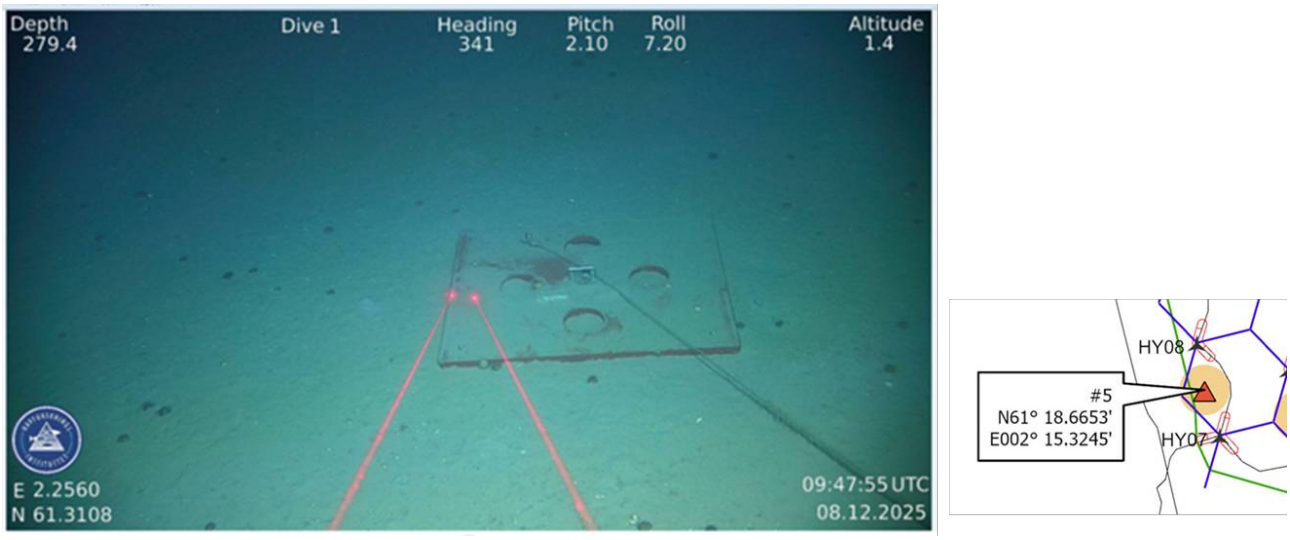


Figure 2. Left: Picture of Lander bottom frame, taken by ROV Freyja during pick up at Hywind Tampen. Right: Position of Lander at Hywind Tampen, depth is 280 m.

2.1.2. Retrieve Lander frame with Dyneema rope

A Lander's bottom plate and Dyneema rope (300m long) were lost when retrieving the Lander in summer 2025 (Fig. 2). The Lander frame was within HT between Hy08 and Hy07. Followed by asking Equinor Kokstad to open or working licences we deployed ROV *Freyja*.

Method: We used a detailed map of underwater structure (provided by Equinor) to keep >250m away from HT cables and chains in our search. Before deploying ROV we also considered current direction, given that there was a 300 m long rope attached to the lander bottom plate. We used the ROV to connect a rope from the aft winch to the lander bottom plate, while paying attention to the current we could lift in the ROV while also lifting lander bottom plate.

Lost the ROV: The tether tired off when latching the ROV on board, due to one big swell. We asked Equinor for permission to use the mob boat to pick up the ROV as it was drifting towards turbine Hy08. Using the mob boat to tow it back out of the 500 m restriction zone, where GO Sars could pick it up.

2.1.3. CTD transects, with water sampling and plankton net

After asking Equinor Kokstad to open licences we conducted a CTD station transect across HT starting at the Tampen plateau and down the slope (from South-West to North-East). We also did two control transects over the same depth range across the shelf north and south of Hywind Tampen (Fig. 3, left). At every CTD station on the cross shelf transects (Fig. 3 left) we also took water samples for nutrients and chlorophyll a as well as plankton net (WP2) hauls.

When we were within HT we always stopped the CTD or WP2 net at 20 m above seabed due to underwater structure (e.g. floated cables, anchor, chains).

A CTD transects with nutrients only were also conducted running through HT from South-West to North-East and from North-West to South-East (see Fig. 3 mid). Furthermore, we did an extended cross shelf CTD transect (Fig. 3 right), that was an extended version of the central Mid cross shelf transect (Fig. 3 left).

Nutrients

We used IMR's standard sampling depths: 5, 10, 20, 30, 50, 75, 100, 125, 150, 200, 250 and 300 m.

Chlorophyl

We sampled chlorophyl a from surface to 100 m depth in the same standard intervals as for the nutrients (see above).

Zooplankton sampling

Plankton samples were always taken by two net hauls. First from 100 m to surface and then from bottom to surface using WP2 net. Our plan was to take from the pycnocline to surface, but as the water column was so well mixed by all the bad weather conditions, we could not see a clear pycnocline and decided to sample upper 100 m as standard. Plankton samples were only taken at the 15 stations in the cross shelf transect (Fig. 3 left).

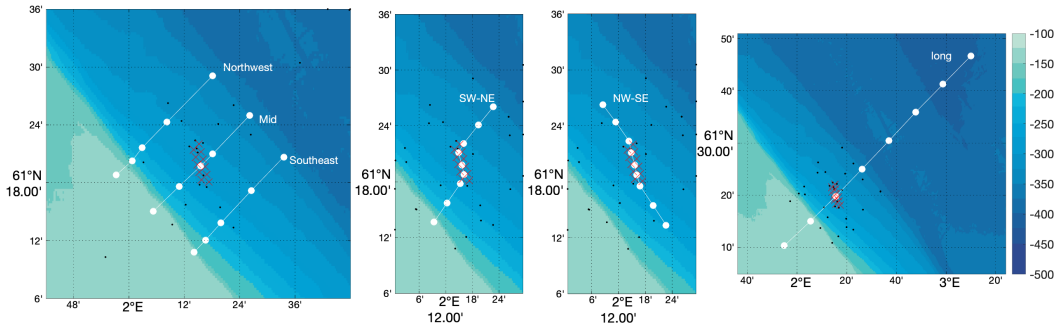


Figure 3. CTD transects conducted on this cruise: Left: Cross shelf CTD transect with water samples, nutrients, chlorophyll a and WP2 net at all 15 stations. Mid: CTD transects trough HT, South-West to North-East and North-West to South-East transect. Right: Long cross shelf transect. On the same line as the middle transect in far-left figure, but with one extra station added in the shallow end - and two extra stations at the deeper end.

2.1.4. Studying Reef effect along subsea installation – by ROV

On a cruise to HT in March 2023, ca one year after the building of HT started, we conducted 12 ROV transects, around suction-anchor 6, 9 and 12 (SA06, SA09, SA12). In 2023 we used REEV Oceans ROV “Aurora”. On these cruises we aimed at repeating the 12 video-transects, see Fig. 4 for position related to HT structure, and Table 2 for more detailed transect position.

Followed by asking Equinor Kokstad to open licence we revisited two of the suction anchors (no. 6 and 9, SA06 and SA09).

In 2025 we conducted three ROV (Freyja) transect starting at the control transect going from North-West towards SA06. In the same dive we also did the transect along the chain from SA06 towards turbine Hy10, and the control transect from South-West towards SA06, before we had to surface due to bad weather coming in.

Method: During the ROV transect G.O. Sars positioned outside the safety zone (> 500 m from any turbine) close to the suction anchor. The ROV enters at the suction anchor and either follows the anchor chain 350-500 m towards the turbine Hy10 or 350-500 m along the control line (Fig. 4). This is the same method and procedures that we used in 2023. We used detailed map of underwater structure to keep >500 m away from cables and chains.

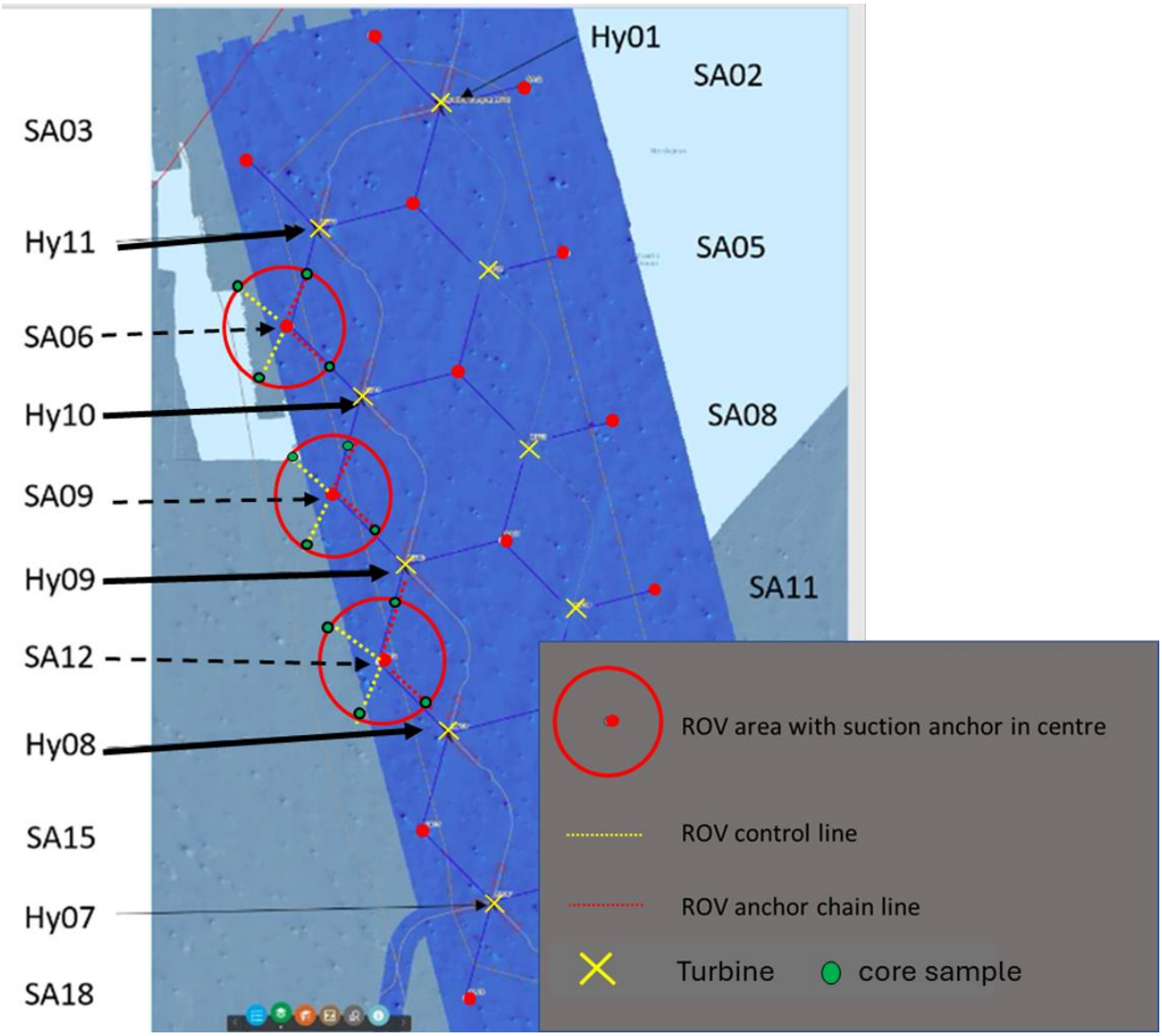


Figure 4. Map of the area. ROV investigations that was conducted in 2023 are marked with a red circle. Dashed red lines are transect /video lines along the anchor chains. Dashed yellow lines are video control lines. The Red circle is 500m in radius. Green circles are core stations, yellow cross turbine positions.

Due to bad weather (swells > 2m) we only managed to conduct transect line 2, 3 and 4 (Table 2). That included three control lines and one chain line around suction anchor 6 (SA06).

Table 2. Start and stop position for the planed ROV video transect (the transect conducted in 2023)

Anchor	Lat	Long	Transect	line_id 2023	Lat_Deg	Lat_Decmin	Long_Deg	Long_Decmin
SA06	61.35263473	2.2208763	SA06 Strat Chain Hy11	1	61	21.1580838	2	13.252578
SA06	61.34944191	2.2274465	SA06	1	61	20.9665146	2	13.64679

			Stop Chain Hy11					
SA06	61.35375949	2.2299206	SA06 Start Chain Hy12	2	61	21.2255694	2	13.795236
SA06	61.34942927	2.2274593	SA06 Stop Chain Hy12	2	61	20.9657562	2	13.647558
SA06	61.34504478	2.2250276	SA06 Start Control	3	61	20.7026868	2	13.501656
SA06	61.34938577	2.2274723	SA06 Stop Control	3	61	20.9631462	2	13.648338
SA06	61.34619263	2.2340412	SA06 Start Control	4	61	20.7715578	2	14.042472
SA06	61.34937505	2.2274882	SA06 Stop Control	4	61	20.962503	2	13.649292
SA09	61.33957884	2.2279873	SA09 Start Chain Hy09	5	61	20.3747304	2	13.679238
SA09	61.33637235	2.2345517	SA09 Stop Chain Hy09	5	61	20.182341	2	14.073102
SA09	61.3331341	2.2411412	SA09 Start Chain Hy10	8	61	19.988046	2	14.468472
SA09	61.33632953	2.2345799	SA09 Stop Chain Hy10	8	61	20.1797718	2	14.074794
			SA09					

SA09	61.34070092	2.2370246	Start Control	6	61	20.4420552	2	14.221476
SA09	61.33638374	2.23455	SA09 Stop Control	6	61	20.1830244	2	14.073
SA09	61.33198798	2.23212	SA09 Start Control	7	61	19.9192788	2	13.9272
SA09	61.3363166	2.2345923	SA09 Stop Control	7	61	20.178996	2	14.075538
SA12	61.32651995	2.2350869	SA12 Start Chain Hy08	9	61	19.591197	2	14.105214
SA12	61.32331441	2.2416445	SA12 Stop Chain Hy08	9	61	19.3988646	2	14.49867
SA12	61.31893016	2.2392128	SA12 Start Chain Hy09	11	61	19.1358096	2	14.352768
SA12	61.32327029	2.241676	SA12 Stop Chain Hy09	11	61	19.3962174	2	14.50056
SA12	61.32764222	2.2441221	SA12 Start Control	10	61	19.6585332	2	14.647326
SA12	61.32332517	2.2416476	SA12 Stop Control	10	61	19.3995102	2	14.498856
SA12	61.32007517	2.2482353	SA12 Start Control	12	61	19.2045102	2	14.894118
SA12	61.32325802	2.2416898	SA12	12	61	19.3954812	2	14.501388

2.1.5 Core samples for bacteria and pollutants

Running ROV transects gave us the possibility to take sediment samples in accurate positions in a gradient design from the wind turbines, to look at bacteria and pollutants. Our plan was to take a push core at the beginning and end of each ROV transect (12 transect, 24 core samples).

Method: 8. We used sterile equipment, cleaned knife and core tube with alcohol between samples. We slice off top 5 cm of core sample, placed it in a sterile plastic bag and stored it in -80°C freezer.

2.1.5. Acoustic study – and trawling with DeepVision

Hywind Tampen might attract fish to the added structures, or it might scare fish away by noise and activity. We therefore want to look at any possible attraction or avoidance effect by conducting an acoustic transect within Hywind Tampen to 5 nm from the farm using vessel mounted broadband echosounders (Kongsberg Discovery EK80; 18, 38, 70, 120, 200, 333 kHz). We did acoustic transects through HT (yellow line) from North to South and the opposite way (direction based on current and wind), and in a flower shape (blue lines) around and across HT as well as across (red lines) and along (green arrows) (Fig. 5).

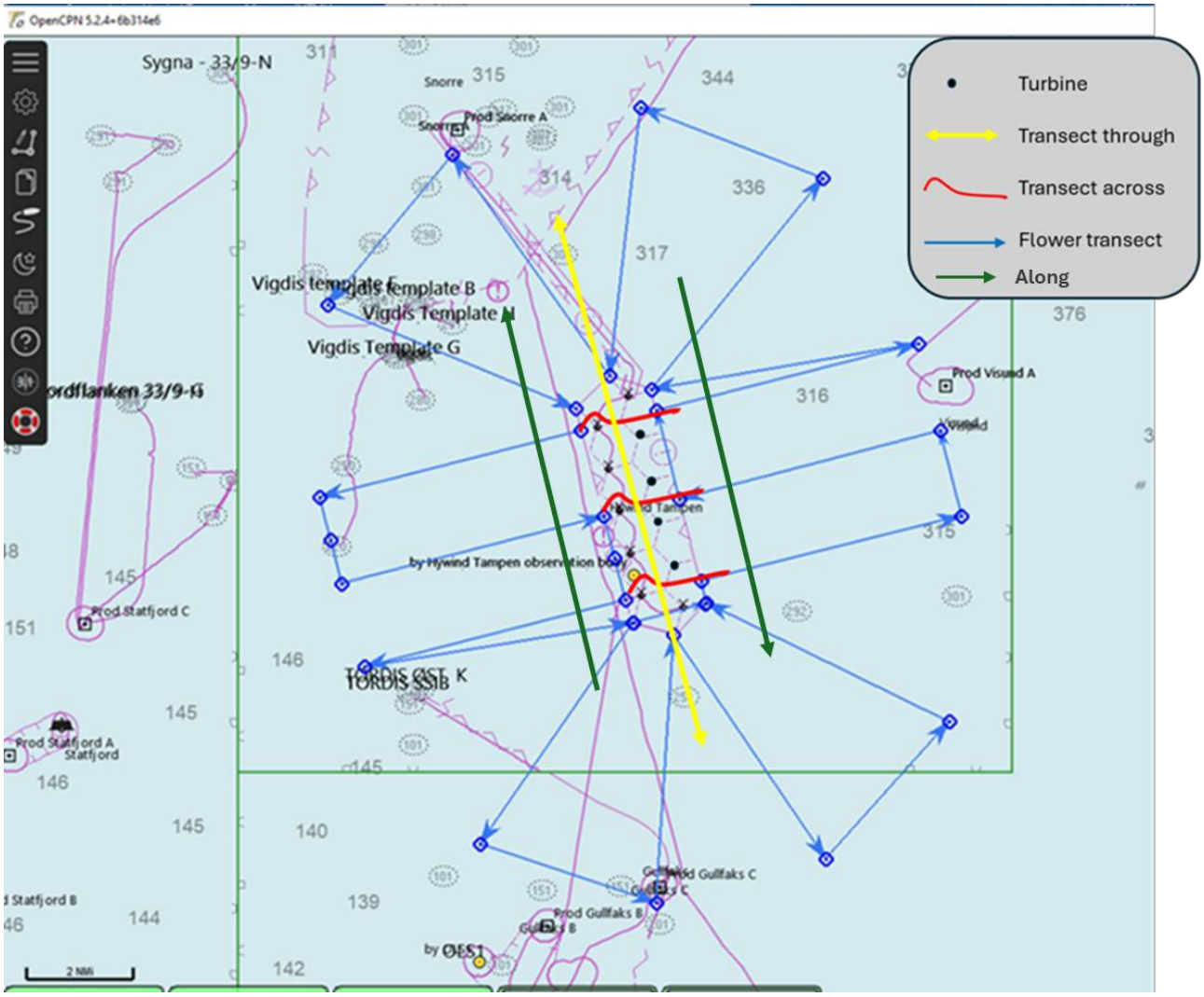


Figure 5. Acoustic transects taken around (blue Flower) and through (yellow) and across (red) at Hywind Tampen.

DeepVision

To identify organisms in the major scattering layers observed by the acoustics we used an open-ended pelagic trawl with the DeepVision camera system in several trawl hauls along the park, taking pictures of the catch as it passes through the trawl.

2.1.6 Continuous underway measurements

Throughout the cruises, currents throughout the water column were monitored using the research vessel-mounted ADCPs (Teledyne RDI Ocean Surveyor at 75 kHz and a Kongsberg EC150 (150kHz)), this was synchronised with the scientific echosounder and controlled using UHDAS.

Likewise, was G.O.Sars bottom mounted broadband echosounders (Kongsberg Discovery EK80; 18, 38, 70, 120, 200, 333 kHz) on throughout the cruise.

2.2. Activity Cruise 2 to 12 March 2026

A detailed logbook of all activities during the cruise is available in Appendix (6). This cruise started off with deployment of Landers in two areas in the North Sea where Norway is planning offshore wind in the near future (Sørvest F and Vestavind F). After deploying the Landers we continued to Hywind Tampen.

2.2.1. Deploy Lander’s at offshore wind sites

Five Landers were deployed: three in Southern North Sea (Sørvest F), and two in the Utsira area (Vestavind F). Two Landers were deployed inside the OW area “Sørvest F” and on in a control area south-west of Sørvest F. Further were on lander deployed inside the OW area “Vestavind F” and one in a control area south-west of Vestavind F.

