Measurements of currents and hydrography in the Southern Norwegian Trench 2024-2025

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Abstract
Here we describe measurements from three oceanographic moorings that were designed to resolve the annual cycle of currents and hydrography in the Southern Norwegian Trough. Related to the possible development of offshore aquaculture in the Southern Norwegian Trough, there is a need to obtain a representative picture of current conditions and statistics in all seasons, including the spatial variation in the current from the Central Trough and seasonal development in hydrography, including stratification. The measurements will also be useful for evaluating ocean models.

Introduction
This note briefly describe measurements performed by the Institute of Marine Research, Norway in the southern Norwegian Trench from Jan. 2024 to Jan 2025 (Fig 1). The measurements were motivated by the lack of environmental data (current, hydrography and oxygen) to evaluate the possibility for offshore fish faring. The observational work was a part of a project with Blue Planet and the University of Stavanger, Norway, and received funding from Ull-Førre Fund and the Norwegian Fisheries directorate.

Data
The array consisted of three separate moorings denoted M1, M2 and M3. The moorings were deployed across the region regulated for offshore fish farming in the southern part of the Norwegian Trench (Fig. 1). The moorings were designed to provide information on the hydrographic and current variability over the upper 100 m considered most relevant for fish farming. Schematic of the moorings are included in Fig 2-4.

Current velocities were measured with upward looking ADCPs (Nortek Signature 250 KHz)) mounted at about 100 m providing current in 2 m bins at 15 min time interval an average of 120 of pings.

RBRSolo T sensors provided temperature data at discrete depths at 1Hz, but here decimated to 15 min mean values in the provided files.

RBR CTD measured conductivity (salinity), temperature and pressure at 3 s interval

SBE37 SMPO2 measured conductivity (salinity), temperature and pressure, and oxygen at 30 s interval.

Details of the mooring and associated netcdf files are provided in Tables 1-3.

M1	Lat: N58° 34.984 Lon: E0004° 16.051, Bottom Depth: 283 m

Instrument	Variable	Depth (m)	Filename
Signature250	V	13:2:115	M1_adcp.nc
RBRSolo	T	29,34,39,44,49,54,68,76,84,92	M1_solo_1_10.nc
RBR CTD	CTP	24	M1_ctd_24.nc
RBR CTD	CTP	59	M1_ctd_59.nc
RBR CTD	CTP	100	M1_ctd_100.nc

Table 1: Mooring details for M1.

M2	Lat: N58° 36.487Lon: E0004°24.305, Bottom Depth: 274 m		
Instrument	Variable	Depth (m)	Filename
Signature250	V	12:2:108	M2_adcp.nc
RBRSolo	T	28,33,38,43,48,53,67,75,83,91	M2_solo_1_10.nc
SBE37 SMPO2	CTPO	23	M2_ctd_23.nc
SBE37 SMPO2	CTPO	58	M2_ctd_58.nc
SBE37 SMPO2	CTPO	99	M2_ctd_99.nc

Table 2: Mooring details for M2.

M3	Lat: N58° 38.051 Lon: E0004°32.569, Bottom Depth: 264 m		
Instrument	Variable	Depth (m)	Filename
Signature250	V	12:2:120	M3_adcp.nc
RBRSolo	T	31,36,41,46,51,55,69,77,85	M3_solo_1_9.nc
SBE37 SMPO2	CTPO	23	M3_ctd_26.nc
SBE37 SMPO2	CTPO	58	M3_ctd_61.nc
SBE37 SMPO2	CTPO	99	M3_ctd_101.nc

Table3: Mooring details for M3.

