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MRV *Scotia*

Survey 1520S

REPORT

12 Oct – 22 Oct 2020

Loading: Aberdeen, 9 Oct 2020

Unloading: Aberdeen, 22 Oct 2020

In setting the survey programme and specific objectives, etc. the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the survey report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate

Personnel

R O'Hara Murray (SIC)
H Smith (Co-SIC)
A Gallego
B Rabe
M Rennie
P Diaz

Out-turn days per project: 11 days: ST05B

Gear

Sea-Bird CTDs, RBR CTD, ADCPs and current meter instrumentation, water filtering equipment, mooring equipment, chemistry sampling equipment.

Objectives

1. Test the SBE911 and CTD carousel (main CTD crane) and the SBE25 and Aquatracker (using plankton crane) in the Buchan Deep **Completed**
2. Perform hydrographic sampling along the JONSIS long term monitoring section in the northern North Sea **Completed**
3. Recover ADCP (FIGN) in trawl-resistant seabed frame from the Fair Isle Gap **Completed**
4. Deploy one ADCP (NWSE, RD longranger) on a single string mooring at a position on Fair Isle – Munken (FIM) section **Completed**
5. Deploy one ADCP (NWER, Sig100)) on a single string mooring on the NOL section

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| | Completed |
| 6. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Nolso – Flugga (NOL) section | Completed |
| 7. Deploy an ADCP (Sig250) in the AL-500 just north of Solan Bank | Completed |
| 8. Deploy one ADCP (AWAC) in a trawl resistant AL-200 frame in the Little Minch | |
| 9. Deploy one ADCP (Sig500) in steel frame in Loch Carron | Completed |
| 10. Run the thermosalinograph throughout the survey | Completed |
| 11. Run the VMADCP on all the standard sections | Completed |
| 12. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Fair Isle – Munken (FIM) section | Completed |
| 13. Take water samples for long term storage on Fair Isle – Munken or Nolso – Flugga section stations | Completed |
| 14. If weather/time permits repeat the JONSIS line at the end of the cruise and extend to 001° 30' east | |
| 15. If weather/time permits perform fine scale VMADCP/CTD survey work on the JONSIS line (around 59° 17' N, 001° 15' W) | |
| 16. If weather/time permits, perform VMADCP/CTD survey work in the Moray Firth and/or Aberdeen Bay | |
| 17. If weather/time permits, perform CTD line along the AlterECO line | Started |

Narrative

12 Oct: Left Aberdeen shortly after 09:00, and spent about an hour compass swing/calibration. We then made way to the Buckan Deep and tested the CTDs at around 13:30, and then made way to the eastern end of the JONSIS line.

13 Oct: Started JONSIS around 01:30 and completed around 16:30. Overnight, performed a VM-ADCP transect through the Fair Isle Channel.

14 Oct: Recovered the AL-200 mooring in the Fair Isle Channel around 10:20. Unfortunately the bottom section was lost when the dyneema rope snapped close to the frame base just as it was becoming visible in the water. We then proceeded to the NE end of the NOL section and started NOL around 1630.

15 Oct: We completed SEFN4 around 06:00 before sailing back along NOL to the NWER mooring position. We deployed NWER at 08:55, resumed NOL (NOL-3a) at 10:00 and continued along NOL. We entered Faroes waters around 19:30.

16 Oct: We completed NOL around 11:30 and made way to the western end of the FIM section. The last NOL station was moved slightly to avoid entering the 12 nm Faroes waters. Similarly, the first station on FIM (FARF1) was not done and FIM-11 was moved slightly.

17 Oct: We continued FIM through the night and entered UK waters around 09:30. After

FIM-05 we made way to the NWSE mooring location and deployed the single string mooring at 14:00. We then made way back to FIM-04 and continued the section. The section was completed around 22:00 and we made way to the Solan Bank mooring location.

18 Oct: Arrived at the Solan Bank mooring location around 04:30 and commenced CTD's on the half hour until 07:30. We then deployed the AL-500 at 09:24. We then made way to the SE end of the shelf3 CTD line, started at 12:45, and completed the line around 23:00. We then made way to the position of the NOL glider that needed to be recovered from west of Shetland.