Lander details

The lander is built by Develogic. It holds three hydrophones type HTI-99 UHF, ADCP (Acoustic Doppler Current Profiler) Nortek Signature100, CTD (Conductivity, Temperature and Depth) Seabird SBE37-SMP MicroCAT, oxygen sensor (Aanderaa Oxygen Optode 4330) and transmissometer, WBAT (Wide Band Autonomous Transceiver) Simrad, with two T218 transducers, Simrad ES70-7CD split-beam transducer and Simrad ES120-7CD split-beam transducer, data logging system and batteries (Fig. 6 and Table 4).

Method: Deployment was done from the ship hangar traverse beam block winch. Position was monitored by the HIPAP system. When retrieving the Lander: The Lander housing (in titanium) is connected to a steel platform that functions as a weight. The Lander holds a built-in acoustic release system, that releases the Lander from its platform. A connection wire between the Lander and the platform makes it possible to pick up the entire device without using an ROV. Unfortunately, these five landers delivered without such a connecting wire, therefore this must be added on before next deployment.

Figure 6. Four of the five Landers on deck before deployment.

Lander	Approximate depth (m)
1-6030	66
2-6031	60
3-6032	57
4-6033	264
5-6034	281

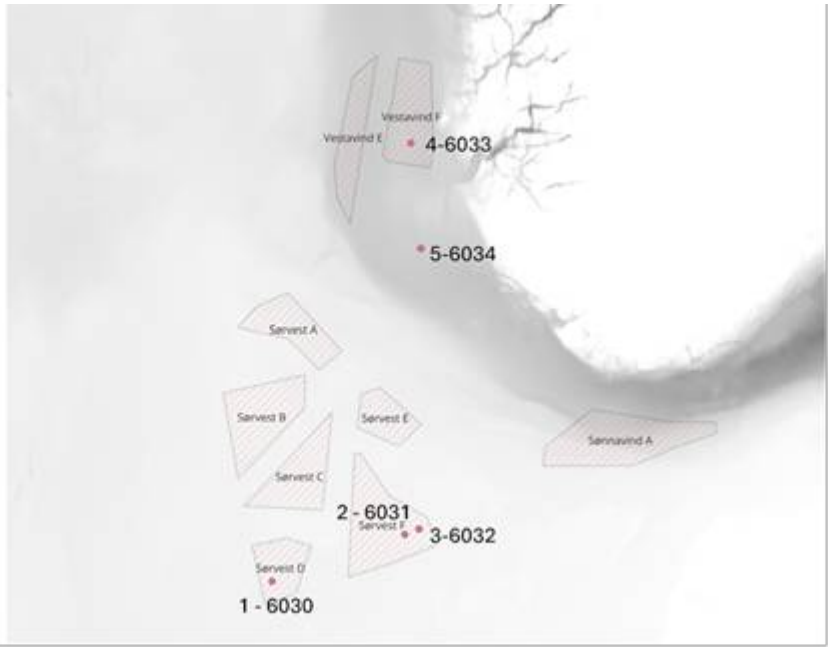


Figure 7. The figure above shows the position of the Landers in relation to the offshore wind areas. The depth at which they are located is given in the table to the left of the figure. Coordinates are given in Table 3.

Table 3. Position coordinates of the 5 Landers deployed in Sørvest F and Vestavind F. ID corresponds to table in Figure 7.

Offshore Wind area	**ID in map (Fig. 7)**	**Decimal Degrees**		**Degrees, Decimal Minutes**		**Depth**
		DD (N)	**DD (E)**	**DDM (N)**	**DDM (E)**	**Map / measurement (m)**
Vestavind F	4-6033	59.1320933828	4.53456538831	59° 7.9256’	4° 32.0739’	261 / 259
Control Vestavind F	5-6034	58.50659	4.83946648394	58° 30.3954’	4° 50.3679’	281 / 278
Sørvest F	3-6032	56.8234816597	5.28552992048	56° 49.4089'	5° 17.1318'	57 / 57
Sørvest F	2-6031	56.7791654519	5.13800087149	56° 46.74993'	5° 8.28005'	60 / 61
Control Sørvest	1-6030	56.3738137118	3.77664391682	56° 22.42882'	3° 46.59864'	66 / 66

Table 4. Offshore wind landers sensors.

ADCP	**CTD**	**Hydrophone**	**Echosounder**	**Transmissometer**	**Oxygen**
Nortek Signature 100	RBR Concerto^3	3x SubMares w/ 3xHTI-99 UHF	Kongsberg Discovery WBAT w/ ES70-7CD, ES120-7CD	Seabird CST-25-DR	AADI 4831 IW

2.2.2. Activity at Hywind Tampen 2026.

The planed activity at HT, was to repeat the hydrographic, plankton and acoustic studies conducted on our December 2025 cruise (see section 2.1). Conduct the rest of the ROV transects (see section 2.1.4). Retrieve the three ADCP rigs, and the two hydrophone rigs deployed on the last cruise (see section 2.1.1). Further we took eDNA, to ground through what we saw on the acoustics. On this cruise we had asked for ROV *Ægir*, as it is able to work in rougher sea than ROV *Freyja*. With Ægir on board we could not trawl, and we did therefor not get any DeepVision data. However, *Ægir* was chosen as we wanted to prioritise finishing the ROV transect along the chain and suction anchors and to retrieve our ADCP and hydrophone rigs.

2.2.2.1. CTD transects, with water sampling eDNA and plankton net

CTD transects

Due to bad weather conditions ahead we prioritize conducting the cross-shelf transects (Fig. 3 left), as this was the transect where also plankton and eDNA were going to be collected. Furter, we sampled station 3 to 6 on this transect passing through the park going from South-West to North-East (Fig. 3 central).

Zooplankton

Zooplankton community sampling was extended during the 2026 cruise, to assess samples for DNA studies. At each station, four WP2 net hauls were conducted: two hauls from 100 m to the surface and two hauls from near bottom to the surface. Due to vessel drift and the time required for each haul, sampling was performed in two stages: one full-depth haul and one 100 m haul were completed first, after which the vessel was repositioned before conducting the remaining two hauls.

Initial sampling design targeted the pycnocline-to-surface layer; however, as the water column was well mixed and no distinct pycnocline was observed during the survey, the upper 100 m was adopted as a standardized sampling depth for the shallow hauls. Zooplankton samples were collected at 15 stations along the cross-shelf transects (Fig. 3 left).

The first two hauls at each station were processed onboard according to standard IMR protocols (Appendix 8). Material from the remaining two hauls was preserved directly in approximately 80% ethanol for subsequent genetic analyses, including DNA metabarcoding of genomic DNA. Genetic analysis and taxonomic identification of specimens to the highest possible resolution is ongoing. The integration and comparison of genomic DNA data, eDNA metabarcoding results, and taxonomic identifications will enable a more comprehensive characterization of plankton community composition.

eDNA sampling

Environmental DNA (eDNA) analysis provides a non-invasive approach for assessing species presence in marine environments through the collection and analysis of water samples. Water samples for eDNA analysis were collected along three cross-shelf CTD transects, in addition to a supplementary station located within the wind farm (Fig. 3 left and mid). Furthermore, an additional sample was obtained from the onboard water system during transit between Sørlige Nordsjø II and Hywind Tampen.

At each station, triplicate water samples (5 L each) were collected from three discrete depths: near-surface, mid-water column, and near-bottom. Surface samples were obtained at approximately 10 m depth, while bottom samples were collected approximately 20 m above the sea floor. Sampling closer to the seabed was restricted due to the presence of wind farm infrastructure. Prior to water sampling, a CTD cast was conducted to assess vertical stratification, including the presence of a pycnocline. As the water column was generally well mixed during the sampling period, the mid-water depth was selected to represent intermediate conditions.

A total of 82 samples were collected across 10 stations (3 stations per transect + one additional inside HT), corresponding to 8–9 samples per station. At the two stations located within Hywind Tampen, all nine samples were obtained. At stations outside the wind farm, one of the three near-bottom replicates was omitted due to a limited number of available filters. In addition to environmental samples, multiple controls were included: one air control, freshwater controls collected before and after cleaning of sampling equipment (four in total), and three

additional near-surface samples collected from a hose during transit to Hywind Tampen.

Filtration was conducted onboard using three 500 mL filter holders (Nalge Nunc International Corporation, Rochester, USA) connected to an EZ-Stream peristaltic pump (Merck KGaA, Darmstadt, Germany). Water samples were filtered onto 2.0 µm glass fiber filters (Merck KGaA). Immediately following filtration, filters were preserved in ATL buffer (Qiagen GmbH, Hilden, Germany) and stored until subsequent DNA extraction. Between samples, all filtration equipment was decontaminated using a bleach solution followed by rinsing with freshwater to minimize the risk of cross-contamination.

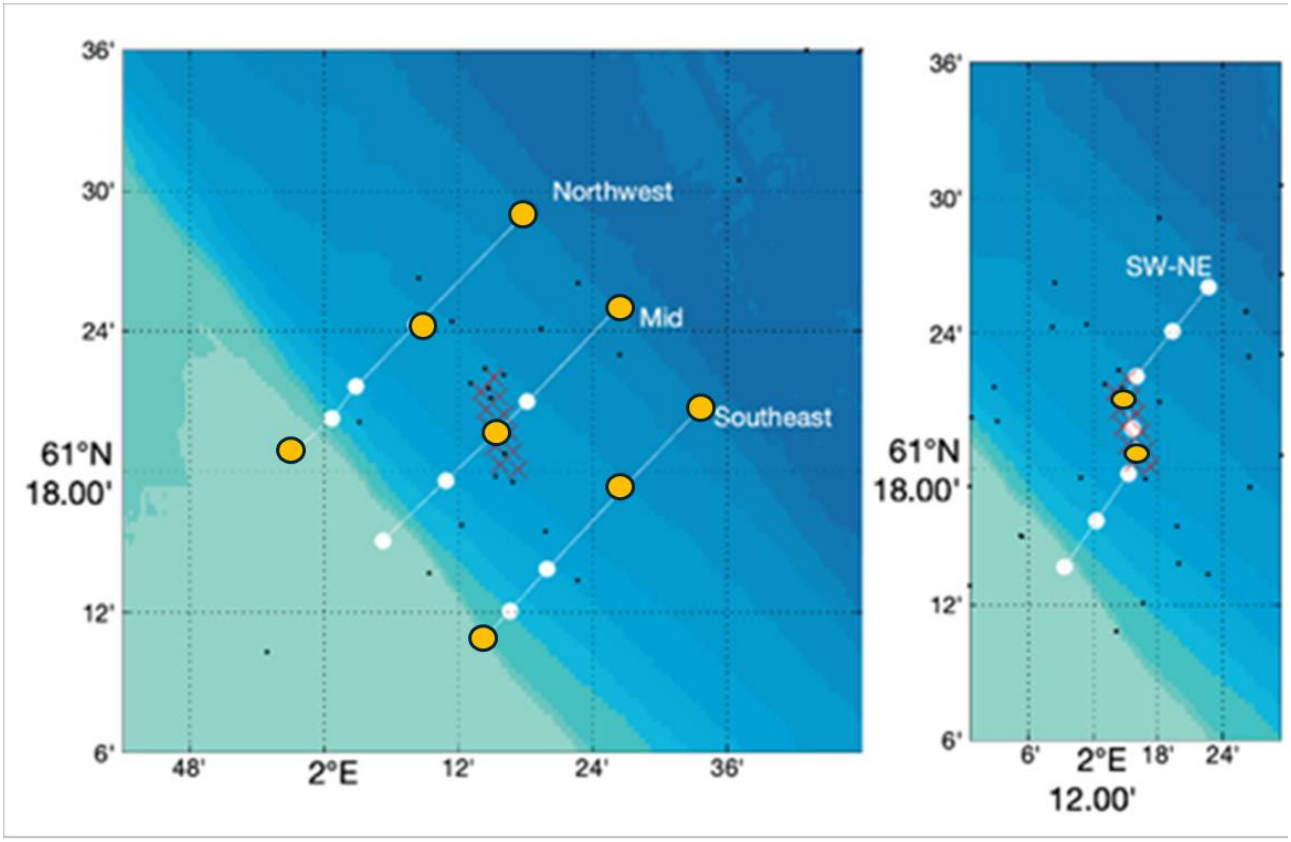


Figure 8. The map shows the CTD transects where eDNA was sampled marked with yellow circle.

2.2.2.2. Studying Reef effect along subsea installation – by ROV "Ægir"

In 2026 we conducted four ROV transects starting on a control transect from North-West towards SA09, continuing with transect from SA09 along the chain towards Hy09 (Fig. 4). Followed by a control transect from South-West towards SA09, continuing with a chain transect from SA09 towards Hy10 (line 5, 6, 7 and 8, Table 2, start stop positions on this cruise is given in Appendix 7). With a core sample next to the suction anchor (SA09). We also tried to get a core sample at the end of the chain transect (closest to the turbine), but something was wrong with the corer, so we only got one core sample.

Technical problems with the ROV stopped us from continuing and finalising our transect study.

2.2.2.3. Acoustic study

Like in December 2025 we did acoustic transects through HT from North to South and the opposite way (direction based on current and wind), and in a flower shape around and across HT as well as along HT (Fig. 5). Having ROV Ægir onboard we could not trawl, as part of its equipment covers the trawl deck. Thus, on this cruise we must use the eDNA samples, to ground through what we see on the acoustics.

3. Results

3.1. Hydrography

3.1.1. Hydrographic data from 2025 cruise

Preliminary results from the CTD transects across the shelf and from north to south through the wind farm (Fig. 9 and 10) indicate a well-mixed water column within and around HT. Signs of stratification are related to the circulation in Norskerenna at the deep ends of the transects. They include colder and slightly more saline bottom waters and surface elevated salinities. This is confirmed in the E-W transect that extends the mid transect into the deepest part of the trough (Fig. 11).

Vessel-mounted ADCP data are currently being processed.

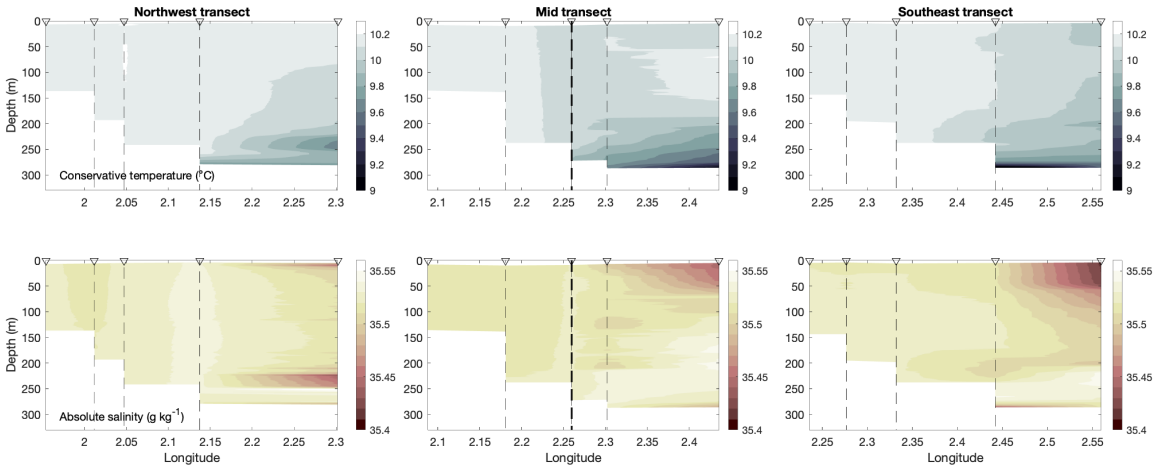


Figure 9. CTD transects cross shelf: Conservative temperature (top row) and absolute salinity (bottom row) along the three cross-shelf transects (Fig. 3, left). Grey vertical dashed lines indicate CTD station positions. The CTD station within HT on the mid transect is marked in black.

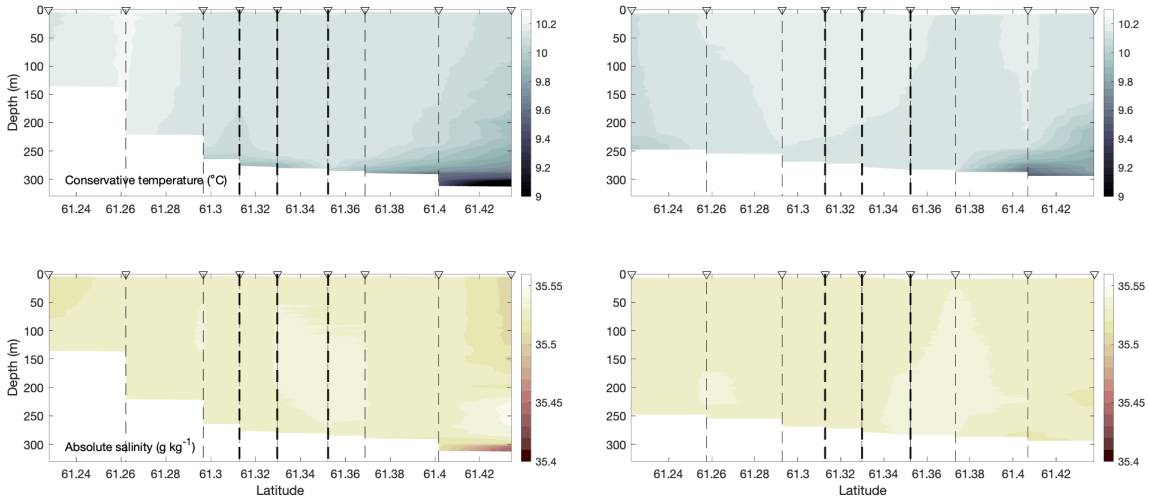


Figure 10. CTD transects North-South: Conservative temperature (top row) and absolute salinity (bottom row) along the N-S transects (Fig. 3, mid panels). Grey vertical dashed lines indicate CTD station positions. The CTD stations within HT are marked in black.

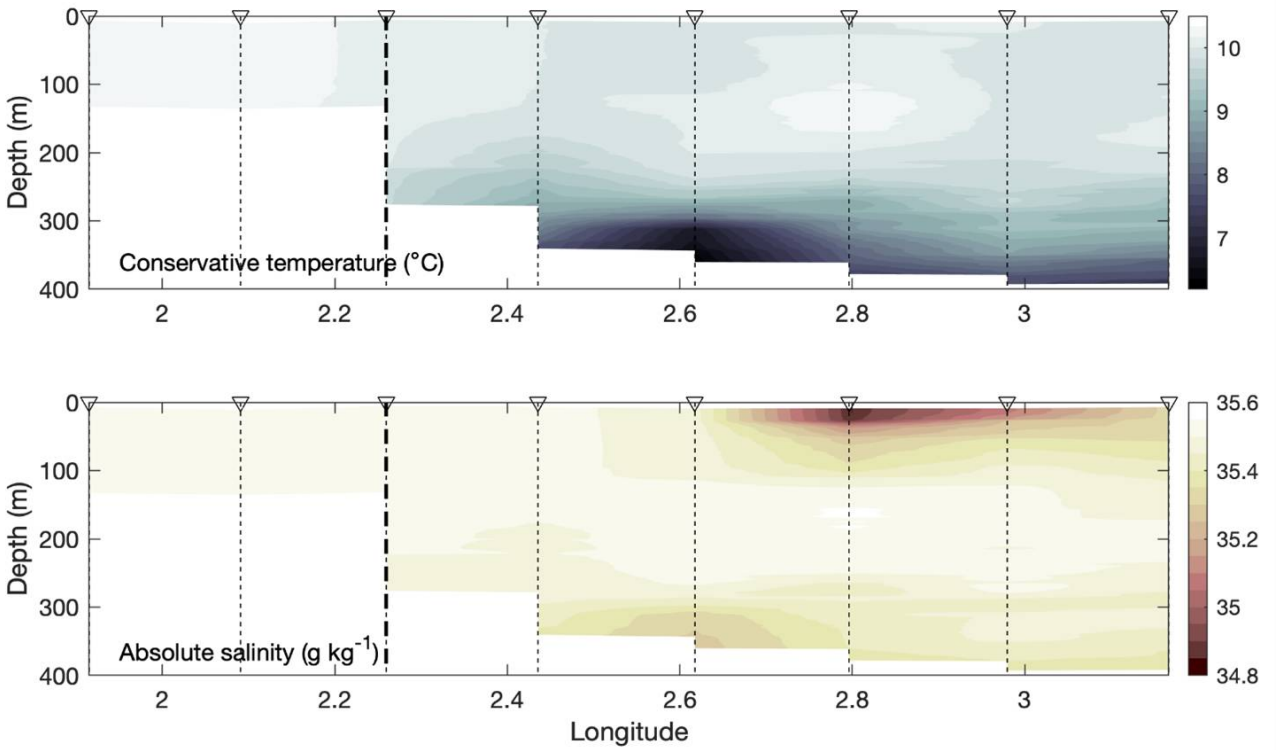


Figure 11. CTD transect East-West transect: Conservative temperature (top row) and absolute salinity (bottom row) along the E-W transect (Fig. 3, right). Grey vertical dashed lines indicate CTD station positions. The CTD station within HT is marked in black. Note different clour scale to Fig. 9 and 10.