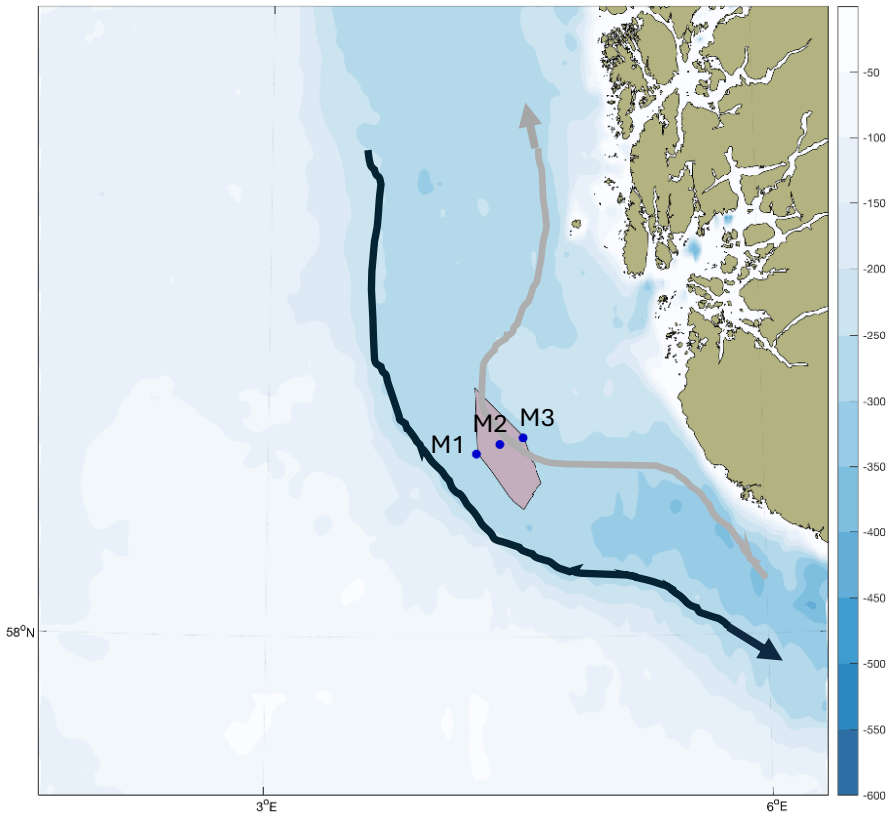

Figure 1 Map of the study area including bathymetry in blue colors, the area "Norskerenna- Sør" regulated for Havbruk til Havs and the position of oceanographic moorings, M[1-3]. Schematic currents are the Norwegian Coastal Current in gray and the Atlantic Water branch in black.

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Data Record Book for Mooring Instruments

Ship platform:	Johan Hjort		
Station name:	Havbruk M1		
Latitude:	N58° 34.984	Longitude:	E0004° 16.051
Bottom depth [m]	283	Total height [m]	
Outgoing date:	2024 7 january	Outgoing time:	11:02 UTC
Incoming date:	-	Incoming time:	-
Argos		S/N:	204-041
PTTID:	160587	Hex:	F1A5BBE
Acoustic Release Ixblue			
Type:	AR861	S/N:	2367
Batt type:	Lithium	Batt exp:	Jan 2028
Range code:	1BBA	Release code:	1B55

Comments for deployment operations:
Lodd satt ut sist

Comments for next recovery operations:

Instruments / sensors					
#	Brand	Type	S/N	Depth	Start
T0	SBE	SBE56	07397	20,7	st. 01.07 12:00
CTD 1	RBR	Concerto CTD	204780	24	st. 01.07 12:00
T1	RBR	Solo T	203570	29	st. 01.07 12:00
T2	RBR	Solo T	203573	34	st. 01.07 12:00
T3	RBR	Solo T	203575	39	st. 01.07 12:00
T4	RBR	Solo T	204238	44	st. 01.07 12:00
T5	RBR	Solo T	204240	49	st. 01.07 12:00
T6	RBR	Solo T	204242	54	st. 01.07 12:00
CTD2	RBR	Concerto CTD	204781	59	st. 01.07 12:00
T7	RBR	Solo T	204243	68	st. 01.07 12:00
T8	RBR	Solo T	204244	76	st. 01.07 12:00
T9	RBR	Solo T	204245	84	st. 01.07 12:00
T10	RBR	Solo T	204247	92	st. 01.07 12:00
CTD3	RBR	Concerto CTD	204783	100	st. 01.07 12:00
14	Norte k	Signature 250	100552	102	st. 01.07 12:00

Instrumentsconfig						
#	Brand	Freq	AVG	celle	M-load	Start
1	RBR CTD	3s		204775		st. 01.07 12:00
2	RBRSolo T	1S		203552		st. 01.07 12:00
3	SBE56	6s				st. 01.07 12:00
4	Sig250	15min	120	2m	70%	st. 01.07 12:00

Rigging parts		
#	Type	Qty
1	Shackle galvanized steel 2T	9
2	Shackle galvanized steel 3.25T	4
3	Kevlar tau (8mm gul)	2x24.7
4	Strope	1x3m

Responsible for deployment and recovery operations:
Terje Hovland og Henrik Søyland