19 Oct: The glider recovery went extremely well in very calm conditions, and was recovered around 08:15. We then made way through the Minch to Linne Crowlin between Scalpay and Eilean Mor to the east of Skye where we started a VM-ADCP station.

20 Oct: Continued the VMADCP work over night and then headed to Loch Carron for 07:30. Performed a CTD dip at 07:30 and deployed the ADCP frame at 08:15. We then headed back to the east coast, planning to go through the Pentland Firth around 22:00.

21 Oct: Arrived Stonehaven mid-morning and commenced CTD work at the Stonehaven sites and then continued along the AlterEco transect until around 14:00. We then headed for Aberdeen.

Mooring positions (successfully recovered)

FIGN	59° 46.61' N 001° 31.90' W	AL-200 trawl-resistant bed frame
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Mooring positions (deployed, to be recovered in Dec 2020 or May 2021)

NWER	61° 07.887' N 002° 05.114' W	Short single string mooring
NWSE	60° 16.348' N 004° 23.038' W	Short single string mooring
SOLB	59° 10.606' N 004° 58.684' W	AL-500 trawl resistant frame
Loch Carron	57° 21.433' N 005° 40.408' W	Steel ADCP seabed frame

Glider recover position

Glider	58° 52.726' N 007° 39.368' W	NOC owned glider
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Scientific Procedures

Deployments of hydrographic equipment were carried out with the CTD crane whilst the vessel was on station. The plankton crane was used for the deployment of ADCP moorings in trawl-resistant frames (AL-500) and short single-string moorings. The top section of the AL-200 and the glider were recovered from the hanger deck and the unsuccessful recovery of the bottom section of the AL-200 was attempted on the aft deck using the cod end crane and net drum.

Chlorophyll samples were stored in the freezer in the Fish House. Nutrient samples were stored in an otherwise empty freezer on the lower container deck.

Submitted: Rory O'Hara Murray

Date: 21 Oct 2020

Approved:

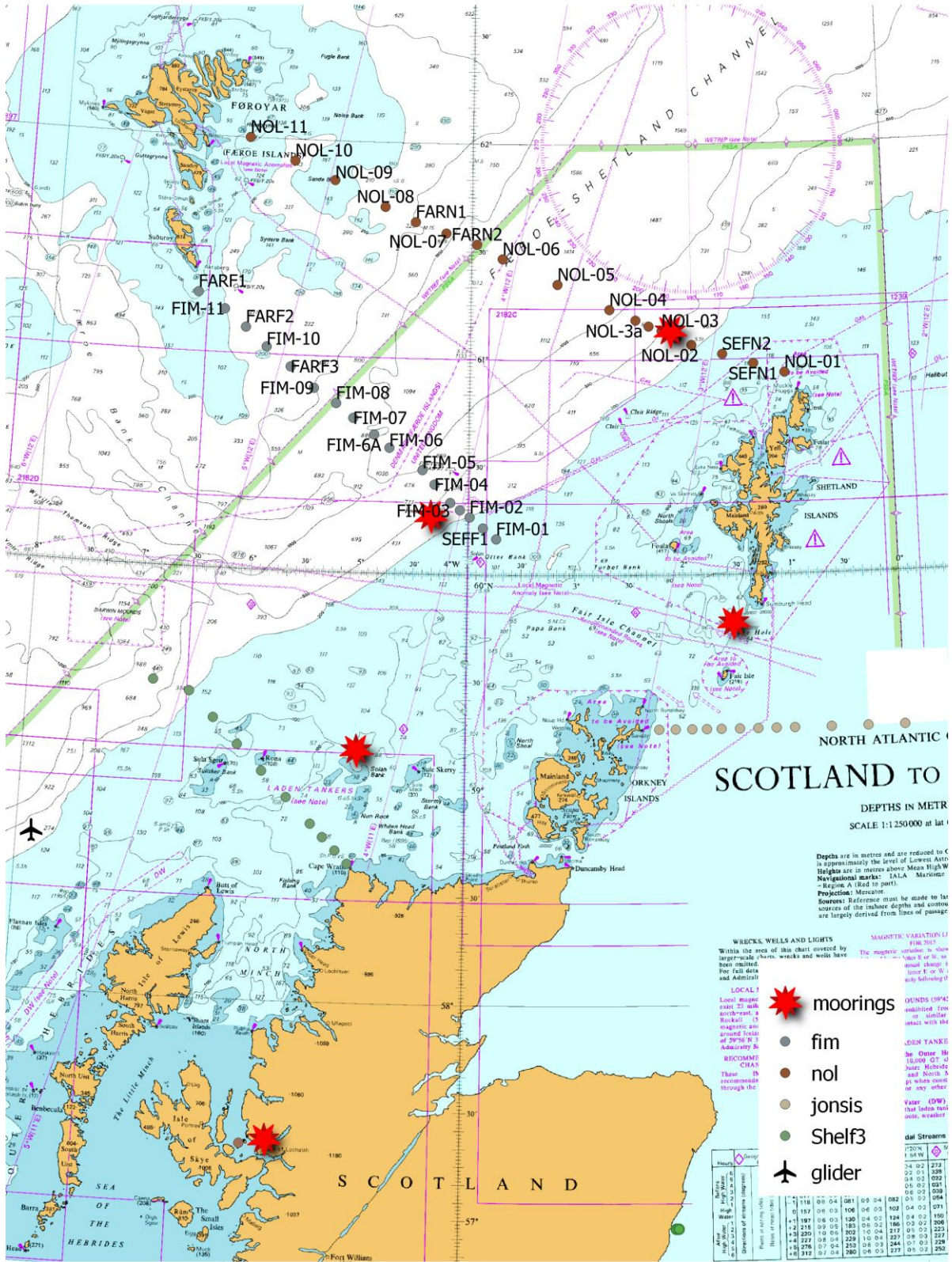


Figure 1: Chart showing key activities on 1520S.