3.1.2. Hydrographic data from 2026 cruise

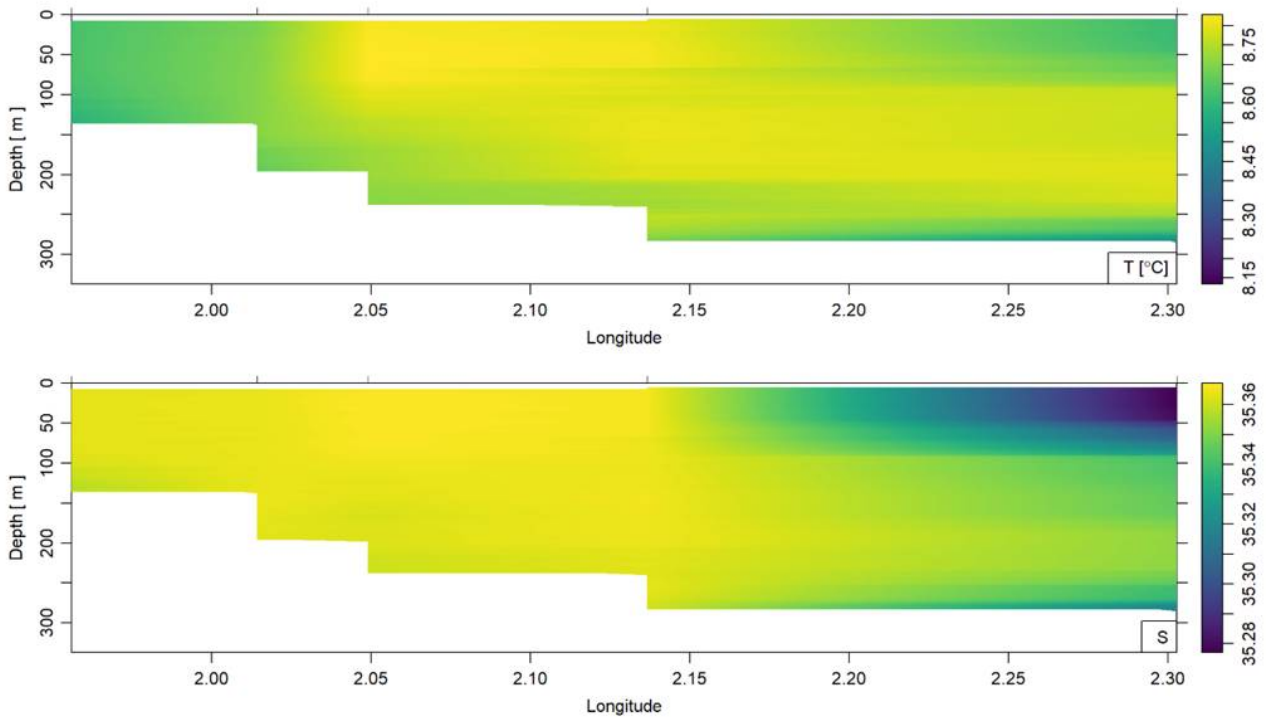


Figure 12. Northern transect (Fig. 3 left). Vertical temperature (°C; upper panel) and practical salinity (PSU; lower panel) profiles from a CTD transect across the continental shelf in the Hywind Tampen region. The transect includes five stations extending from shallow shelf waters toward deeper offshore conditions. The dashed line marks the CTD station obtained within the wind farm.

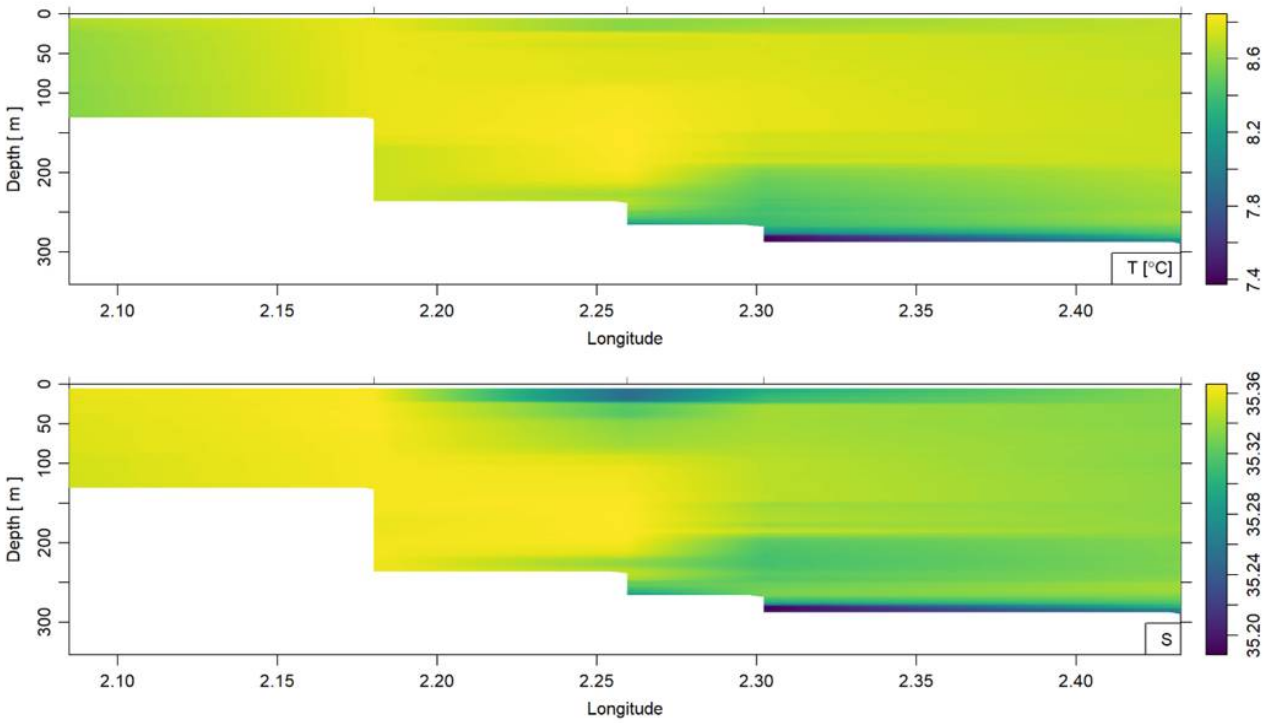


Figure 13. Mid transect (Fig. 3 left) Vertical temperature (°C; upper panel) and practical salinity (PSU; lower panel) profiles from the Northwest CTD control transect across the continental shelf in the Hywind Tampen region. The transect includes five stations extending from shallow shelf waters toward deeper offshore conditions, north of the wind farm.

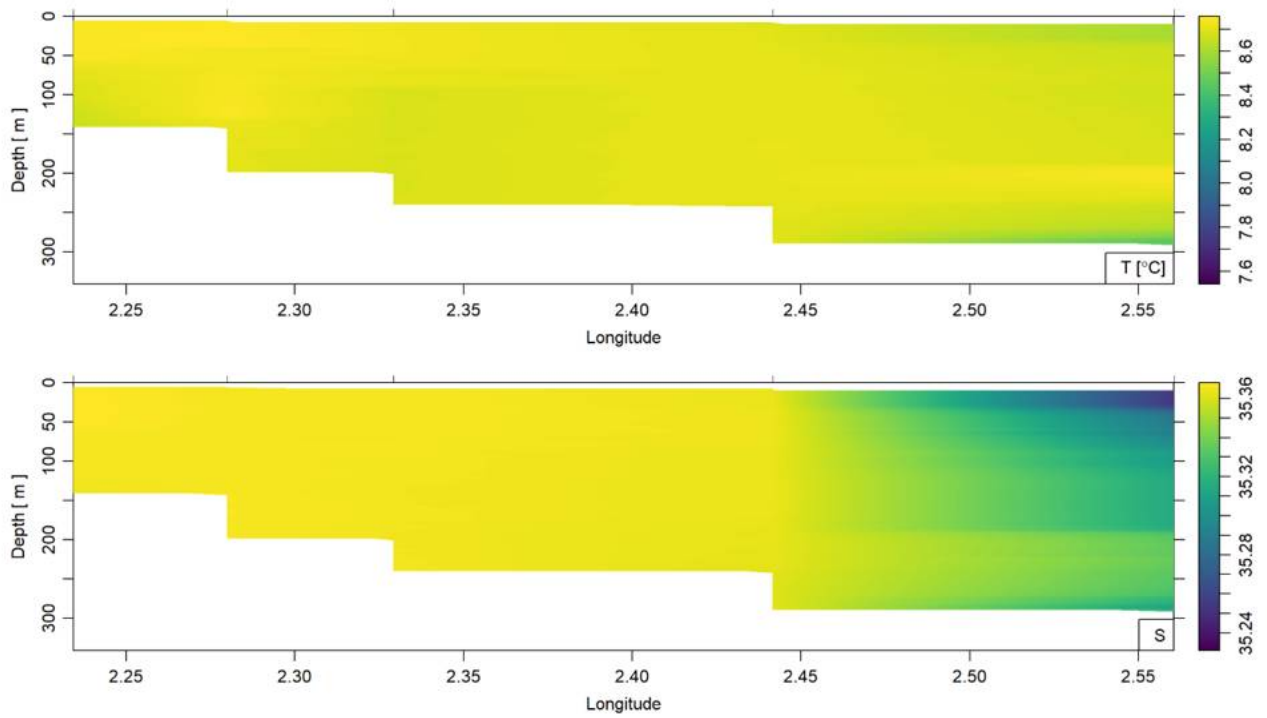


Figure 14. Vertical temperature (°C; upper panel) and practical salinity (PSU; lower panel) profiles from the Southeast CTD control transect across the continental shelf in the Hywind Tampen region. The transect includes five stations extending from shallow shelf waters toward deeper offshore conditions, south of the wind farm.

Preliminary CTD transects across the shelf and from north to south of Hywind Tampen (Fig. 12, 13 og 14) show a largely well-mixed water column within and around the wind farm when expressed in terms of practical salinity (PSU) and temperature (℃).

Salinity profiles show minimal vertical variability across all transects, with changes confined to small decimal-scale variations. Temperature exhibits a weak decrease with depth, particularly in the deeper portions of the transects. This vertical temperature structure is most pronounced along the mid-shelf transect and likely reflects larger-scale circulation in Norskerenna.

3.2. Plankton biomass 2025 and 2026

Plankton samples were taken at each station on the cross shelf transect (Fig. 3. Left). The biomass of different size groups of plankton caught in the WP2 from bottom – 0 m or from 100 – 0 m, during the cruise in December 2025 and March 2026 is shown in Figure 15. There was a higher biomass in the upper 100 m as expected, and the biomass was, however, significantly larger in December compared to March (Fig.16). Otherwise, there were now clear trends in the biomass distribution related to HT Species composition has not yet been looked at.

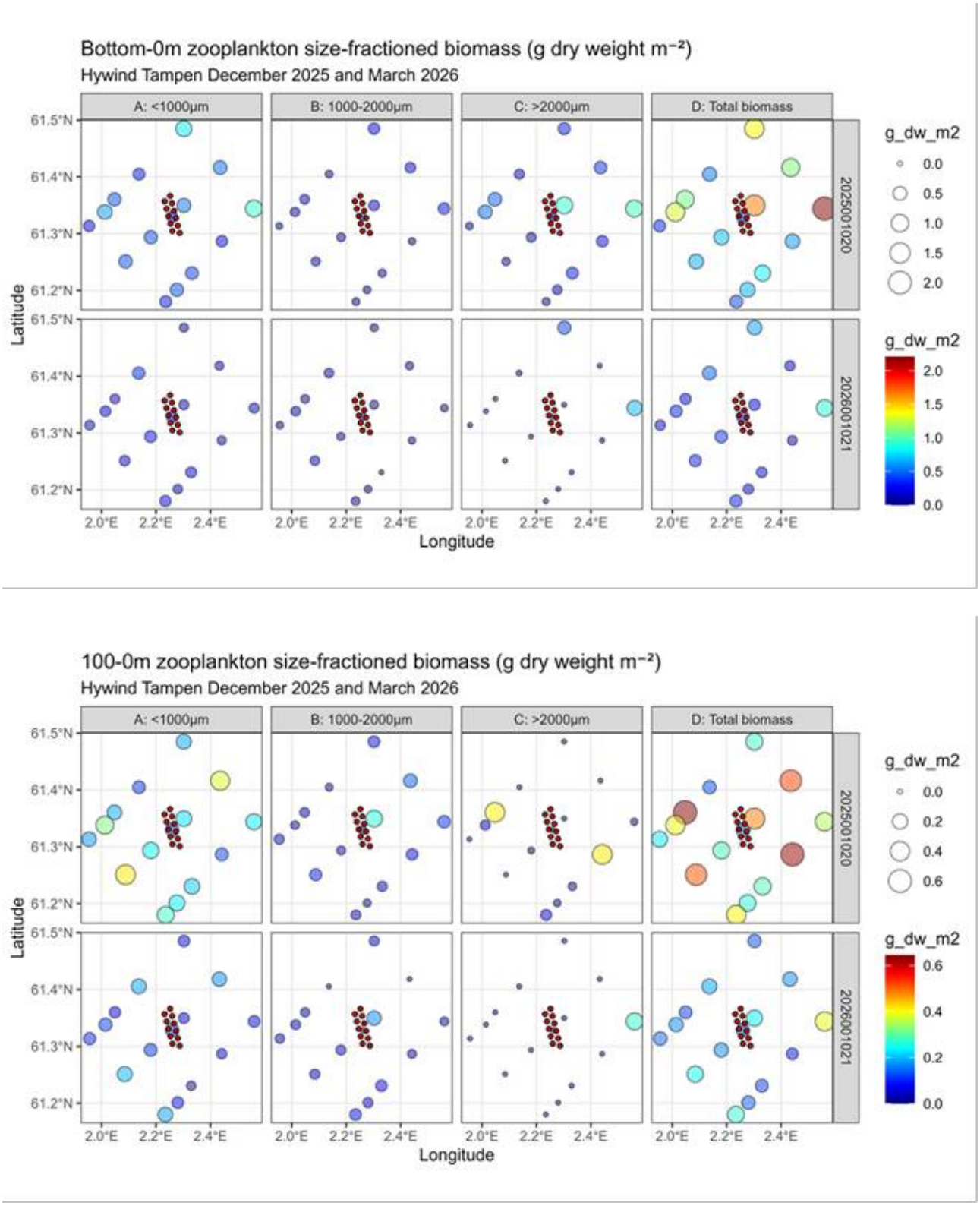


Figure 15. Biomass of different size groups of plankton caught by WP2-net. (a) Net-haul from bottom to surface, during the 2025 and 2026 cruise (b) Net hauls upper 100 m.

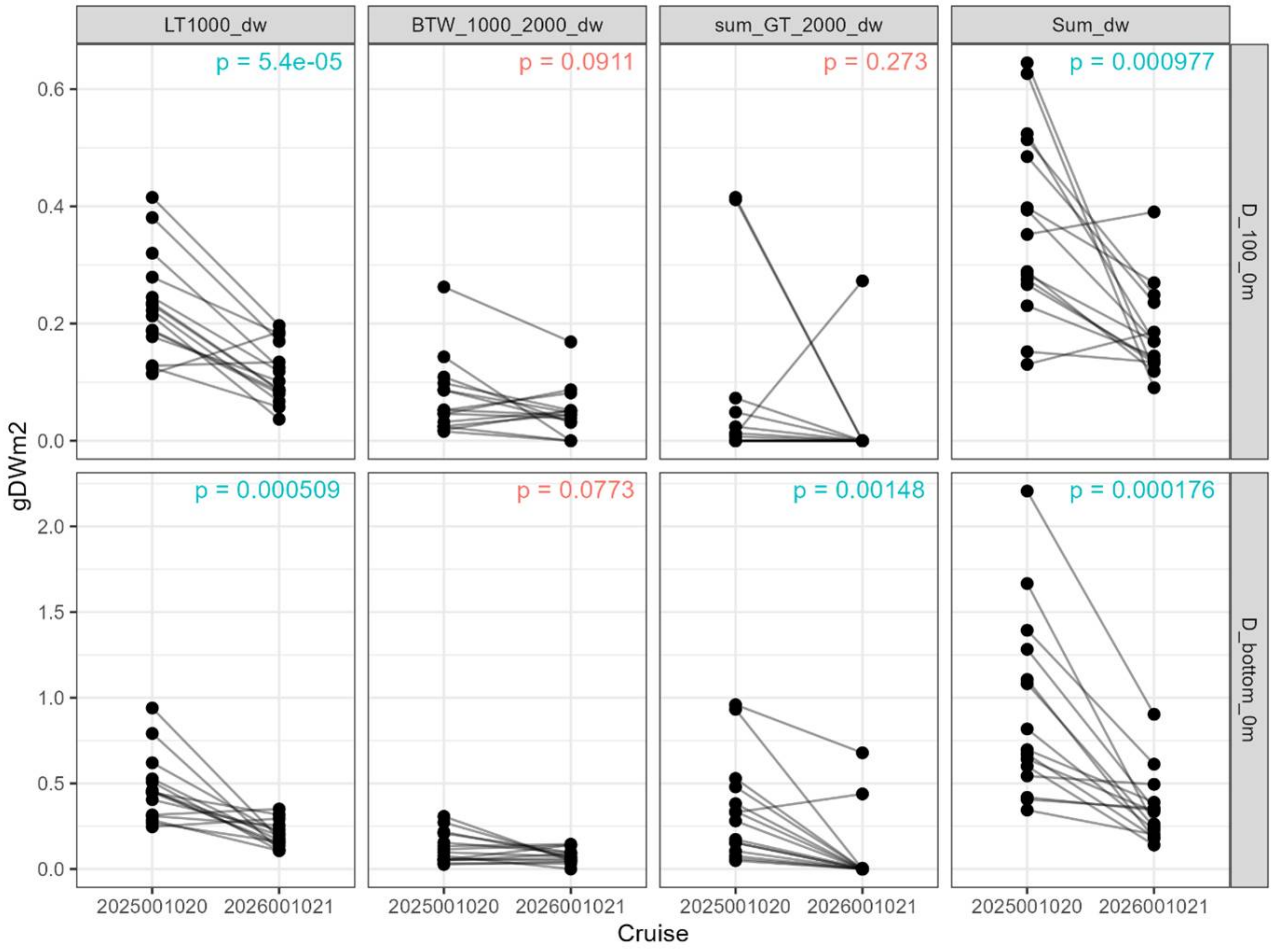


Figure 16. Comparing zooplankton biomass by station between 2025 and 2026, using pared t-test.

3.3. ROV study of possible Reef and structure effect 2025 and 2026

The Station overview of the ROV transects follows the transect names used in 2023 cruise report (Table 2).

The benthos biologists made annotations of animals as they appaired on the video during transects. Number of organisms within some organisms' groups were counted during the control transects and the chain transect as well as around the suction anchor (SA06), and this is given in Table 5. In 2026 they aditionaly made a descriptive annotation of biotope and the organism most frequently observed (see below).

Table 5. Noted organisms' groups along the ROV transects in 2025 (HT01-HT04) and 2026 (HT05-HT08). Transect HT01: was a transect from suction anchor 06 (SA06) along the chain towards turbine HY10; Transect HT02: control transect from SA06 towards north-west; Transect HT03: control transect from SA06 towards south-west; HT04: video observations around suction anchor SA06; Transect HT05: control transect from SA09 to north-west; Transect HT06: from SA09 south-east along chain towards Hy09 (Hywind Turbine 9); Transect HT07: control transect from SA09 towards north-west; Transect HT08: chain transect from SA09 going north-east to Hy10 (Hywind turbine 10). Taxon are given when possible to determin, also common name in English and Norwegian are given.