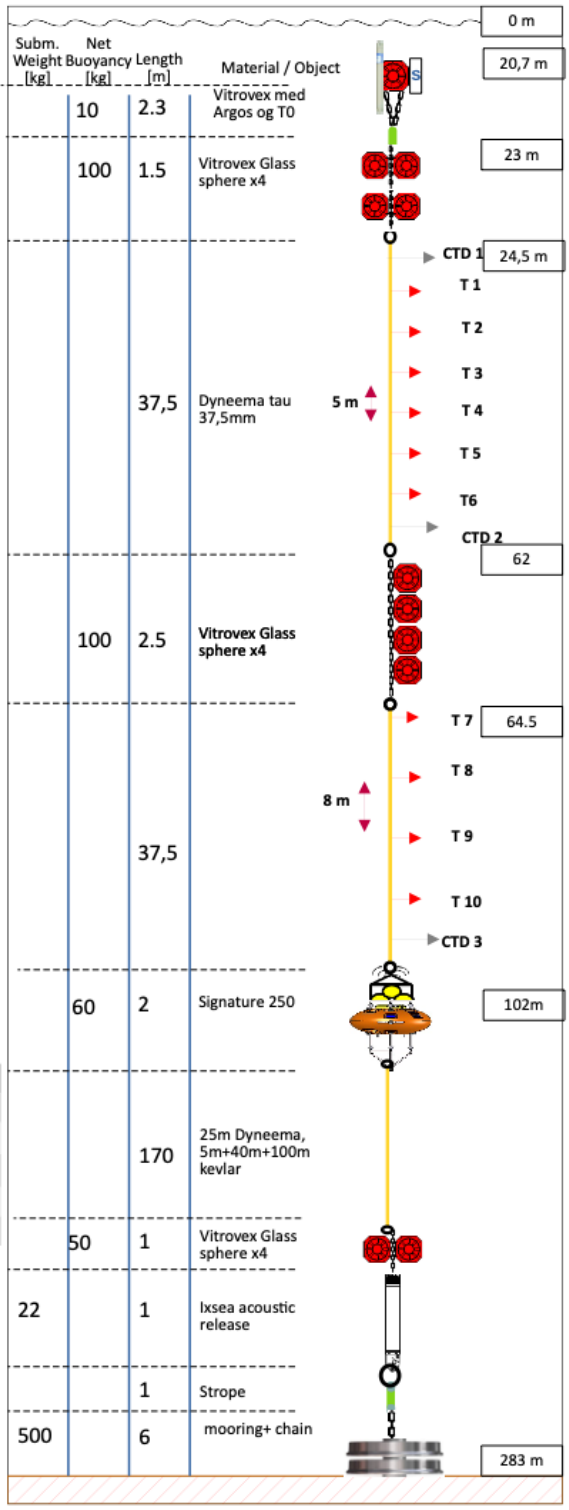

Figure 2: Schematic and details for mooring M1.

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Data Record Book for Mooring Instruments

Ship platform:	Johan Hjort		
Station name:	Havbruk M2		
Latitude:	N58° 36.487	Longitude:	E0004°24.305
Bottom depth [m]	274	Total height [m]	
Outgoing date:	2024 7 january	Outgoing time:	03:40 UTC
Incoming date:	-	Incoming time:	-
Argos		S/N:	204-040
PTTID:	160586	Hex:	F1A5BBE
Acoustic Release Ixblue			
Type:	AR861	S/N:	2877
Batt type:	Lithium	Batt exp:	April 2027
Range code:	3B9D	Release code:	3B55

Comments for deployment operations:
Lodd satt ut sist

Comments for next recovery operations:
Husk å sette inn bølge måler på topp!!!!!

Instruments / sensors

#	Brand	Type	S/N	Depth	Start
T0	SBE	SBE56	07394	19,7	st. 01.07 12:00
CTD 1	SBE	SBE37 SMPO2	21424	23	st. 01.07 12:00
T1	RBR	Solo T	204248	28	st. 01.07 12:00
T2	RBR	Solo T	204249	33	st. 01.07 12:00
T3	RBR	Solo T	204250	38	st. 01.07 12:00
T4	RBR	Solo T	203552	43	st. 01.07 12:00
T5	RBR	Solo T	203553	48	st. 01.07 12:00
T6	RBR	Solo T	203554	53	st. 01.07 12:00
CTD2	SBE	SBE37 SMPO2	21422	58	st. 01.07 12:00
T7	RBR	Solo T	203556	67	st. 01.07 12:00
T8	RBR	Solo T	203557	75	st. 01.07 12:00
T9	RBR	Solo T	203559	83	st. 01.07 12:00
T10	RBR	Solo T	203560	91	st. 01.07 12:00
CTD3	SBE	SBE37 SMPO2	20179	99	st. 01.07 12:00
14	Norte k	Signature 250	102734	101	st. 01.07 12:00