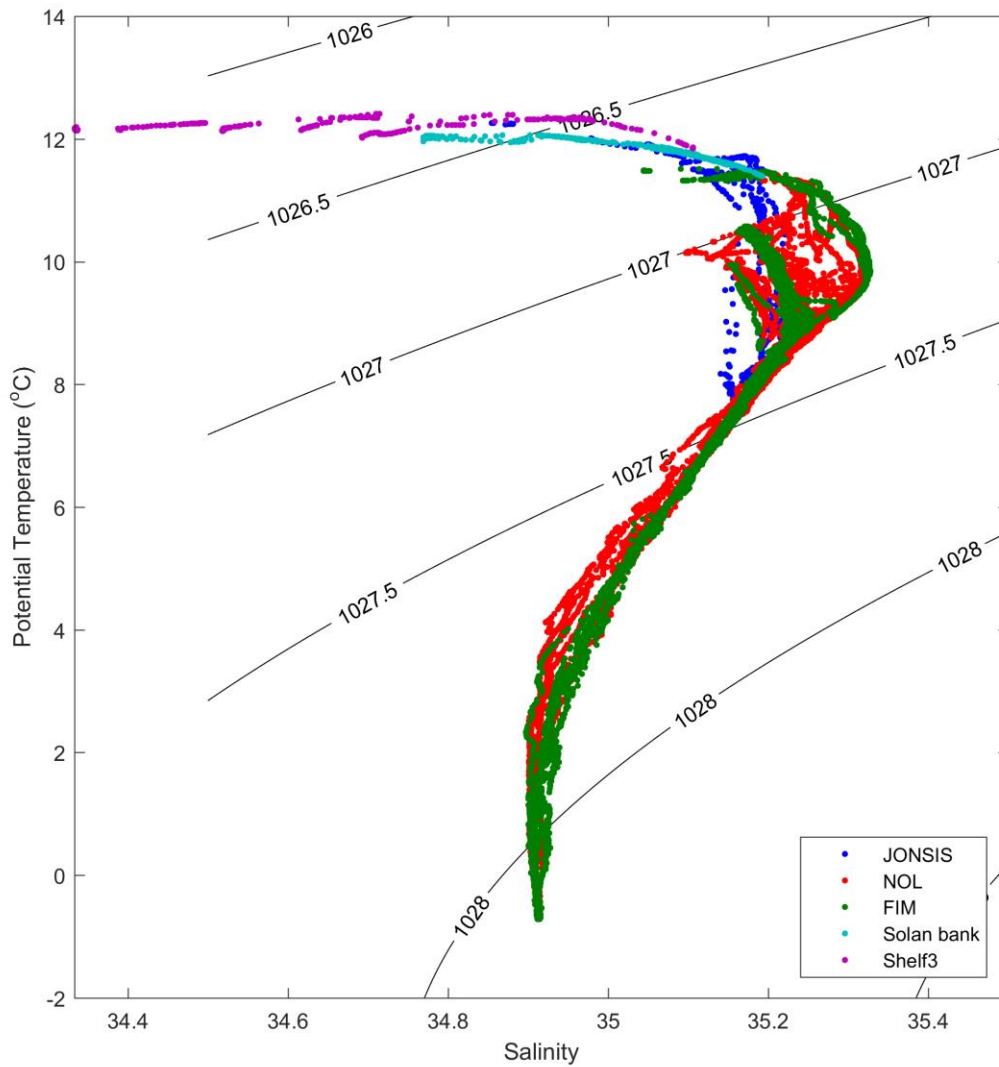


Figure 2: Temperature and Salinity diagram showing all the CTD data gathered on 1520S, with each transect coloured differently. The reference pressure used to calculate potential temperature and potential density contours was 0 db.