	2025

				Chain	Control	Control	Suc anc
Taxon	Common names	Norwegian	Species group	HT01	HT02	HT03	HT
Actiniaria	sea anemone	anemone	sea anemone	1			
Amphipoda	amphipod	amphipode	amphipod	1	3		
Aporrhais sp.	pelican’s foot (whelk)	snegl	whelk				
Argentina sp.	argentine smelt	vasssild /strømsild	fish		1		
Astarte sp.	astartid clam	bivalv	Bivalve				
Asterias rubens	common starfish	vanlig korstroll	sea star	4		1	
Asteriidae	asteriid sea star	sjøstjerne	sea star				
Asteroidea	sea star	sjøstjerne	sea star	44	13	12	
Balanidae	acorn barnacle	rur / rankefotinger	barnacle				
Bolocera tuediae	deeplet sea anemone	mudderbunnsjørose	sea anemone				
Brachyura	true crab	krabbe	crab				
Brosme brosme	tusk	brosme	fish	4			
Buccinoidea	whelks and allie	snegl	whelk	3	1		
Buccinum sp.	whelk	snegl	whelk	2		1	
Burrow cave		hule		1	3	2	
Burrows		gravehull		2			
Caridea	true shrimp	reke	shrimp	75	32	28	
Cephalopoda benthic	benthic cephalopod	blekksprut	Cephalopod				
Chimaera monstrosa	rabbitfish / ratfish	havmus	fish				
Colus sp.	whelk (genus Colus)	snegl	whelk				
Crangonidae	sand shrimp	reke	shrimp				

Ditrupa tubes	calcareous bristle worm	kalkrørsorm	bristle worm	204	1132	1040
Epizoanthus sp.	colonial zoanthid	anemone	sea anemone			
Filograna implexa	bristle worm	børstemark	bristle worm			
Flabellum macandrewi	solitary cup coral	steinkorall	coral			
Flustridae	flustrid bryozoan	mosdyr	Bryozoa			
Gadiculus argenteus	silvery codling	sølvtorsk	fish		9	2
Galatheoidea	squat lobster	trollhummer	squat lobster			
Glyptocephalus cynoglossus	witch flounder	smørflyndre	fish	1	1	1
Gracilechinus acutus	regular sea urchin	kråkebolle	sea urchin	815	681	1035
Helicolenus dactylopterus	bluemouth rockfish	blåkjeft	fish	4		1
Henricia sp.	henricia sea star	blodsjøstjerne	sea star		1	
Hormathiidae	hormathiid sea anemone	anemone	sea anemone	20		7
Hydrozoa	hydroid	hydroider	Hydrozoa	6	1	
Lebensspuren feces	feces	ekskrement				
Lebensspuren tracks	trace mark	spor		1		
Lepidorhombus boscii	four-spot megrim	fireflekket var	fish		1	3
Lophius sp.	monkfish / anglerfish	breiflabb	fish	1		
Merlangius merlangus	whiting	hvitting	fish	1		
Mesothuria intestinalis	sea cucumber	tarmpølse	sea cucumber			1
Metridium senile	plumose anemone	sjønellik	sea anemone	1		

Micromesistius poutassou	blue whiting	kolmule	fish		2		
Molva molva	ling	lange	fish	13	1		2
Munida sp.	squat lobsters	trollhummer	squat lobster	95			
Nephrops cave	Norway lobster burrow	sjøkreps hule			2		
Neptunea sp.	whelks	snegl	whelk				
Ophiuroidea	brittle star	slangestjerne	brittle star	27	3	1	
Paguridae	hermit crab	eremittkreps	hermit crab	29	1	2	
Pandalidae	pandalid shrimp	reke	shrimp				1
Parastichopus tremulus	sea cucumber	rødpølse	sea cucumber	23	12	11	
Phycis blennoides	greater forkbeard	skjellbrosme	fish	2			
Pleuronectiformes	flatfish	flyndre	fish	2	5	2	
Pollachius virens	saithe	sei	fish	6	12	12	
Pontaster tenuispinus	sea star	sjøstjerne	sea star	31	2	6	
Porania pulvillus	cushion star	sjøstjerne	sea star	2			1
Porifera	sponge	svamp	sponge			2	
Prosobranchia	snail	snegl	snail				
Psilaster andromeda	sea star	andromedasjøstjerne	sea star	1			
Sabellidae	fan worm	påfuglmark	bristle worm	7	6	1	
Scalpellidae	stalked barnacle	rur /rankfotinger	barnacle	3			
Seaweed fragments	seaweed fragments	tang / tare		9	1	1	
Serpulidae	tube-dwelling polychaete	kalkrørsorm	bristle worm	5	1	2	
Spatangus sp.	irregular sea urchin	irregulær sjøpinsvin	irregular sea urchin	1721	1900	2420	

Stichastrella rosea	rose star	rødstjerne	sea star				
Suberites sp.	sponge	svamp	sponge				
Teleostei	teleost / bony fish	fisk, beinfisk udefinert	fish	6	8	3	
Trisopterus sp.	poor cods	sypike /øyepål	fish	25	6	1	

Annotations from ROV transect 2026

HT05 (06.03.26 at 15:42 UTC)

Control transect starting in North-West moving South-East 500m off the chain towards suction anchor SA09.

Muddy sand with some burrows. Tracks from burrowing sea urchins all the way.

The sea urchins *Gracilechinus* and *Spatangus* dominated the transect in addition to *Ditrupa* tubes. The sea star *Pontaster tenuispinus* and *Sabellidae* tubes were also frequently observed.

Some saithe *(Pollachius virens*) were following the ROV along the video line, and several flatfish were observed, including Glyptocephalus cynoglossus and Lepidorhombus boscii. Ling (*Molva molva*), and greater forkbeard (*Physcis blennoides*) were also seen.

Other taxa: *Astarte sp.*, *Parastichopus tremulus, Aporrhais sp., Crangonidae, Pandalidae, Colus, Filograna*.

A push core was taken at the anchor site.

HT06 (06.03.26 at 17:05, UTC)

Transect starting from suction anchor SA09, continuing South-East along the **anchor chain**.

Filming the suction anchor before the video line. Several ling (*Molva molva*) at the anchor. Also tusk (*Brosme brosme*) and saithe (*Pollachius virens*) swimming around. Some sea stars, hydroids and barnacles.

Muddy sand with some burrows along the video line. Tracks from burrowing sea urchins all the way.

The sea urchins *Gracilechinus* and *Spatangus* were dominating. Hermit crabs with Hormathiidae anemones were frequently observed. *Ditrupa* tubes and the sea stars *Pontaster tenuispinus* and *Asterias rubens* were common. Also, several *Molva*, Colus, *Gadiculus, Parastichopus* and *Munida* were seen in the video line.

The transect stopped 480 m in the line when the chain rose above the sea floor.

Attempt to take push core at the end of the line failed, due to problems with the core.

HT07 (07.03.26 at 08:05 UTC)

Control transect in North East direction 500 m off chain towards suction anchor SA09.

A push core was taken at the start of the video line approximately 500 m from SA 09.

Muddy sand with some burrows. Tracks from burrowing sea urchins all the way.

The sea urchins *Gracilechinus* and *Spatangus* were very abundant. High densities of *Ditrupa* tubes were also observed.

Common species along the transect were the sea cucumber, *Parastichopus tremulus* and the sea star *Pontaster tenuispinus*. *Sabellidae* tubes, shrimps (*Pandalidae*), *Hormathiidae* and *Colus* snails were also common, in addition to saithe (*Pollachius virens*) and silvery pout (*Gadiculus argenteus*). A few Astarte shells, ling, squat lobsters and hermit crabs were also seen.

HT08 (07.03.26 at 09:08 UTC)

Transect from suction anchor (SA09) on **chain** North East direction towards Hy10.

Started at the suction anchor, but more detailed filming of this area was done in the previous dive.

Muddy sand with some burrows. Tracks from burrowing sea urchins all the way along the video line.

The sea urchins *Gracilechinus* and *Spatangus* dominated, and Squat lobsters (*Munida*), were also abundant along the chain. Hermit crabs with *Hormathiidae* anemones were frequently observed, in addisjon to ling (*Molva molva*), sea stars (*Asterias rubens, Pontaster tenuispinus* and shrimps (*Pandalidae*).

Some sea cucumbers (*Parastichopus tremulus*), brittle stars, sponges, seaweed fragments, tusk (*Brosme brosme*) and silvery pout (*Gadiculus argenteus*).

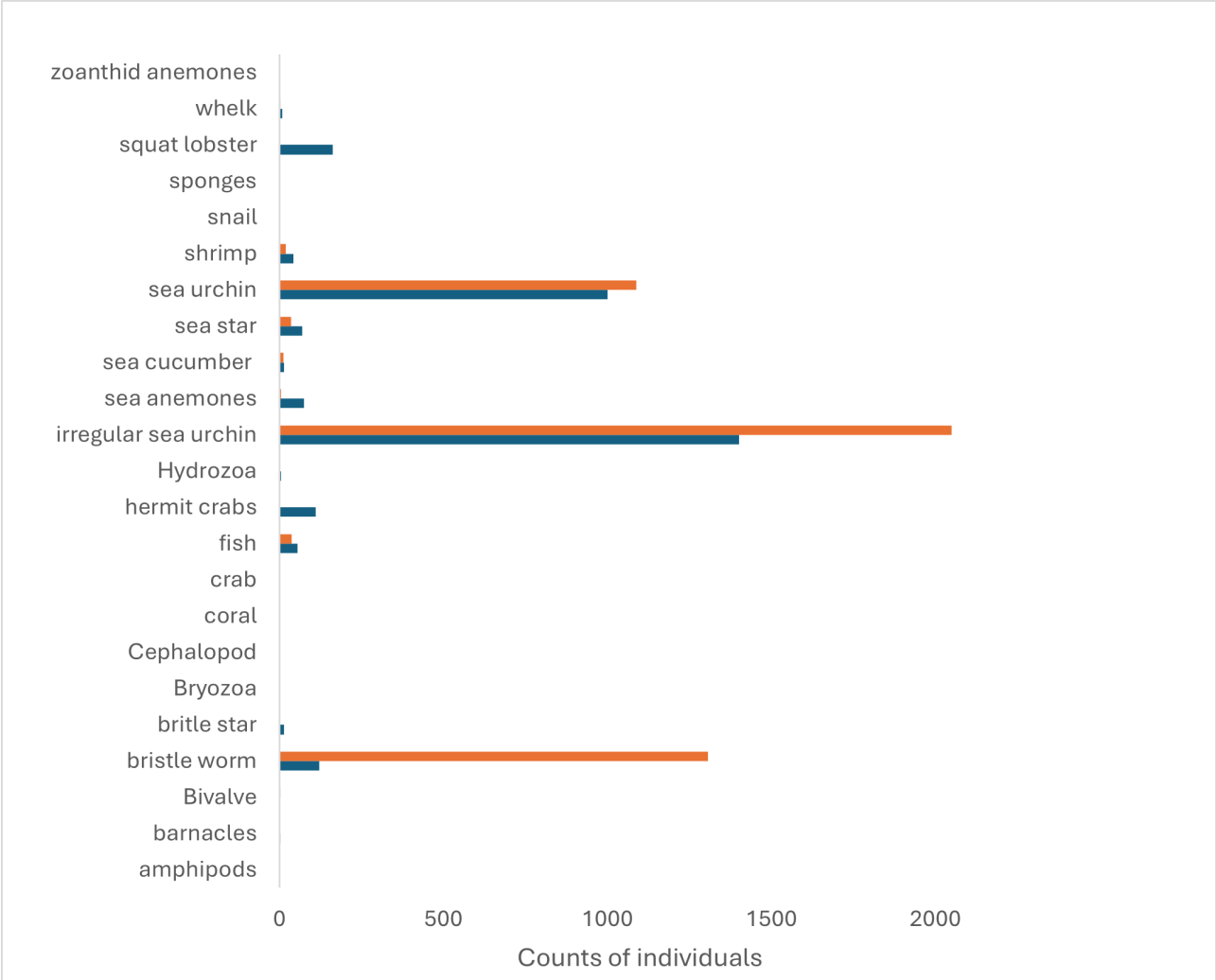
Poor visibility towards the end of the line due to movement from the chains and the videoline was stopped after approx. 350m

Attempt to take a pushcore at the end of the line failed, due to problems with the core.

Litter observed: A part of a loading strap on the chain.

Preliminary results indicate a lower number of irregular sea urchins and bristle worms along the chain, compared to the control (Fig 17a), while most of the other species' groups where higher in number along the chain. In particular squat lobster, hermit crabs, sea anemone, shrimp, sea star, brittle star and Hydrozoa where much more abundant along the chai (Fig 17b), but also sea cucumber, whelk and fish where more common along the chain transect.

a)


zoanthid anemones
whelk
squat lobster
sponges
snail
shrimp
sea urchin
sea star
sea cucumber
sea anemones
irregular sea urchin
Hydrozoa
hermit crabs
fish
crab
coral
Cephalopod
Bryozoa
britle star
bristle worm
Bivalve
barnacles
amphipods
0
500
1000
1500
2000
Counts of individuals

b)

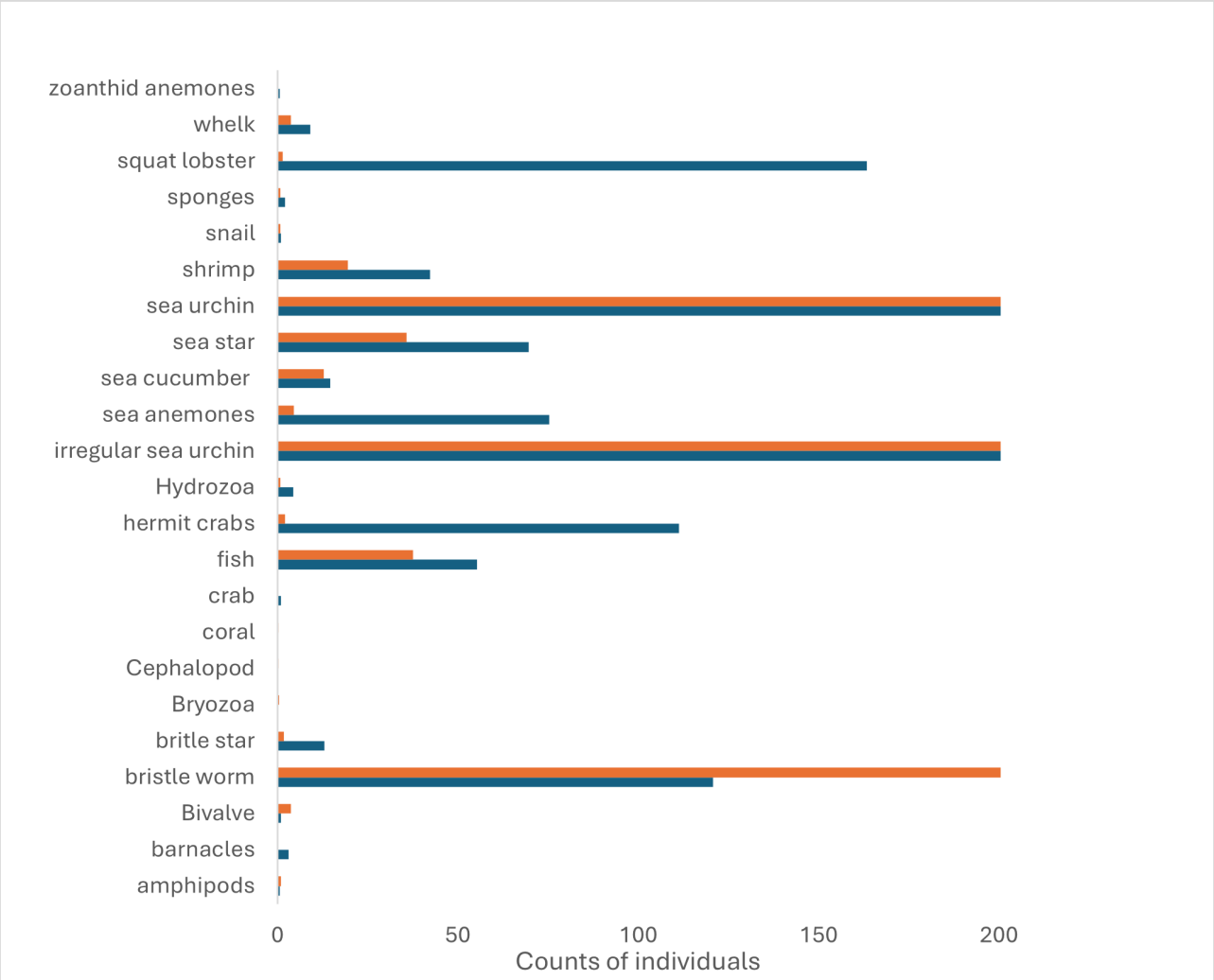


Figure 17. Counts of individuals by species groups: red columns are number of individuals seen along the control transect. Blue columns are number seen along chain transect. Topp figure (a) is showing all counts, while bottom figure (b) is zooming in cutting off the most common species groups, to give a better resolution on the rest of the groups. The data have been corrected for number of transects conducted.

3.4. Push cores'

We aimed at taking a core at each end of the ROV transect lines (12 transect lines 24 core), however the cores were not closing properly, so the sediment seeped out. Position of the two core samples taken are given in table 6.

Table 6. Information on core position.

Core #	Date	Transect #	Direction of transect	Suction anchor	Lat (N)	Lon (E)	Remark
1	6.3.2026	HT05	South East	SA 09	61.336402	2.234497	At SA 09
2	7.3.2026	HT07	North East	SA09	61.331860	2.232052	Start of control line

3.4. Acoustic study – and trawling with DeepVision transects

A total of 19 acoustic transects were performed, one through the park and 18 outside. Acoustic data was continuously collected along the transects using Kongsberg Discovery EK80 scientific echosounders operating in broadband mode (Table 7). All echosounders transmitted simultaneously.

The 18 transects outside Hywind Tampen, "*flower transects*", started at 500 m distance to the turbines and conduct transects outwards to 5.4 nm from Hywind Tampen (or in opposite direction). The transect design is a compromise between design for quantity calculation (more or less homogeneous coverage) and gradient study from the windfarm. Total length of transect is ca 105 nm. The transects are shown in (Fig. 18).

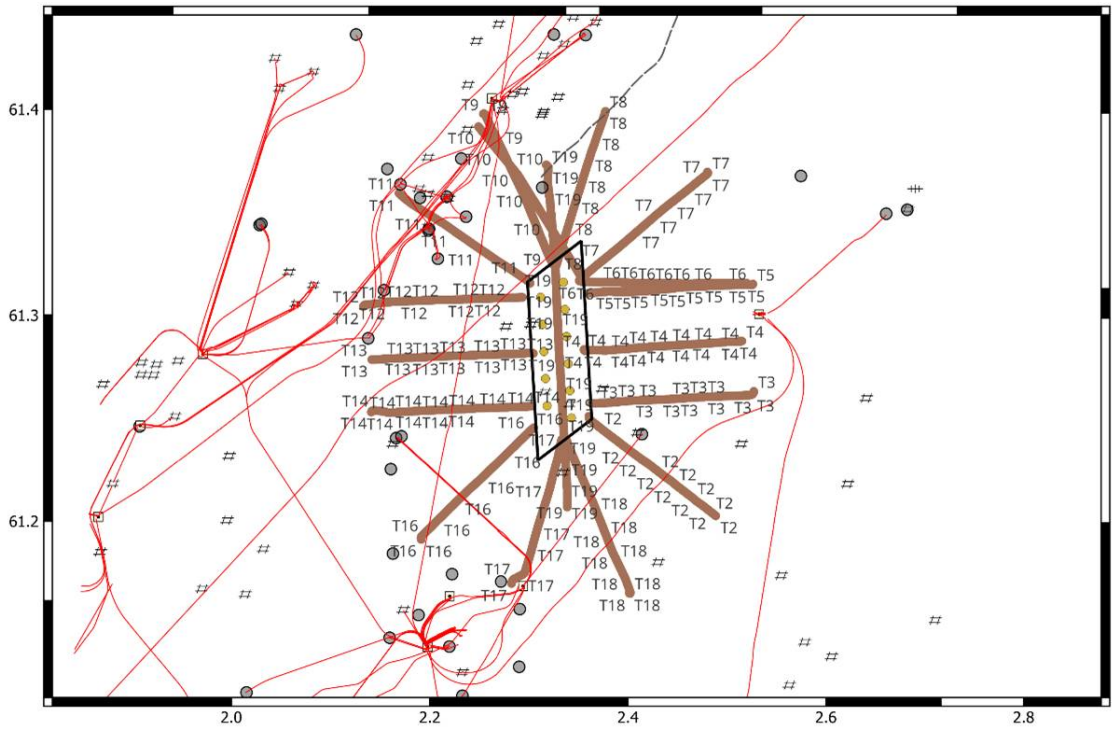


Figure 18. Flower transect, Acoustic transects performed on the 2026 cruise.

This *flower-transect* has been used on all previous cruises (Figure 15., Utne Palm et al., 2023). In addition, several transects were performed across the park to capture potential edge effects, such as potential accumulation of biomass near the edges of the park (see Fig. 5). Below are examples of data from acoustic transects outside, through and across the Hywind Tampen (38 kHz) (Fig. 19, 20 amd 21). Vertical lines indicate the start and end of the polygon covering the wind park. In this initial analysis, this polygon is used to describe the boundaries of the park which is an artificial boundary.