Instrumentsconfig

#	Brand	Freq	AVG	celle	M-load	Start
1	RBR CTD	3s		204775		st. 01.07 12:00
2	RBRSolo T	1S		203552		st. 01.07 12:00
3	SBE56	6s				st. 01.07 12:00
4	Sig250	15min	120	2m	70%	st. 01.07 12:00

Rigging parts

#	Type	Qty
1	Shackle galvanized steel 2T	9
2	Shackle galvanized steel 3.25T	4
3	Kevlar tau (8mm gul)	2x24.7
4	Strope	1x3m

Responsible for deployment and recovery operations:
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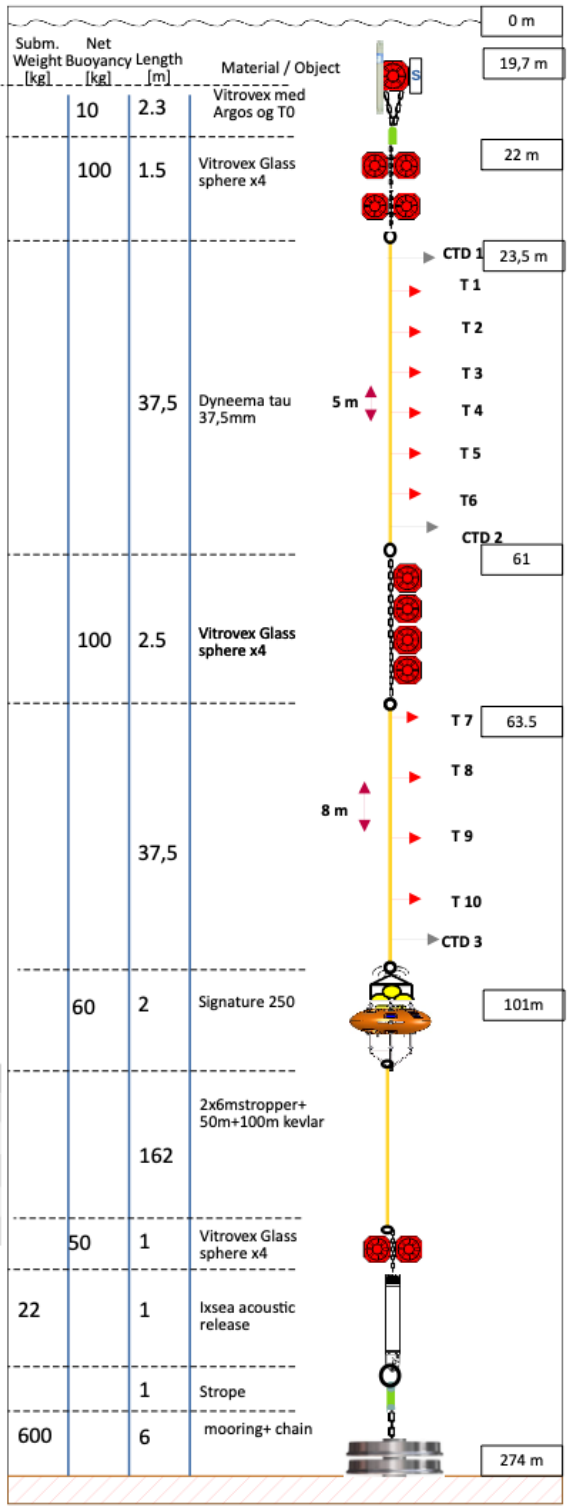

Figure 3: Schematic and details for mooring M2.

Institute of Marine Research
Data Record Book for Mooring Instruments

Ship platform:	Dannevig		
Station name:	Havbruk M3		
Latitude:	N58° 38.051	Longitude:	E0004°32.569
Bottom depth [m]	264	Total height [m]	
Outgoing date:	2024 7 Mai	Outgoing time:	12:00 UTC
Incoming date:	-	Incoming time:	-
Argos		S/N:	230
PTTID:	1575	Hex:	F1A5BBE
Acoustic Release Ixblue			
Type:	AR861	S/N:	2876
Batt type:	Lithium	Batt exp:	April 2027
Range code:	3B9C	Release code:	3B55

Comments for deployment operations:
Lodd satt ut sist

Comments for next recovery operations:
Husk å sette inn Concerto CTD på dyp 101m!!!!!

Instruments / sensors

#	Brand	Type	S/N	Depth	Start
wav	rbr	Bølgem	7392	14	st. 01.07 12:00
CTD 1	RBR	RBR concerto	204784	26	st. 01.07 12:00
T1	RBR	Solo T	203561	31	st. 01.07 12:00
T2	RBR	Solo T	203562	36	st. 01.07 12:00
T3	RBR	Solo T	203563	41	st. 01.07 12:00
T4	RBR	Solo T	203564	46	st. 01.07 12:00
T5	RBR	Solo T	203565	51	st. 01.07 12:00
T6	RBR	Solo T	203566	55	st. 01.07 12:00
CTD2	RBR	RBR concerto	232970	61	st. 01.07 12:00
T7	RBR	Solo T	203567	69	st. 01.07 12:00
T8	RBR	Solo T	203568	77	st. 01.07 12:00
T9	RBR	Solo T	203569	85	st. 01.07 12:00
T10	SBE	SBE56	07385	93	st. 01.07 12:00
CTD3	RBR	RBR concerto	232553	101	st. 01.07 12:00
14	Norte k	Signature 250	100390	103	st. 01.07 12:00

Instrumentsconfig

#	Brand	Freq	AVG	celle	M-load	Start
1	RBR CTD	3s		204775		st. 01.07 12:00
2	RBRSolo T	1S		203552		st. 01.07 12:00
3	SBE56	6s				st. 01.07 12:00
4	Sig250	15min	120	2m	70%	st. 01.07 12:00

Rigging parts

#	Type	Qty
1	Shackle galvanized steel 2T	9
2	Shackle galvanized steel 3.25T	4
3	Kevlar tau (8mm gul)	2x24.7
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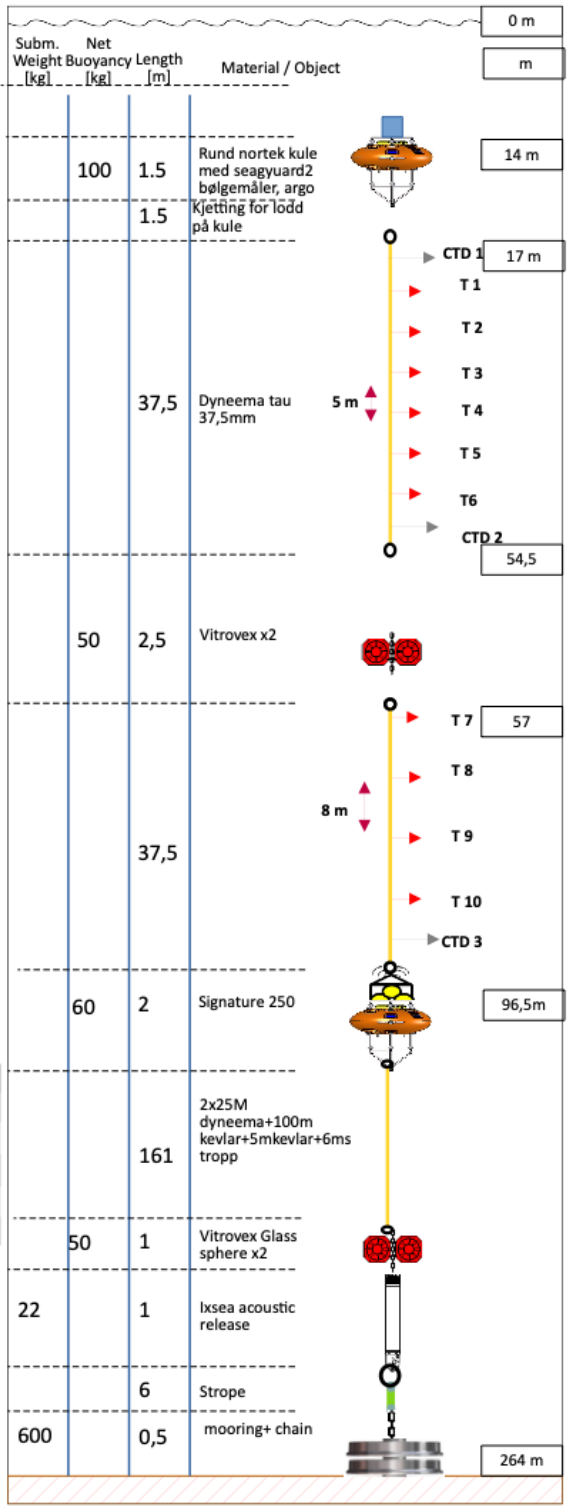

Figure 4: Schematic and details for mooring M3.