Acoustic backscatter data (Sv) from EK80 transects crossing the Hywind area were preprocessed by removing low-quality samples, block-averaging in range and time, and computing cumulative along-track distance. From

the echograms we derived a set of integrative indices (center of mass, abundance, density, spread, etc.) and defined “inside” the wind farm using a time window mapped to along-track distance. For each transect, we compared conditions inside this window to nearby “*outside*” conditions restricted to a local corridor (±5 km from the window) to avoid bias from distant parts of the transect. Differences in density index *D* and depth averaged Sv (10–300 m) between inside and outside were assessed using permutation tests on the mean and median, which do not rely on distributional assumptions. A complete and more detailed analysis will be carried out when the full dataset is available.

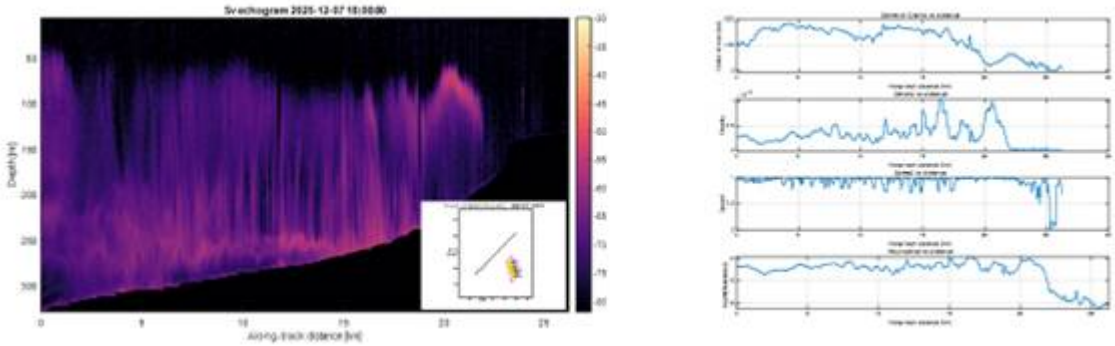


Figure 19. Example acoustic transect outside Hywind Tampen (transect T1).

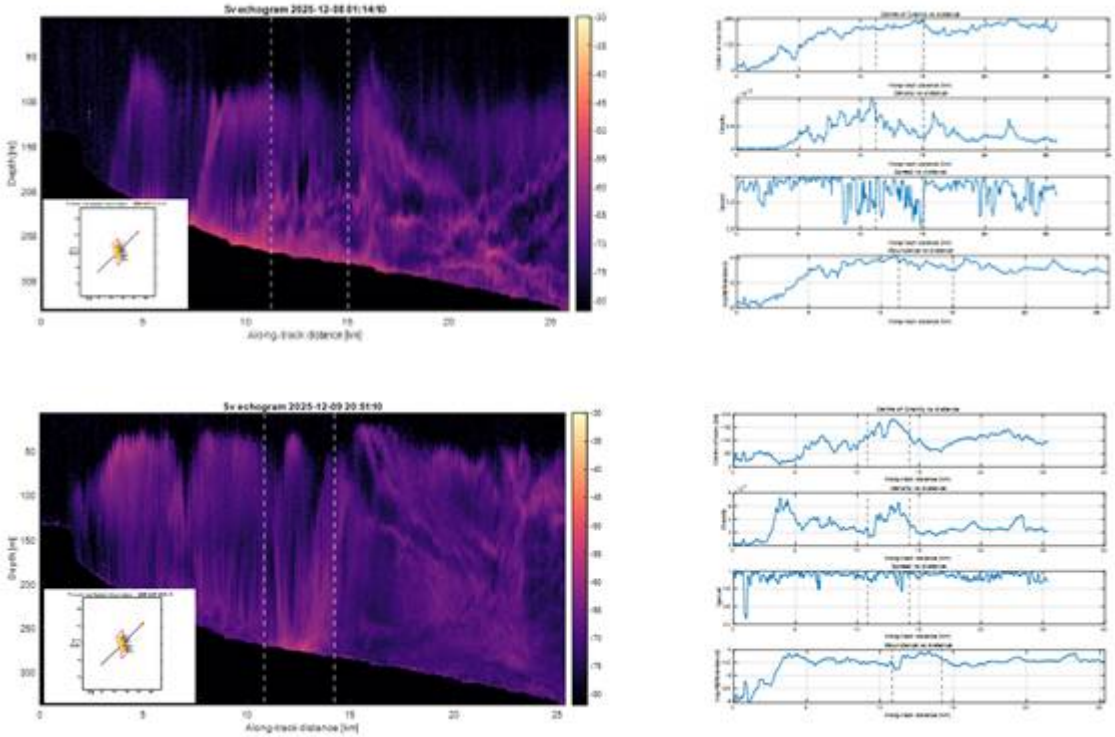


Figure 20. Example acoustic transects across Hywind Tampen (a) transects T2 and (b) transect T5).

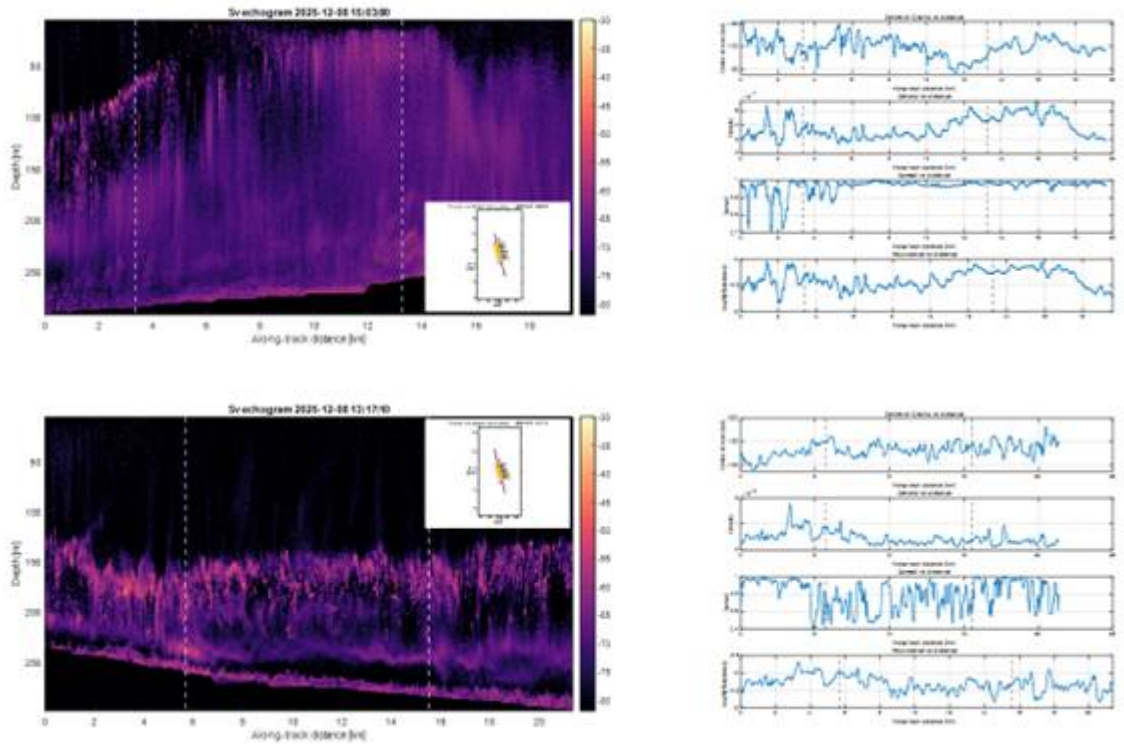


Figure 21. Example acoustic transects along (through) Hywind Tampen (a) transects T3 and (b) Transect T4).

The example echograms show the effect of time on the distribution of organisms within the wind park, which is most clearly visible when comparing T3 and T4. T3 was performed as the mesopelagic layer, a dominating feature within the park in addition to demersal fish, ascended to the surface and backscattering became evenly distributed throughout the water column.

Very preliminary analysis of the limited dataset showed that across the two independent transects crossing the wind farm (T2 and T5), we found consistent but transect specific patterns. In T2, the density index *D* did not differ significantly between inside and local outside, although a pronounced peak in *D* was observed in the edge zone immediately adjacent to the boundary. In contrast, T5 showed a clear and statistically significant increase in *D* inside the wind farm relative to the local outside both in time and along track distance. Depth integrated Sv (10–300 m) tended to be slightly lower inside than outside in both transects, but this reduction was small (order 0.3–1 dB) and more evident in the mean than in the median, indicating subtle changes in the distribution of scatterers rather than a uniform shift. Together, these preliminary results suggest that the across farm structure of scatterers can vary between crossings, likely influenced by time of day and background conditions, with T5 showing a more pronounced accumulation inside the wind farm than T2.

Along-transect (through HT) preliminary analyses for T3 and T4 show a consistent pattern of reduced density and backscatter inside the wind farm compared to the local outside corridor. For both transects, the density index *D* is significantly lower inside than outside in both time and distance domains. Depth integrated Sv over 10–300 m is also significantly lower inside than outside in both T3 and T4, with a larger reduction in T3 (mean and median differences of about 1–1.7 dB) and a somewhat weaker but still significant reduction in T4 (mean difference ≈ 0.3 dB, median ≈ 2.4 dB). Edge regions in T3 do not differ from the local outside, whereas in T4 the edges already show a modest but significant decrease in *D* relative to outside, suggesting a broader transition zone. The initial analysis of the 2025 acoustics showed a tendency of a systematically lower backscatter within

the wind farm than in the adjacent local surroundings.

However, this pattern was not seen in the 2026 acoustics data. Example transects from the 2026 data are shown in the figure 22 (38 kHz data). Figure 22 shows transect T19 through the park. G. O. Sars entered the park from the south at approximately 16:01, just before the onset of diel vertical migration (as seen from approximately 8 km (along-track distance).

No conclusions can be drawn from this initial analysis, a full analysis of all crossings will be performed and compiled with data from previous cruises.

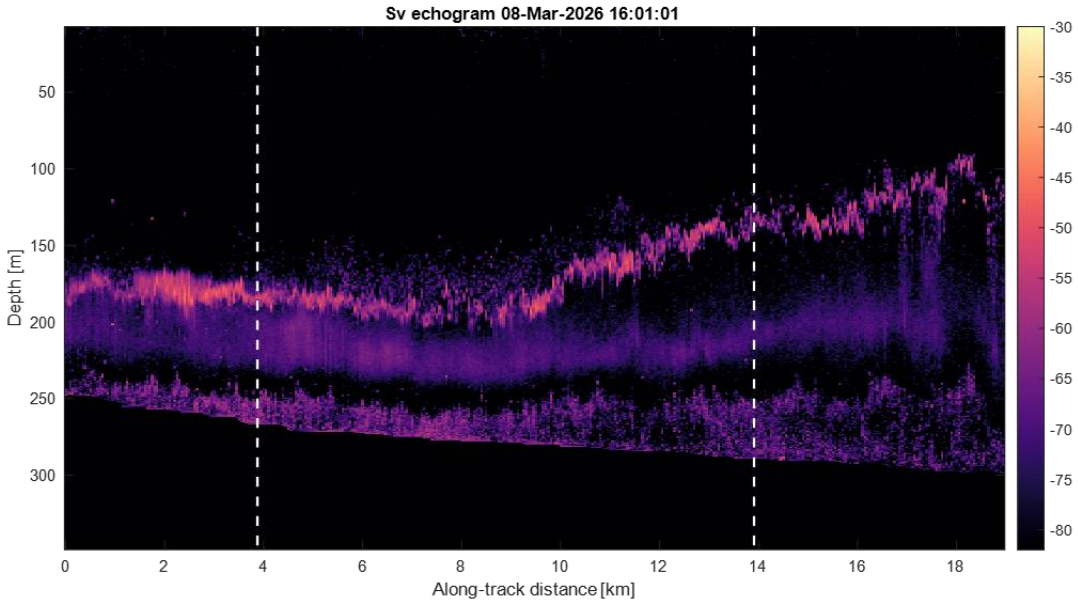


Figure 22. Transect through Hywind Tampen (T19). Vertical lines indicate start and end of the Hywind Tampen polygon.

3.5. Pelagic trawling with DeepVision

In total we conducted seven trawl hauls (Table 7). The preliminary results from the pelagic trawling with DeepVision, show that mesopelagic fish as well as gelatinous plankton is dominating in the area (Fig. 23), this corresponds with our findings from previous years (Utne Palm et al., 2023 and 2024).

Table 7. Time and position of start and stop for the seven pelagic trawl stations with *DeepVision*, conducted in 2025.

Date	Time	Longitude	Latitude	Station
2025-12-07	15:33:27	2.36	61.41	Pelagic trawl start
2025-12-07	15:43:30	2.36	61.42	Pelagic trawl stop
2025-12-08	14:40:04	2.23	61.39	Pelagic trawl start
2025-12-08	17:47:55	2.31	61.24	Pelagic trawl stop

2025-12-15	12:04:50	2.26	61.40	Pelagic trawl start
2025-12-15	15:01:51	2.34	61.24	Pelagic trawl stop
2025-12-16	08:42:40	2.33	61.27	Pelagic trawl start
2025-12-16	11:10:24	2.26	61.40	Pelagic trawl stop
2025-12-16	12:36:44	2.17	61.38	Pelagic trawl start
2025-12-16	15:22:57	2.24	61.24	Pelagic trawl stop
2025-12-16	16:45:11	2.33	61.27	Pelagic trawl start
2025-12-16	20:15:00	2.25	61.42	Pelagic trawl stop
2025-12-16	21:47:05	2.17	61.37	Pelagic trawl start
2025-12-16	23:48:21	2.23	61.27	Pelagic trawl stop

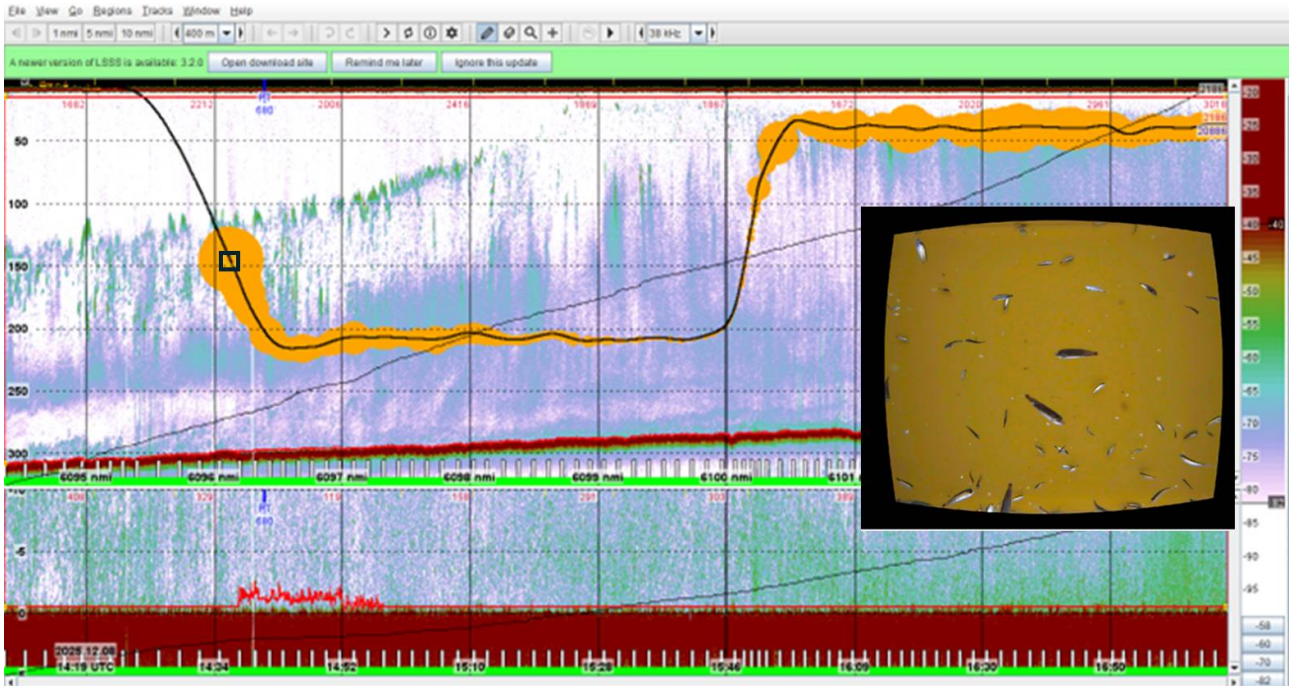


Figure 23. acoustic transect through the park from south to north. (a) the echogram shows the acoustic sound scattering layers (at 38 kHz), as displayed in LSSS when merged with DeepVision data. Black line shows the trawl path. The yellow bubbles show that something is seen in DeepVision the size of the bubble indicates the amount. The camera view displays what is seen in DeepVision when the trawl passes the area marked with a black square on the trawl track. In this case it is the mesopelagic fish Pearlside (Maurolicus muelleri) that dominated together with some gelatinous plankton (white bobbles /pearls).

3.6. eDNA

The eDNA data from the March cruise has not yet been analyzed.

4. Referances

Burkhard B, Opitz S, Lenhart H, Ahrendt K, Garthe S, Mendel B, Windhorst W. 2011. Ecosystem based modeling and indication of ecological integrity in the German North Sea—Case study offshore wind parks. Ecological Indicators 11(1):168-174. https://doi.org/10.1016/j.ecolind.2009.07.004

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Utne-Palm AC, Søiland H, Sveistrup AK, Renner A, Ross R, Moy F, Bakhoday Paskyabi M, Totland A, Hannaas S, de Jong K, Gonzalez-Mirelis G, Hovland T, Pedersen P, Wilhelmsen JF, Majaneva MA, Heum SW, Skjold W, Vågenes S, Skaret G, Corus F, Voronkov A, Vågenes P, Kielland L. Cruise report Hywind tampen 13 to 28 March 2023. Toktrapport No. 10, 2023. https://www.hi.no/hi/nettrapporter/toktrapport-en-2023-10

5. Abbreviation and word explanatio

ADCP: is an Acoustic Doppler Current Profiler. It is a hydroacoustic current meter similar to a sonar, used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column.

Acoustic releaser: is for the deployment and subsequent recovery of instrumentation from the sea floor, in which the recovery is triggered remotely by an acoustic command signal.

CTD: is an oceanography instrument used to measure the electrical conductivity, temperature, and pressure of seawater. Conductivity is used to determine salinity and depth is calculated from pressure.

Hydrophone: is a microphone designed to be used underwater for recording or listening to underwater sound. Most hydrophones are based on a piezoelectric transducer that generates an electric potential when subjected to a pressure change, such as a sound wave.

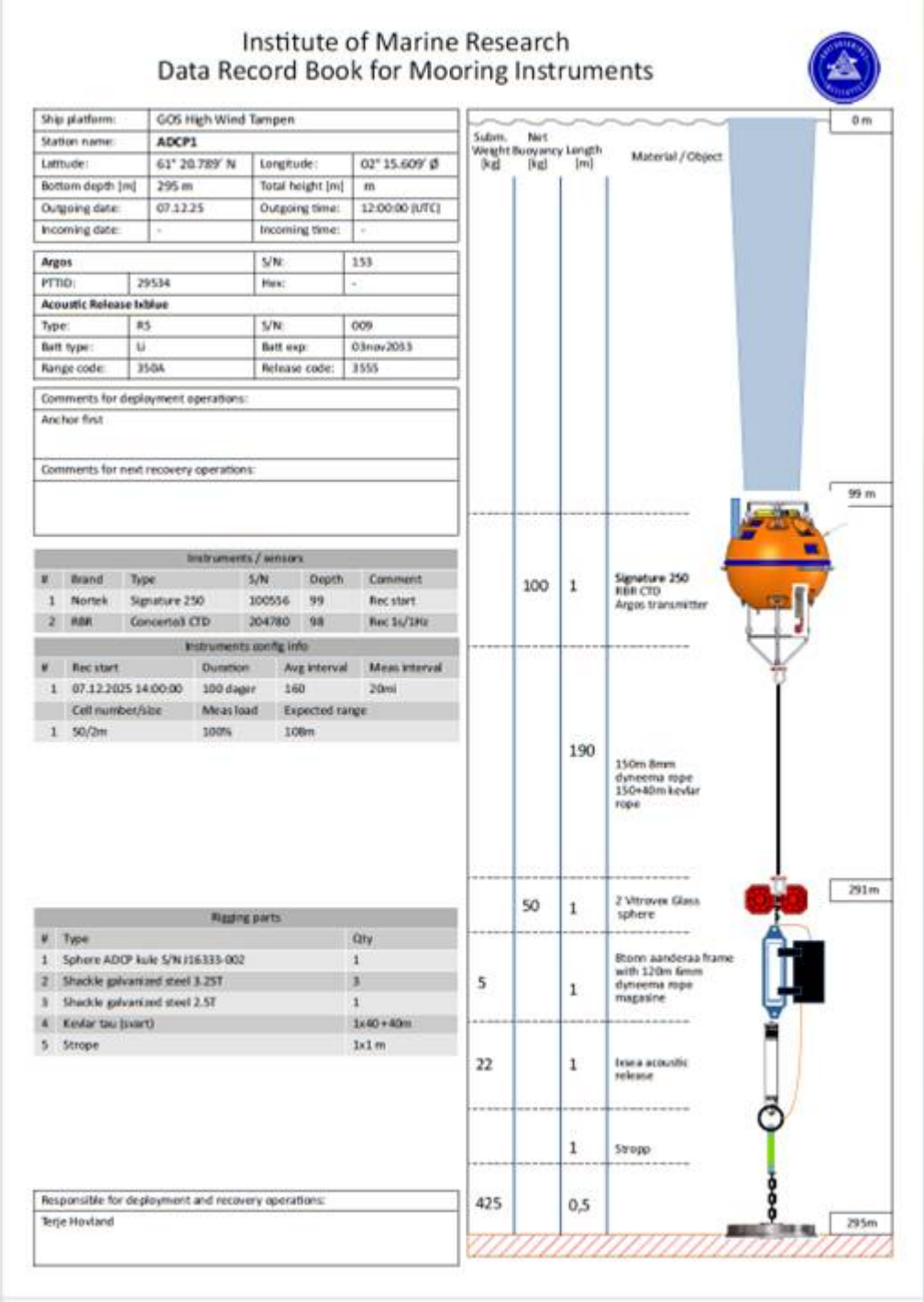
Multi-frequency echosounder: Recent research has shown that simultaneous use of several discrete echo sounder frequencies (multifrequency) not only improves fish stock estimates but can also be used to identify species. This is because each specie has a unique acoustic frequency response. This new and growing understanding greatly improves the value of hydroacoustics to obtain information about marine resources. For more information see: https://www.kongsberg.com/maritime/support/themes/simrad-content-s/scientificapplications/multifrequency-echo-sounder-operation/

ROV: stands for remote operating vehicle. ROVs are unmanned, highly manoeuvrable underwater machines that can be used to explore ocean depths while being operated by someone at the water surface. For more details see: https://www.revocean.org/vessel/rov/

DeepVision: is a camera system that is mounted at the cod-end entrance of the trawl. Here it takes pictures of the catch as it passes through the trawl. It is used to sample fish without having to land or injure the fish, as the fish passes through the open trawl cod-end. For more details see: https://www.deepvision.no/deep-vision-formarine-research

6. Appendix

1. ADCP mooring 1



Institute of Marine Research
Data Record Book for Mooring Instruments

Ship platform:	GO5 High Wind Tampen		
Station name:	**ADCP1**		
Lattitude:	61° 20.789' N	Longitude:	02° 15.609' Ø
Bottom depth [m]	295 m	Total height [m]	m
Outgoing date:	07.12.25	Outgoing time:	12:00:00 (UTC)
Incoming date:	-	Incoming time:	-

Argos		S/N:	153
PTTID:	29534	Hex:	-
Acoustic Release Ixblue			
Type:	R5	S/N:	009
Batt type:	Li	Batt exp:	03nov2053
Range code:	3504	Release code:	3555

Comments for deployment operations:
Anchor first
Comments for next recovery operations:

Instruments / sensors

#	Brand	Type	S/N	Depth	Comment
1	Nortek	Signature 250	100556	99	Rec start
2	RBR	Concerto3 CTD	204780	98	Rec 1s/1Hz

Instruments config info

#	Rec start	Duration	Avg interval	Meas interval
1	07.12.2025 14:00:00	100 dager	160	20mi
	Cell number/size	Meas load	Expected range	
1	50/2m	100%	108m	

Rigging parts

#	Type	Qty
1	Sphere ADCP kule S/N J16333-002	1
2	Shackle galvanized steel 3.25T	3
3	Shackle galvanized steel 2.5T	1
4	Kevlar tau (svart)	1x40+40m
5	Stropp	1x1 m

Responsible for deployment and recovery operations:
Terje Hovland

Subm. Weight [kg]	Net Buoyancy [kg]	Length [m]	Material / Object
			0 m
			99 m
	100	1	Signature 250 RBR CTD Argos transmitter
		190	150m 8mm dyneema rope 150+40m kevlar rope
			291m
	50	1	2 Vitrovex Glass sphere
5		1	Bionn aanderaa frame with 120m 6mm dyneema rope magasine
22		1	Ixsea acoustic release
		1	Stropp
425		0,5	
			295m

2. ADCP mooring 2

Institute of Marine Research
Data Record Book for Mooring Instruments

Ship platform:	GOS High Wind Tampen		
Station name:	**ADCP2**		
Latitude:	61° 15.384' N	Longitude:	02° 17.339' Ø
Bottom depth [m]	255 m	Total height [m]	m
Outgoing date:	07.12.25	Outgoing time:	1330 (UTC)
Incoming date:	-	Incoming time:	-

Argos		S/N:	295
PTTID:	22530	Hex:	-
Acoustic Release Ixblue			
Type:	RS	S/N:	0036
Batt type:	Li	Batt exp:	14.01.2028
Range code:	3525	Release code:	3555

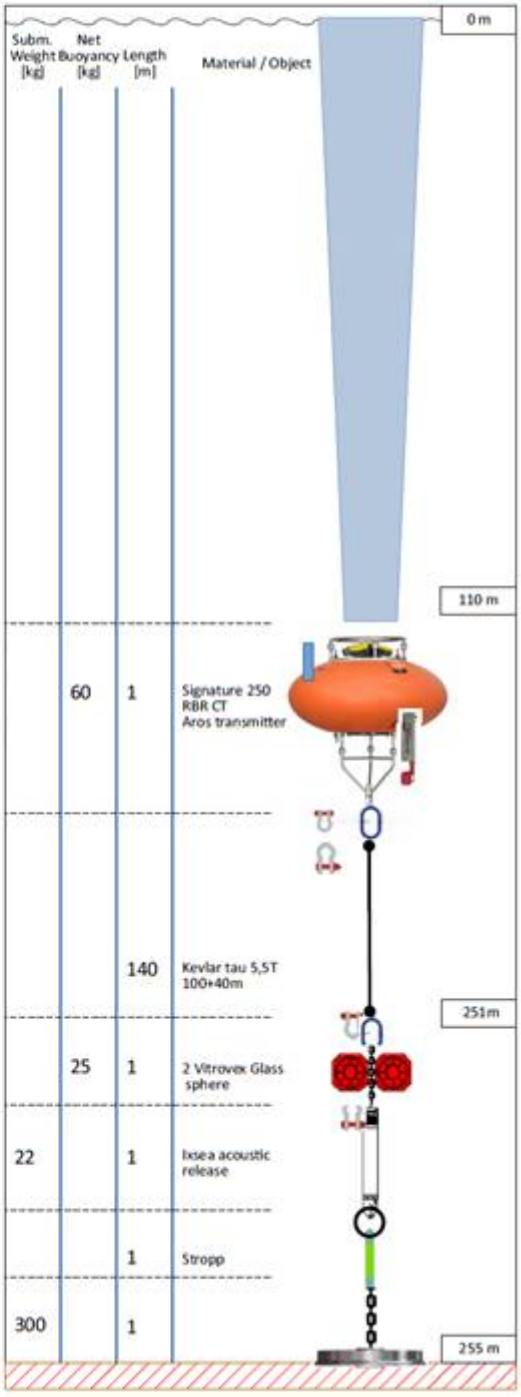
Comments for deployment operations:
Anchor first
Comments for next recovery operations:

Instruments / sensors					
#	Brand	Type	S/N	Depth	Comment
1	Nortek	Signature 250	100390	110	Rec start
2	RBR	Concertoduo CT	205747	109	Rec 1s/1Hz

Instruments config info				
#	Rec start	Duration	Avg interval	Meas interval
1	07.12.2025 14:00	100 dager	160	20min
	Cell number/size	Meas load	Expected range	
1	50/2m	100%	108m	

Rigging parts		
#	Type	Qty
1	Sphere ADCP kule S/N J16333-002	1
2	Shackle galvanized steel 3.25T	3
3	Shackle galvanized steel 2.5T	1
4	Kevlar tau (svart)	1x100 +40m
5	Strope	1x1 m

Responsible for deployment and recovery operations:
Terje Hovland



3. ADCP mooring 3

Institute of Marine Research
Data Record Book for Mooring Instruments

Ship platform:	GOS High Wind Tampen		
Station name:	**ADCP3**		
Latitude:	61° 23.358' N	Longitude:	02° 20.069' Ø
Bottom depth [m]	319 m	Total height [m]	m
Outgoing date:	07.12.25	Outgoing time:	14:30 (UTC)
Incoming date:	-	Incoming time:	-

Argos		S/N:	297
PTTID:	22536	Hex:	-
Acoustic Release Ixblue			
Type:	RS	S/N:	0006
Batt type:	Li	Batt exp:	21 mai 2030
Range code:	3507	Release code:	3555

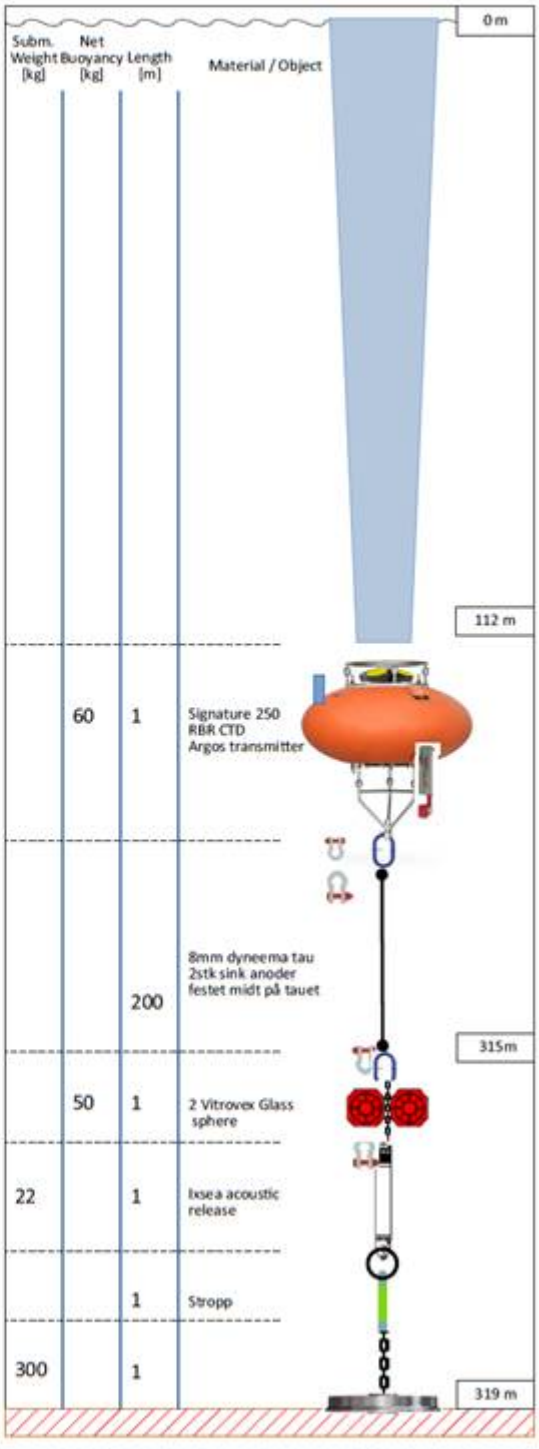
Comments for deployment operations:
Anchor first
Comments for next recovery operations:

Instruments / sensors					
#	Brand	Type	S/N	Depth	Comment
1	Nortek	Signature 250	100221	112	Rec start
2	RBR	Concerto3 CTD	204775	111	Rec 1s/1Hz

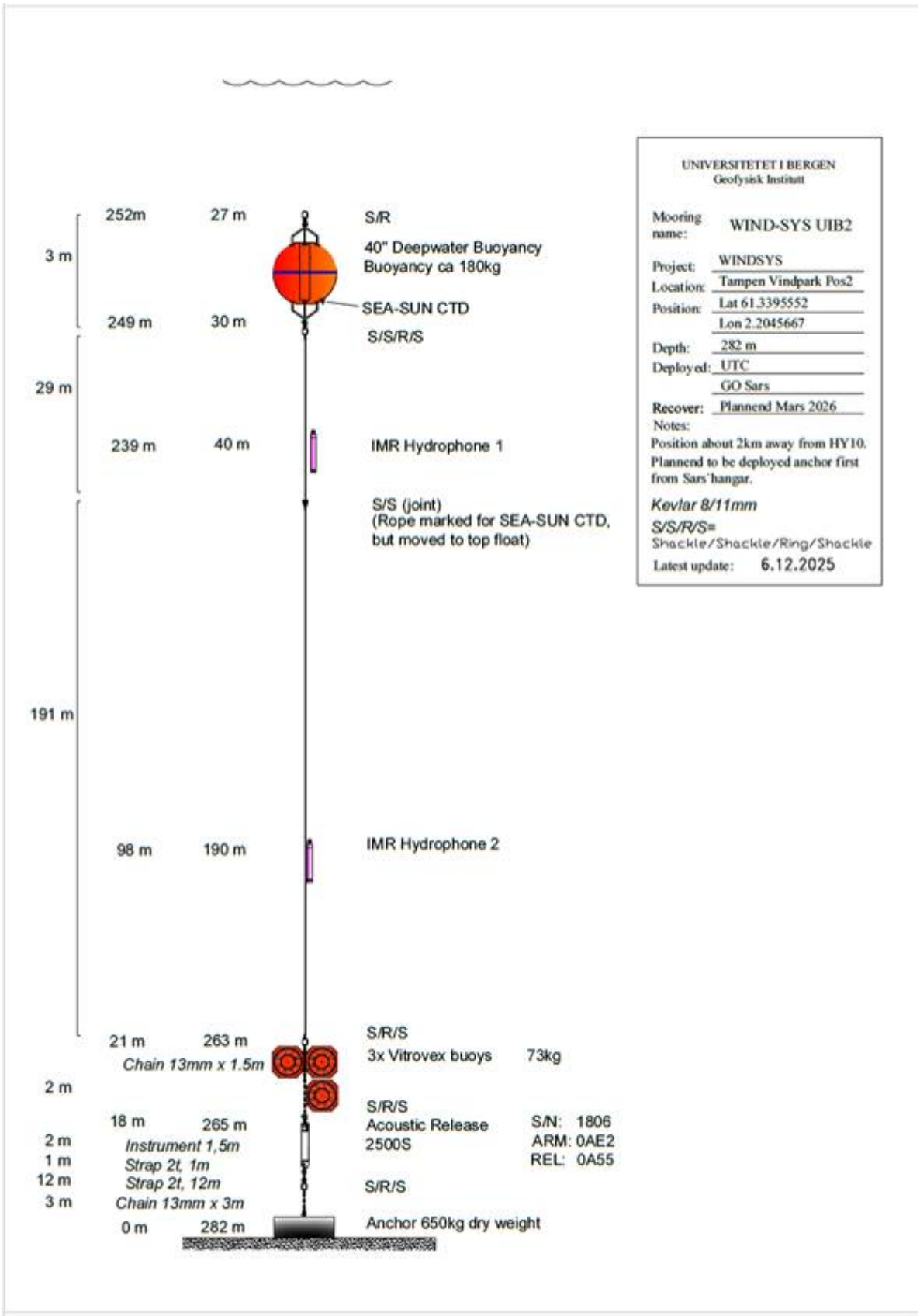
Instruments config info				
#	Rec start	Duration	Avg interval	Meas interval
1	07.12.25 15:00	100 dager	160s	20min
	Cell number/size	Meas load	Expected range	
1	50/2m	100%	108m	

Rigging parts		
#	Type	Qty
1	Sphere ADCP kule S/N J16333-002	1
2	Shackle galvanized steel 3.25T	3
3	Shackle galvanized steel 2.5T	1
4	Kevlar tau (svart)	1x100 +100m
5	Strope	1x1 m

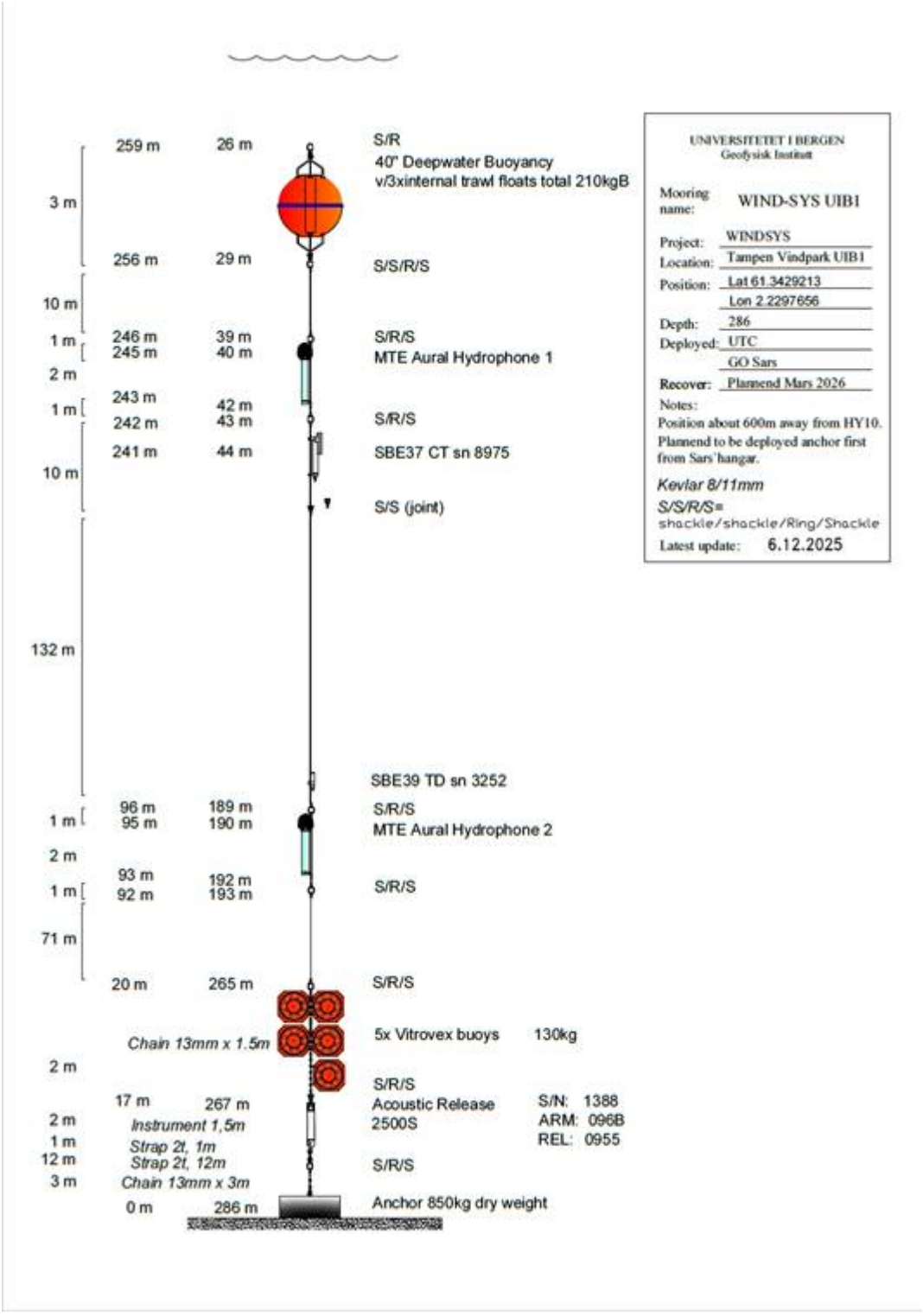
Responsible for deployment and recovery operations:
Terje Hovland



4. Hydrophone mooring 1



5. Hydrophone mooring 2



6. All stations

All stations conducted during the 2025 cruise

Station type	Info	Date	Time	Loc.St.No	Latitude	Longitude	Depth
Mooring out	Hydrophone rig 1 UiB	07.12.2025	08:43:34	4059	6120.564085 N	00213.671738 E	285.39
Mooring out	Hydrophone rig 2 UiB	07.12.2025	09:46:50	4060	6120.358255 N	00212.150341 E	281.02
Mooring out	ADCP 1 (between Hy02-03	07.12.2025	12:46:53	4061	6120.790360 N	00215.611615 E	292.97
Mooring out	ADCP 3 (north of HT)	07.12.2025	13:50:38	4062	6115.384290 N	00217.352266 E	254.53
Mooring out	ADCP 2 (south of HT)	07.12.2025	15:02:04	4063	6123.357208 N	00220.066101 E	315.63
Start Cross shelf transect (see Fig.3,left)							
CTD with watersample start	Line North of HT, Nutrients, Chlorophyl a	07.12.2025	17:04:01	834	6129.101065 N	00218.121698 E	344.24
CTD with watersample stop		07.12.2025	17:19:15	834	6129.101364 N	00218.121525 E	344.36
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	17:20:25	834	6129.100564 N	00218.122050 E	344.62
Håv-trekk stasjon.stop		07.12.2025	17:27:35	834	6129.100994 N	00218.121148 E	344.71
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	17:31:12	835	6129.101302 N	00218.122434 E	344.58
Håv-trekk stasjon.stop		07.12.2025	17:52:50	835	6129.104090 N	00218.128642 E	343.80
CTD with watersample start	Line North of HT, Nutrients, Chlorophyl a	07.12.2025	18:49:06	835	6124.301600 N	00208.270164 E	291.73
CTD with watersample stop		07.12.2025	18:58:27	835	6124.306522 N	00208.313814 E	291.98
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	19:00:49	836	6124.306313 N	00208.313506 E	291.74
Håv-trekk stasjon.stop		07.12.2025	19:08:27	836	6124.305525 N	00208.315217 E	291.72
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	19:10:04	837	6124.305398 N	00208.315061 E	292.09

Håv-trekk stasjon.stop		07.12.2025	19:27:45	837	6124.305548 N	00208.314209 E	292.50
CTD with watersample start	Line North of HT, Nutrients, Chlorophyl a	07.12.2025	19:55:17	836	6121.635248 N	00202.846828 E	247.35
CTD with watersample stop		07.12.2025	20:15:15	836	6121.633370 N	00202.844230 E	247.64
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	20:15:20	838	6121.633313 N	00202.844607 E	248.26
Håv-trekk stasjon.stop		07.12.2025	20:23:00	838	6121.632530 N	00202.844232 E	247.64
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	20:39:45	839	6121.669266 N	00202.918170 E	248.96
Håv-trekk stasjon.stop		07.12.2025	20:39:47	839	6121.669323 N	00202.918298 E	248.96
CTD with watersample start	Line North of HT, Nutrients, Chlorophyl a	07.12.2025	21:02:22	837	6120.288116 N	00200.709577 E	201.21
CTD with watersample stop		07.12.2025	21:14:51	837	6120.287624 N	00200.709458 E	200.34
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	21:15:06	840	6120.287166 N	00200.709535 E	200.70
Håv-trekk stasjon.stop		07.12.2025	21:23:20	840	6120.291981 N	00200.734741 E	200.82
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	21:24:34	841	6120.292023 N	00200.735528 E	201.75
Håv-trekk stasjon.stop		07.12.2025	21:37:27	841	6120.289617 N	00200.753171 E	201.98
CTD with watersample start	Line North of HT, Nutrients, Chlorophyl a	07.12.2025	22:02:57	838	6118.812366 N	00157.225438 E	144.31
CTD with watersample stop		07.12.2025	22:11:16	838	6118.810822 N	00157.224752 E	144.34
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	22:12:24	842	6118.810932 N	00157.224621 E	144.05
Håv-trekk stasjon.stop		07.12.2025	22:20:07	842	6118.811654 N	00157.226289 E	144.46
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	22:21:27	843	6118.811326 N	00157.224787 E	144.15
Håv-trekk stasjon.stop		07.12.2025	22:32:14	843	6118.837985 N	00157.298462 E	144.58

CTD with watersample start	Line Mid of HT, Nutrients, Chlorophyl a	07.12.2025	23:14:30	839	6115.069791 N	00205.287018 E	141.77
CTD with watersample stop		07.12.2025	23:25:41	839	6115.069275 N	00205.287371 E	142.02
Håv-trekk stasjon.start	WP2-net (100-0m)	07.12.2025	23:27:42	844	6115.068761 N	00205.288731 E	142.23
Håv-trekk stasjon.stop		07.12.2025	23:34:44	844	6115.068535 N	00205.288978 E	141.90
Håv-trekk stasjon.start	WP2-net (bottom-0m)	07.12.2025	23:37:07	845	6115.069187 N	00205.288708 E	142.01
Håv-trekk stasjon.stop		07.12.2025	23:46:13	845	6115.069228 N	00205.288490 E	142.48
CTD with watersample start	Line Mid of HT, Nutrients, Chlorophyl a	08.12.2025	00:17:26	840	6117.625596 N	00210.867169 E	247.52
CTD with watersample stop		08.12.2025	00:30:01	840	6117.628309 N	00210.868562 E	247.08
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	00:32:27	846	6117.629415 N	00210.868161 E	247.08
Håv-trekk stasjon.stop		08.12.2025	00:39:07	846	6117.628907 N	00210.866795 E	247.01
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	00:41:47	847	6117.628367 N	00210.868183 E	246.72
Håv-trekk stasjon.stop		08.12.2025	00:57:20	847	6117.628594 N	00210.867165 E	246.60
CTD with watersample start	Line Mid of HT, Nutrients, Chlorophyl a	08.12.2025	01:26:03	841	6119.747819 N	00215.590557 E	284.21
CTD with watersample stop		08.12.2025	01:40:12	841	6119.749270 N	00215.591105 E	284.28
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	01:42:20	848	6119.749872 N	00215.591317 E	284.45
Håv-trekk stasjon.stop		08.12.2025	01:49:28	848	6119.749140 N	00215.590511 E	284.50
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	01:52:03	849	6119.750259 N	00215.591862 E	284.73
Håv-trekk stasjon.stop		08.12.2025	02:09:35	849	6119.750199 N	00215.590917 E	284.13
CTD with watersample start	Line Mid of HT, Nutrients, Chlorophyl a	08.12.2025	02:30:20	842	6120.985429 N	00218.133501 E	295.15

CTD with watersample stop		08.12.2025	02:44:04	842	6120.986577 N	00218.135799 E	295.02
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	02:46:14	850	6120.986301 N	00218.134279 E	295.14
Håv-trekk stasjon.stop		08.12.2025	02:53:55	850	6120.986114 N	00218.134270 E	295.06
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	02:56:11	851	6120.986957 N	00218.134464 E	295.06
Håv-trekk stasjon.stop		08.12.2025	03:14:01	851	6120.986226 N	00218.134743 E	295.23
CTD with watersample start	Line Mid of HT, Nutrients, Chlorophyl a	08.12.2025	04:01:23	843	6124.986149 N	00226.146032 E	346.25
CTD with watersample stop		08.12.2025	04:15:20	843	6124.986889 N	00226.146456 E	346.44
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	04:17:47	852	6124.985338 N	00226.146989 E	346.58
Håv-trekk stasjon.stop		08.12.2025	04:25:11	852	6124.986540 N	00226.146437 E	346.66
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	04:30:52	853	6124.985886 N	00226.147069 E	346.53
Håv-trekk stasjon.stop		08.12.2025	04:49:06	853	6124.985762 N	00226.147266 E	346.20
CTD with watersample start	Line South of HT, Nutrients, Chlorophyl a	08.12.2025	05:34:22	844	6120.652776 N	00233.573729 E	344.86
CTD with watersample stop		08.12.2025	05:49:13	844	6120.653869 N	00233.575617 E	344.88
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	05:51:18	854	6120.654112 N	00233.575393 E	344.47
Håv-trekk stasjon.stop		08.12.2025	05:59:32	854	6120.653488 N	00233.574613 E	344.36
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	06:01:47	855	6120.653152 N	00233.575329 E	344.39
Håv-trekk stasjon.stop		08.12.2025	06:22:34	855	6120.653649 N	00233.575460 E	344.49
Stop Cross shelf transekt after one station on southern line							
ROV station start	Pick up Lander bottom frame	08.12.2025	08:50:53	1	6118.681794 N	00215.315277 E	277.90

ROV station stop		08.12.2025	11:57:10	1	6117.984123 N	00215.712634 E	273.08
Pelagic trawl start (through HT from N to S)	DeepVision pelagik trawl through HT	08.12.2025	14:40:04	680	6123.640424 N	00213.684338 E	298.94
Pelagic trawl stop		08.12.2025	17:47:55	680	6114.417183 N	00218.420828 E	245.22
CTD with watersample start Line South continues	Repeet: S, Nutrients, Chlorophyl a, deepest st.	08.12.2025	19:03:47	845	6120.712037 N	00233.590141 E	345.65
CTD with watersample stop		08.12.2025	19:19:12	845	6120.711655 N	00233.590203 E	346.00
CTD with watersample start	Line South of HT, Nutrients, Chlorophyl a	08.12.2025	19:54:45	846	6117.206081 N	00226.521762 E	292.68
CTD with watersample stop		08.12.2025	20:08:13	846	6117.205643 N	00226.521136 E	293.12
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	20:09:08	856	6117.205373 N	00226.520951 E	292.87
Håv-trekk stasjon.stop		08.12.2025	20:18:12	856	6117.205382 N	00226.521019 E	292.69
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	20:18:27	857	6117.205340 N	00226.521081 E	292.71
Håv-trekk stasjon.stop		08.12.2025	20:36:37	857	6117.205201 N	00226.520653 E	292.89
CTD with watersample start	Line South of HT, Nutrients, Chlorophyl a	08.12.2025	21:10:49	847	6113.830295 N	00219.930163 E	245.46
CTD with watersample stop		08.12.2025	21:23:23	847	6113.830349 N	00219.928506 E	245.13
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	21:25:07	858	6113.830207 N	00219.928940 E	245.34
Håv-trekk stasjon.stop		08.12.2025	21:32:05	858	6113.830450 N	00219.928938 E	245.93
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	21:34:13	859	6113.829615 N	00219.928449 E	245.46
Håv-trekk stasjon.stop		08.12.2025	21:49:16	859	6113.830799 N	00219.928359 E	245.64
CTD with watersample start	Line South of HT, Nutrients, Chlorophyl a	08.12.2025	22:09:59	848	6112.068243 N	00216.609236 E	200.37

CTD with watersample stop		08.12.2025	22:20:57	848	6112.072675 N	00216.606317 E	200.83
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	22:22:48	860	6112.072654 N	00216.606409 E	200.11
Håv-trekk stasjon.stop		08.12.2025	22:29:36	860	6112.073215 N	00216.605661 E	200.65
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	22:32:37	861	6112.072088 N	00216.607000 E	200.47
Håv-trekk stasjon.stop		08.12.2025	22:45:15	861	6112.070562 N	00216.621949 E	201.28
CTD with watersample start	Line South of HT, Nutrients, Chlorophyl a	08.12.2025	23:05:28	849	6110.818876 N	00214.143056 E	149.36
CTD with watersample stop		08.12.2025	23:13:45	849	6110.818097 N	00214.144411 E	149.84
Håv-trekk stasjon.start	WP2-net (100-0m)	08.12.2025	23:15:47	862	6110.818400 N	00214.144640 E	149.46
Håv-trekk stasjon.stop		08.12.2025	23:22:41	862	6110.818102 N	00214.144352 E	150.14
Håv-trekk stasjon.start	WP2-net (bottom-0m)	08.12.2025	23:25:14	863	6110.818238 N	00214.143636 E	150.03
Håv-trekk stasjon.stop		08.12.2025	23:34:38	863	6110.817866 N	00214.144918 E	150.05
CTD transekt trough HT from SW to NE, see Fig. 3. midle)							
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	00:05:32	850	6113.674880 N	00209.380974 E	141.83
CTD with watersample stop		09.12.2025	00:15:07	850	6113.675091 N	00209.381383 E	141.48
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	00:36:11	851	6115.739333 N	00212.303759 E	226.95
CTD with watersample stop		09.12.2025	00:47:19	851	6115.739053 N	00212.302275 E	226.84
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	01:08:30	852	6117.799834 N	00215.293231 E	269.08
CTD with watersample stop		09.12.2025	01:21:19	852	6117.800114 N	00215.290767 E	269.17

CTD with watersample start	South st. inside HT	09.12.2025	01:39:23	853	6118.769734 N	00216.154437 E	280.89
CTD with watersample stop		09.12.2025	01:52:55	853	6118.770273 N	00216.153186 E	281.36
CTD with watersample start	Mid st. inside HT	09.12.2025	02:07:38	854	6119.788460 N	00215.626143 E	284.57
CTD with watersample stop		09.12.2025	02:21:37	854	6119.788274 N	00215.625192 E	284.32
CTD with watersample start	North st. inside HT	09.12.2025	02:38:07	855	6121.136747 N	00214.908841 E	293.38
CTD with watersample stop		09.12.2025	02:51:38	855	6121.136619 N	00214.906183 E	293.36
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	03:08:09	856	6122.136001 N	00216.057879 E	302.02
CTD with watersample stop		09.12.2025	03:21:06	856	6122.136018 N	00216.056443 E	301.86
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	03:42:06	857	6124.101386 N	00219.350175 E	322.18
CTD with watersample stop		09.12.2025	03:55:08	857	6124.100537 N	00219.347679 E	321.93
CTD with watersample start	SW-NE through HT, only Nutrients	09.12.2025	04:14:42	858	6126.045559 N	00222.675796 E	345.94
CTD with watersample stop		09.12.2025	04:28:55	858	6126.044836 N	00222.676519 E	346.10
CTD on acoustic Flower transect (Fig. 5)							
CTD with watersample start	Flower transect, only Nutrients	09.12.2025	05:28:01	859	6122.408988 N	00214.379796 E	298.42
CTD with watersample stop		09.12.2025	05:40:40	859	6122.400116 N	00214.382320 E	298.54
CTD with watersample start	Flower transect, only Nutrients	09.12.2025	05:53:43	860	6121.774252 N	00213.065102 E	290.27
CTD with watersample stop		09.12.2025	06:04:57	860	6121.771319 N	00213.078154 E	290.46
CTD with watersample start	Flower transect, only Nutrients	09.12.2025	07:00:54	861	6126.262376 N	00208.462791 E	306.78

CTD with watersample stop		09.12.2025	07:15:01	861	6126.262763 N	00208.461759 E	306.80
ROV video-transect SA06							
ROV station start	SA06: both cont. transects, one chain towards Hy10	09.12.2025	08:58:32	2	6121.168250 N	00213.323548 E	288.80
ROV station stop		09.12.2025	14:21:44	2	6120.947673 N	00213.699473 E	289.09
CTD transekt trough HT from NW to SE, see Fig. 3. midle)							
CTD with watersample start	NW-SE through HT, only Nutrients	09.12.2025	15:00:58	862	6124.414527 N	00211.389371 E	302.36
CTD with watersample stop		09.12.2025	15:14:35	862	6124.415052 N	00211.392741 E	302.13
CTD with watersample start	NW-SE through HT, only Nutrients	09.12.2025	15:40:27	863	6122.391181 N	00214.352864 E	299.34
CTD with watersample stop		09.12.2025	15:52:10	863	6122.391967 N	00214.354532 E	299.22
CTD with watersample start	North st. inside HT	09.12.2025	16:10:22	864	6121.142279 N	00214.875649 E	292.97
CTD with watersample stop		09.12.2025	16:22:55	864	6121.142735 N	00214.877456 E	292.62
CTD with watersample start	Mid st. inside HT	09.12.2025	16:52:05	865	6119.789487 N	00215.633426 E	287.57
CTD with watersample stop		09.12.2025	17:03:43	865	6119.789067 N	00215.632704 E	287.72
CTD with watersample start	South st. inside HT	09.12.2025	17:17:59	866	6118.756903 N	00216.080535 E	284.64
CTD with watersample stop		09.12.2025	17:29:50	866	6118.768308 N	00216.138508 E	284.02
CTD with watersample start	NW-SE through HT, only Nutrients	09.12.2025	17:43:40	867	6117.565687 N	00216.827283 E	277.39
CTD with watersample stop		09.12.2025	18:13:16	867	6115.722322 N	00219.480307 E	266.34
CTD with watersample start	NW-SE through HT, only Nutrients	09.12.2025	18:21:51	868	6115.464930 N	00219.756929 E	264.47

CTD with watersample stop		09.12.2025	18:44:56	868	6114.002297 N	00221.949896 E	258.57
CTD with watersample start	NW-SE through HT, only Nutrients	09.12.2025	18:57:42	869	6113.368927 N	00222.654479 E	255.06
CTD with watersample stop		09.12.2025	19:10:09	869	6113.369670 N	00222.654459 E	255.61
Acoustic transect start (fron SW-to NE diagornaly through the park centre)							
Acoustic transect start		09.12.2025	20:15:02	1	6115.190759 N	00205.254246 E	143.35
Acoustic transect stop		09.12.2025	21:39:30	1	6124.992488 N	00226.117598 E	350.41
ROV finding trawl in Bjørnefjorden							
ROV station start		10.12.2025	12:05:37	3	6011.213972 N	00514.042295 E	0.00
ROV station stop		10.12.2025	15:58:58	3	6011.197347 N	00514.110575 E	677.81
Release of ADCP 1	Did not releas proparly	11.12.2025	20:00:00		6120.790360 N	00215.611615 E	292.97
Acoustic transect across HT: with CTD at 5nm W, Mid and 5nm E of HT							
CTD with watersample start	5 nm West of HT	11.12.2025	22:47:49	870	6122.996679 N	00226.409092 E	337.46
CTD with watersample stop		11.12.2025	23:04:13	870	6122.994384 N	00226.408224 E	338.76
Acoustic transect		11.12.2025	22:54:27	2	6122.995436 N	00226.408005 E	337.92
CTD with watersample start	Midle of HT	11.12.2025	23:50:46	871	6121.547244 N	00214.688935 E	294.40
CTD with watersample stop		12.12.2025	00:05:35	871	6121.548248 N	00214.687855 E	294.14
CTD with watersample start	5 nm East of HT	12.12.2025	00:53:07	872	6120.124055 N	00203.151111 E	227.95
CTD with watersample stop		12.12.2025	01:06:07	872	6120.123137 N	00203.155589 E	228.66

Acoustic transect (crossing HT)	Crossing HT	12.12.2025	05:08:38	2	6118.153094 N	00229.035692 E	312.74
Acoustic transect (crossing HT)		12.12.2025	05:54:10	3	6114.427485 N	00218.362176 E	248.73
Acoustic transect (crossing HT)		12.12.2025	07:00:04	3	6125.413703 N	00212.806195 E	311.05
Acoustic transect (crossing HT)		12.12.2025	09:27:11	4	6121.762503 N	00213.000958 E	290.79
Acoustic transect (crossing HT)		12.12.2025	15:19:07	4	6121.123510 N	00225.029456 E	318.20
Acoustic transect (crossing HT)		12.12.2025	17:40:44	5	6121.034815 N	00224.490381 E	316.20
Acoustic transect (crossing HT)		12.12.2025	22:27:34	5	6118.077761 N	00218.206839 E	281.24
Acoustic transect (crossing HT)		12.12.2025	23:01:46	6	6121.703430 N	00213.087695 E	290.28
Acoustic transect (crossing HT)		13.12.2025	04:19:47	6	6118.136917 N	00218.235618 E	283.71
Acoustic transect (crossing HT)		13.12.2025	07:15:56	7	6121.339420 N	00227.204445 E	326.76
Acoustic transect (crossing HT)		13.12.2025	09:52:56	7	6122.980405 N	00226.351804 E	337.06
ROV in Bjørnefjorden to retrive lost trawl							
ROV station start - to bring up trawl		14.12.2025	07:28:31	4	6011.176916 N	00514.099746 E	677.67
ROV station stop - to bring up trawl		14.12.2025	11:01:13	4	6011.159303 N	00513.962857 E	676.18
Acoustic transect (to compleate the star across HT)		15.12.2025	03:20:02	8	6119.706728 N	00228.029302 E	318.16
Acoustic transect stop		15.12.2025	11:27:32	8	6125.313751 N	00214.893654 E	319.84
Pelagic trawl DeepVision along HT	along HT ca 1 km East of HT	15.12.2025	12:04:50	681	6123.901156 N	00215.546341 E	309.49
Pelagic trawl stop		15.12.2025	15:01:51	681	6114.691523 N	00220.516461 E	260.06
CTD with watersample Long	across shelf 8 st. only nutrients (see Fig.3 left)	15.12.2025	19:59:47	873	6146.730361 N	00310.008005 E	402.01

CTD with watersample stop		15.12.2025	20:19:06	873	6146.678155 N	00310.237983 E	401.87
CTD with watersample start		15.12.2025	21:22:01	874	6141.262800 N	00258.731799 E	405.65
CTD with watersample stop		15.12.2025	21:43:05	874	6141.161821 N	00259.030724 E	405.39
CTD with watersample start		15.12.2025	22:48:03	875	6135.923667 N	00247.772492 E	390.73
CTD with watersample stop		15.12.2025	23:08:21	875	6135.910678 N	00247.841594 E	392.00
CTD with watersample start		16.12.2025	00:05:37	876	6130.445423 N	00237.052049 E	372.99
CTD with watersample stop		16.12.2025	00:24:12	876	6130.443900 N	00237.052594 E	373.16
CTD with watersample start		16.12.2025	01:20:16	877	6124.990287 N	00226.144697 E	350.89
CTD with watersample stop		16.12.2025	01:38:11	877	6124.974309 N	00226.208459 E	351.26
CTD with watersample start		16.12.2025	02:32:44	878	6119.760471 N	00215.568529 E	288.61
CTD with watersample stop		16.12.2025	02:48:14	878	6119.760270 N	00215.569995 E	287.46
CTD with watersample start		16.12.2025	03:38:35	879	6115.022658 N	00205.442913 E	143.17
CTD with watersample stop		16.12.2025	03:46:11	879	6115.002583 N	00205.493346 E	143.23
CTD with watersample start		16.12.2025	04:38:15	880	6110.302165 N	00154.912255 E	142.50
CTD with watersample stop		16.12.2025	04:45:19	880	6110.290142 N	00154.942871 E	142.88
Repeet: Pelagic trawl DeepVision along HT	ca 1 km East of HT, from S to N	16.12.2025	08:42:40	682	6116.487002 N	00219.700671 E	276.46
Repeat: Pelagic trawl stop		16.12.2025	11:10:24	682	6123.935486 N	00215.570196 E	309.69
Pelagic trawl start	ca 1 km West of HT, from N to S	16.12.2025	12:36:44	683	6122.847246 N	00209.931384 E	291.01
Pelagic trawl stop		16.12.2025	15:22:57	683	6114.362725 N	00214.371669 E	225.27

Pelagic trawl start	ca 1 km East of HT, from S to N	16.12.2025	16:45:11	684	6115.934807 N	00219.882062 E	270.18
Pelagic trawl stop		16.12.2025	20:15:00	684	6125.193890 N	00214.855761 E	318.20
Pelagic trawl start	ca 1 km West of HT, from N to S	16.12.2025	21:47:05	685	6122.040947 N	00210.094658 E	286.91
Pelagic trawl stop		16.12.2025	23:48:21	685	6116.044452 N	00213.543376 E	245.62

All stations 2026 cruise

Station type	Info	Date	Time	Loc.St.No	Latitude	Longitude	Depth
Acoustic lander	Sørvest F Control	03.03.2026	23:08:43	1	5622.439105 N	00346.596112 E	65.85
Acoustic lander	Sørvest F	04.03.2026	05:42:03	2	5646.748939 N	00508.288463 E	60.34
Acoustic lander	Sørvest F	04.03.2026	07:17:36	3	5649.409533 N	00517.132350 E	56.60
Acoustic lander	Vestav. F Control	04.03.2026	18:15:47	4	5830.392097 N	00450.367759 E	277.39
CTD with watersample start	Test	04.03.2026	18:28:51	252	5830.384398 N	00450.393454 E	277.56
CTD with watersample stop	Test	04.03.2026	18:43:13	252	5830.384305 N	00450.393204 E	277.43
Håv-trekk stasjon.start	Test	04.03.2026	18:43:18	252	5830.384482 N	00450.392500 E	277.44
Håv-trekk stasjon.stop	Test	04.03.2026	19:04:44	252	5830.384357 N	00450.393445 E	277.56
Acoustic lander	Vestav. F	04.03.2026	23:21:29	5	5907.926004 N	00432.073923 E	258.41
Acoustic transect	At HT	05.03.2026	20:00				
Acoustic transect	At HT	06.03.2026	06:20				
ROV station start	Retrive ADCP1	06.03.2026	08:49:43	1	6120.768410 N	00215.493450 E	290.17
ROV station stop	Retrive ADCP1	06.03.2026	12:49:18	1	6120.642256 N	00215.324129 E	290.84
CTD start	calibrate ROV	06.03.2026	13:44:09	253	6120.369081 N	00213.621999 E	284.49

CTD stop	calibrate ROV	06.03.2026	14:07:52	253	6120.368353 N	00213.622646 E	285.04
ROV station start	ROV SA09	06.03.2026	15:17:03	2	6120.369726 N	00213.621413 E	284.77
ROV station stop	ROV SA09	06.03.2026	18:47:03	2	6120.053566 N	00214.294078 E	285.15
Cross shelf transect							
CTD with watersample start	Midle line	06.03.2026	21:00:07	254	6115.083905 N	00205.093315 E	143.28
CTD with watersample stop	Midle line	06.03.2026	21:11:59	254	6115.084228 N	00205.093328 E	142.75
CTD with watersample start	Midle line eDNA	06.03.2026	21:33:20	255	6115.084146 N	00205.093206 E	142.64
CTD with watersample stop	Midle line eDNA	06.03.2026	21:45:09	255	6115.084006 N	00205.093740 E	143.11
Håv-trekk stasjon.start	4xWP2 Midle line	06.03.2026	21:47:18	254	6115.084219 N	00205.092711 E	142.81
Håv-trekk stasjon.stop	4xWP2 Midle line	06.03.2026	22:30:11	254	6115.084295 N	00205.093609 E	143.37
CTD with watersample start	Midle line	06.03.2026	23:00:52	256	6117.623744 N	00210.814709 E	248.33
CTD with watersample stop	Midle line	06.03.2026	23:15:04	256	6117.623678 N	00210.814651 E	248.65
Håv-trekk stasjon.start	4xWP2 Midle line	06.03.2026	23:18:43	256	6117.623930 N	00210.813499 E	247.71
Håv-trekk stasjon.stop	4xWP2 Midle line	07.03.2026	00:11:02	256	6117.623761 N	00210.814502 E	248.67
CTD with watersample start	Midle line	07.03.2026	00:37:35	257	6119.728969 N	00215.577098 E	287.68
CTD with watersample stop	Midle line	07.03.2026	00:51:21	257	6119.728018 N	00215.575129 E	286.77
CTD with watersample start	Midle line eDNA	07.03.2026	01:08:02	258	6119.728126 N	00215.575841 E	286.92
CTD with watersample stop	Midle line eDNA	07.03.2026	01:25:29	258	6119.728186 N	00215.576891 E	287.16
Håv-trekk stasjon.start	4xWP2 Midle line	07.03.2026	01:27:23	257	6119.727624 N	00215.576550 E	286.98
Håv-trekk stasjon.stop	4xWP2 Midle line	07.03.2026	02:23:23	257	6119.728347 N	00215.575173 E	286.38

CTD with watersample start	Midle line	07.03.2026	02:52:04	259	6120.984468 N	00218.134488 E	298.21
CTD with watersample stop	Midle line	07.03.2026	03:08:14	259	6120.985375 N	00218.132312 E	298.11
Håv-trekk stasjon.start	4xWP2 Midle line	07.03.2026	03:09:39	259	6120.985336 N	00218.131699 E	297.88
Håv-trekk stasjon.stop	4xWP2 Midle line	07.03.2026	04:08:16	259	6120.985382 N	00218.132611 E	297.81
CTD with watersample start	Midle line	07.03.2026	04:57:03	260	6124.985567 N	00226.146814 E	349.78
CTD with watersample stop	Midle line	07.03.2026	05:10:43	260	6124.985804 N	00226.147290 E	349.57
CTD with watersample start	Midle line eDNA	07.03.2026	05:25:01	261	6124.985664 N	00226.148631 E	349.67
CTD with watersample stop	Midle line eDNA	07.03.2026	05:40:23	261	6124.985305 N	00226.147201 E	349.77
Håv-trekk stasjon.start	1xWP2 Midle line	07.03.2026	05:42:43	260	6124.985836 N	00226.145543 E	349.93
Håv-trekk stasjon.stop	1xWP2 Midle line	07.03.2026	06:02:56	260	6124.986199 N	00226.147382 E	349.86
Transects SA09							
ROV station start	SA09	07.03.2026	07:57:17	3	6119.908264 N	00213.908660 E	282.29
ROV station stop	1 Core sample	07.03.2026	11:21:51	3	6120.344725 N	00214.170336 E	287.49
Cross shelf transect							
CTD with watersample start	Northern line	07.03.2026	12:53:53	262	6118.826232 N	00157.368694 E	0.00
CTD with watersample stop	Northern line	07.03.2026	13:02:57	262	6118.818025 N	00157.463162 E	146.09
CTD with watersample start	North line eDNA	07.03.2026	13:18:51	263	6118.793899 N	00157.673445 E	145.51
CTD with watersample stop	North line eDNA	07.03.2026	13:30:20	263	6118.768502 N	00157.982432 E	146.77
Håv-trekk stasjon.start	4xWP2 Northern line	07.03.2026	13:45:00	262	6118.740282 N	00158.172663 E	146.22
Håv-trekk stasjon.stop	4xWP2 Northern line	07.03.2026	14:47:24	262	6118.724160 N	00157.825882 E	145.12
CTD with watersample start	Northern line	07.03.2026	15:17:45	264	6120.300455 N	00200.865495 E	0.00

CTD with watersample stop	Northern line	07.03.2026	15:31:58	264	6120.273327 N	00201.139540 E	209.33
Håv-trekk stasjon.start	4xWP2 Northern line	07.03.2026	15:39:49	264	6120.257876 N	00201.289187 E	210.95
Håv-trekk stasjon.stop	4xWP2 Northern line	07.03.2026	16:50:53	264	6120.300521 N	00201.422364 E	213.24
CTD with watersample start	Northern line	07.03.2026	17:15:17	265	6121.614976 N	00202.931196 E	250.66
CTD with watersample stop	Northern line	07.03.2026	17:27:48	265	6121.587539 N	00203.058968 E	252.07
Håv-trekk stasjon.start	2xWP2 Northern line	07.03.2026	17:47:36	265	6121.634924 N	00202.925719 E	251.21
Håv-trekk stasjon.stop	2xWP2 Northern line	07.03.2026	18:15:07	265	6121.672437 N	00202.861473 E	250.69
Håv-trekk stasjon.start	2xWP2 Northern line	07.03.2026	20:32:48	265	6121.650904 N	00202.884489 E	251.43
Håv-trekk stasjon.stop	2xWP2 Northern line	07.03.2026	21:21:13	265	6124.237472 N	00207.458475 E	294.13
CTD with watersample start	Northern line	07.03.2026	21:32:50	266	6124.335855 N	00208.192180 E	295.60
CTD with watersample stop	Northern line	07.03.2026	21:46:59	266	6124.335520 N	00208.200045 E	295.64
CTD with watersample start	North line eDNA	08.03.2026	17:36:04	267	6124.292140 N	00208.337945 E	295.29
CTD with watersample stop	North line eDNA	08.03.2026	17:53:06	267	6124.290093 N	00208.354708 E	295.24
Håv-trekk stasjon.start	4xWP2 Northern line	08.03.2026	18:17:31	266	6124.308522 N	00208.256575 E	295.88
Håv-trekk stasjon.stop	4xWP2 Northern line	08.03.2026	19:37:05	266	6124.856810 N	00209.318020 E	299.03
CTD with watersample start	Northern line	08.03.2026	20:24:54	268	6129.134160 N	00218.156200 E	348.47
CTD with watersample stop	Northern line	08.03.2026	20:42:33	268	6129.133476 N	00218.138273 E	347.64
CTD with watersample start	North line eDNA	08.03.2026	20:59:05	269	6129.104851 N	00218.113908 E	347.61
CTD with watersample stop	North line eDNA	08.03.2026	21:19:24	269	6129.104336 N	00218.114430 E	347.89
Håv-trekk stasjon.start	4xWP2 Northern line	08.03.2026	21:47:40	268	6129.136971 N	00217.932848 E	347.93

Håv-trekk stasjon.stop	4xWP2 Northern line	08.03.2026	23:00:32	268	6129.109676 N	00218.196104 E	350.33
CTD with watersample start	Southern line	08.03.2026	23:47:20	270	6125.108060 N	00225.954249 E	350.53
CTD with watersample stop	Southern line	09.03.2026	00:06:06	270	6125.102391 N	00226.043332 E	352.44
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	00:23:50	270	6125.119239 N	00225.926683 E	350.91
Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	01:29:10	270	6125.126937 N	00226.146352 E	353.16
CTD with watersample start	Southern line	09.03.2026	02:32:10	271	6120.646879 N	00233.607437 E	349.08
CTD with watersample stop	Southern line	09.03.2026	02:52:20	271	6120.647021 N	00233.727078 E	349.39
CTD with watersample start	Southern eDNA	09.03.2026	03:08:02	272	6120.665800 N	00233.593132 E	349.59
CTD with watersample stop	Southern eDNA	09.03.2026	03:26:28	272	6120.665738 N	00233.663570 E	348.27
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	03:47:20	271	6120.684487 N	00233.614113 E	348.92
Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	04:49:38	271	6120.678361 N	00234.213963 E	352.26
CTD with watersample start	Southern line	09.03.2026	05:52:39	273	6117.223788 N	00226.523007 E	297.00
CTD with watersample stop	Southern line	09.03.2026	06:09:47	273	6117.227574 N	00226.503388 E	295.79
CTD with watersample start	Southern eDNA	09.03.2026	07:15:02	274	6117.222963 N	00226.579206 E	296.82
CTD with watersample stop	Southern eDNA	09.03.2026	07:30:10	274	6117.224518 N	00226.656135 E	297.00
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	07:55:36	273	6117.228464 N	00226.591683 E	297.15
Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	08:58:14	273	6117.258368 N	00227.160119 E	299.79
CTD with watersample start	Southern line	09.03.2026	13:22:35	275	6113.857123 N	00219.721794 E	250.34
CTD with watersample stop	Southern line	09.03.2026	13:36:21	275	6113.830931 N	00219.989526 E	248.00
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	13:59:39	275	6113.832738 N	00220.025442 E	247.95

Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	15:04:37	275	6113.785099 N	00220.260337 E	249.56
CTD with watersample start	Southern line	09.03.2026	15:40:29	276	6112.074498 N	00216.787266 E	0.00
CTD with watersample stop	Southern line	09.03.2026	15:52:03	276	6112.054458 N	00217.038721 E	208.19
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	16:11:24	276	6112.071546 N	00216.976633 E	207.94
Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	17:15:37	276	6112.029852 N	00217.160054 E	209.26
CTD with watersample start	Southern line	09.03.2026	17:45:16	277	6110.820869 N	00214.046393 E	143.57
CTD with watersample stop	Southern line	09.03.2026	17:53:40	277	6110.818759 N	00214.103772 E	146.95
CTD with watersample start	Southern eDNA	09.03.2026	18:06:32	278	6110.814299 N	00214.264730 E	162.85
CTD with watersample stop	Southern eDNA	09.03.2026	18:17:08	278	6110.820921 N	00214.251849 E	161.35
Håv-trekk stasjon.start	4xWP2 Southern line	09.03.2026	18:40:03	277	6110.828898 N	00214.186581 E	156.01
Håv-trekk stasjon.stop	4xWP2 Southern line	09.03.2026	19:22:16	277	6110.822765 N	00214.397027 E	172.70
CTD with watersample start	North inside HT	10.03.2026	10:58:19	279	6121.161319 N	00214.854176 E	292.73
CTD with watersample stop	North inside HT	10.03.2026	11:14:36	279	6121.160489 N	00214.856129 E	293.36
CTD with watersample start	North inside HT eDNA	10.03.2026	11:34:25	280	6121.160178 N	00214.854698 E	292.81
CTD with watersample stop	North inside HT eDNA	10.03.2026	11:53:00	280	6121.137539 N	00214.862614 E	293.11
CTD with watersample start	South inside HT eDNA	10.03.2026	13:46:43	281	6118.786591 N	00216.092073 E	284.69
CTD with watersample stop	South inside HT eDNA	10.03.2026	14:05:00	281	6118.779687 N	00216.104642 E	284.52

7. Strat and stop positions for ROV transects

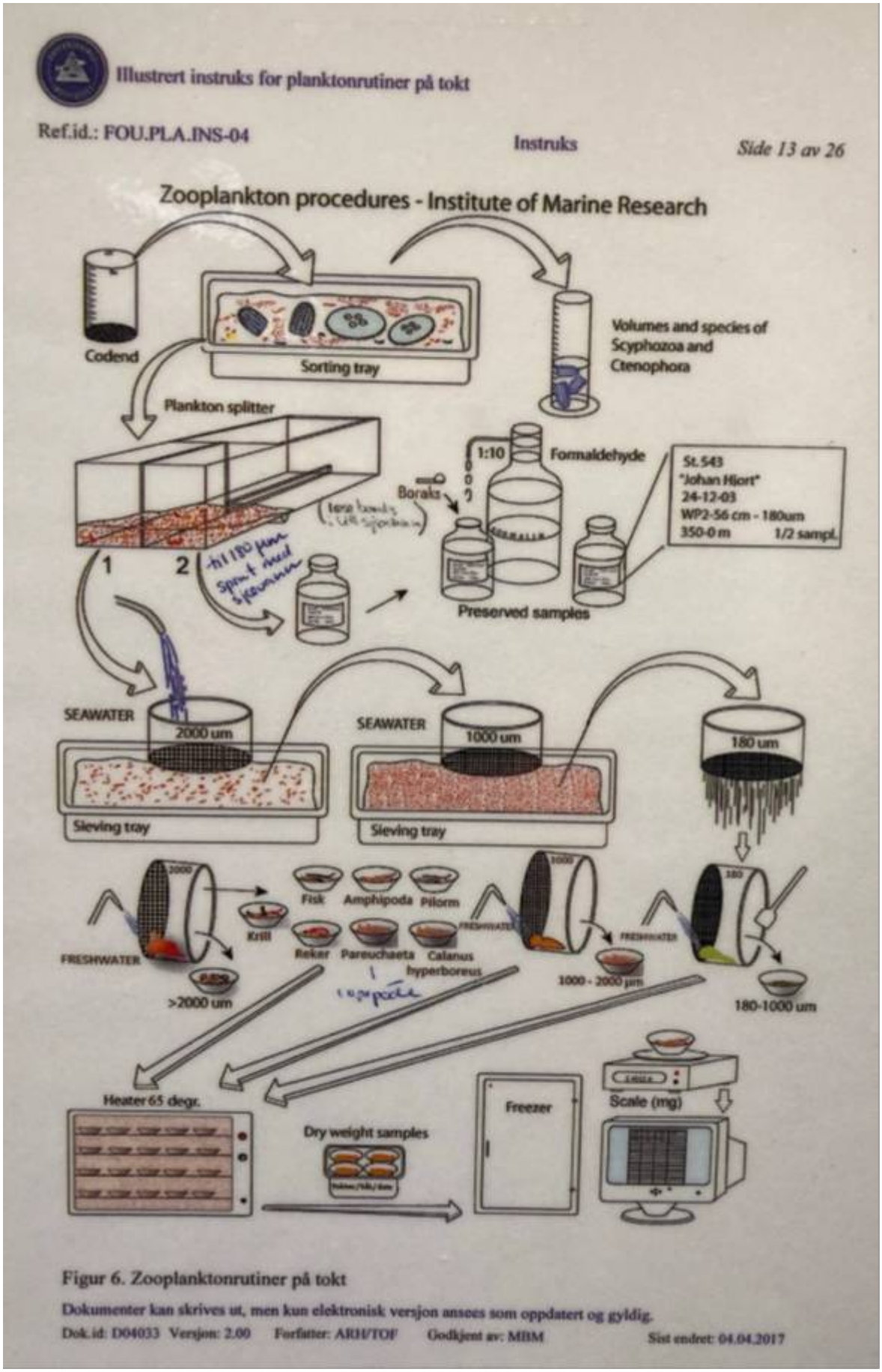
Start and stop positions for ROV video transect conducted by Freyja December 2025

Anchor	Lat	Long	Transect	line_id 2025	Lat_Deg	Lat_Decmin	Long_Deg	Long_Decmin
SA06	61.35375949	2.2299206	SA06 Start Chain HY10	1	61	21.2255694	2	13.795236
SA06	61.34942927	2.2274593	SA06 Stop Chain HY10	1	61	20.9657562	2	13.647558
SA06	61.34504478	2.2250276	SA06 Start Control	2	61	20.7026868	2	13.501656
SA06	61.34938577	2.2274723	SA06 Stop Control	2	61	20.9631462	2	13.648338
SA06	61.34619263	2.2340412	SA06 Start Control	3	61	20.7715578	2	14.042472
SA06	61.34937505	2.2274882	SA06	3	61	20.962503	2	13.649292
			Stop Control					

Start and stop positions for ROV video transect conducted by *Ægir*, March 2026.

Anchor	Videoline ID	Start or stop	Lat_Deg	Lat_Decmin	Long_Deg	Long_Decmin
SA09	HT05	Start control	61	20.376166945	2	13.67718546
SA09	HT05	Stop control	61	20.182902412	2	14.073515124
SA09	HT06	Start chain	61	20.173043935	2	14.089644114
SA09	HT06	Stop chain	61	19.99638	2	14.4534
SA09	HT07	Start control	61	19.911572531	2	13.92265179
SA09	HT07	Stop control	61	20.178780277	2	14.074243626
SA09	HT08	Start chain	61	20.188043225	2	14.077672971
SA09	HT08	Stop chain	61	20.367364971	2	14.186400223

8. IMR's handling prosedures for plankton samples



Figur 6. Zooplanktonrutiner på tokt

Dokumenter kan skrives ut, men kun elektronisk versjon ansees som oppdatert og gyldig.
Dok.id: D04033 Versjon: 2.00 Forfatter: ARH/TOF Godkjent av: MBM Sist endret: 04.04.2017

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