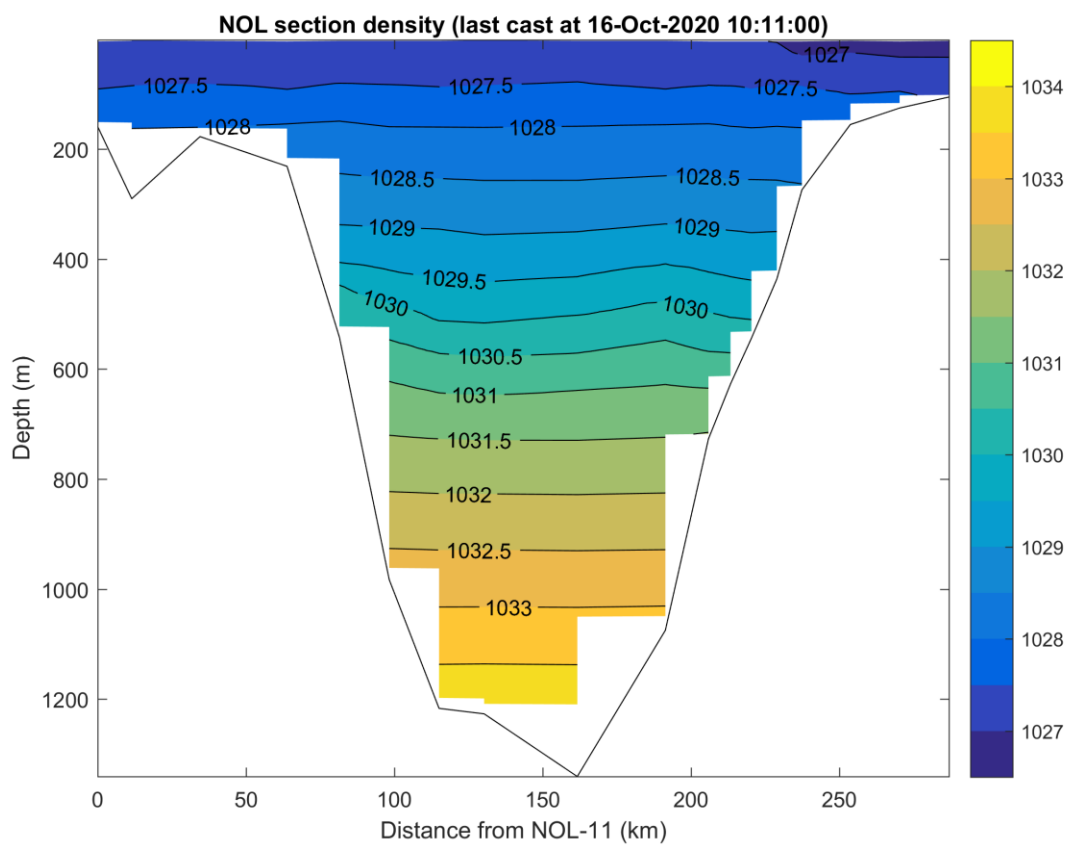
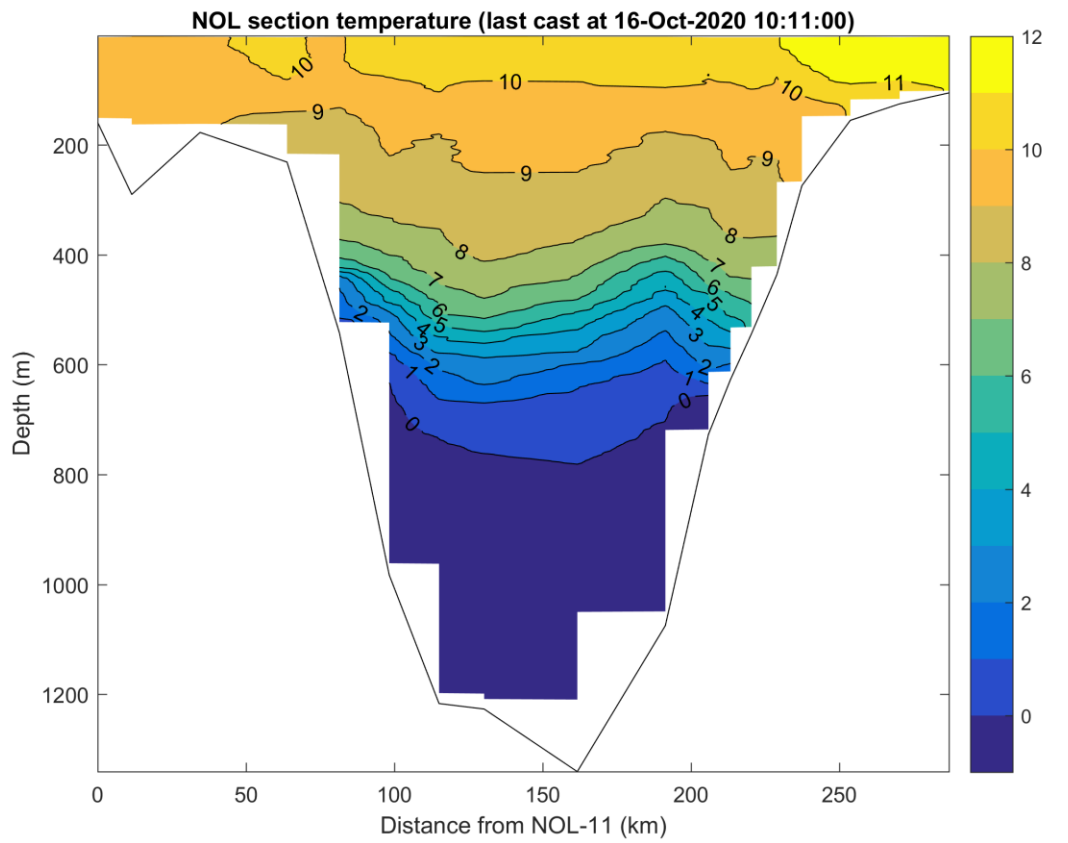


Figure 3: Temperature and density sections from the NOL transect during 1520S.

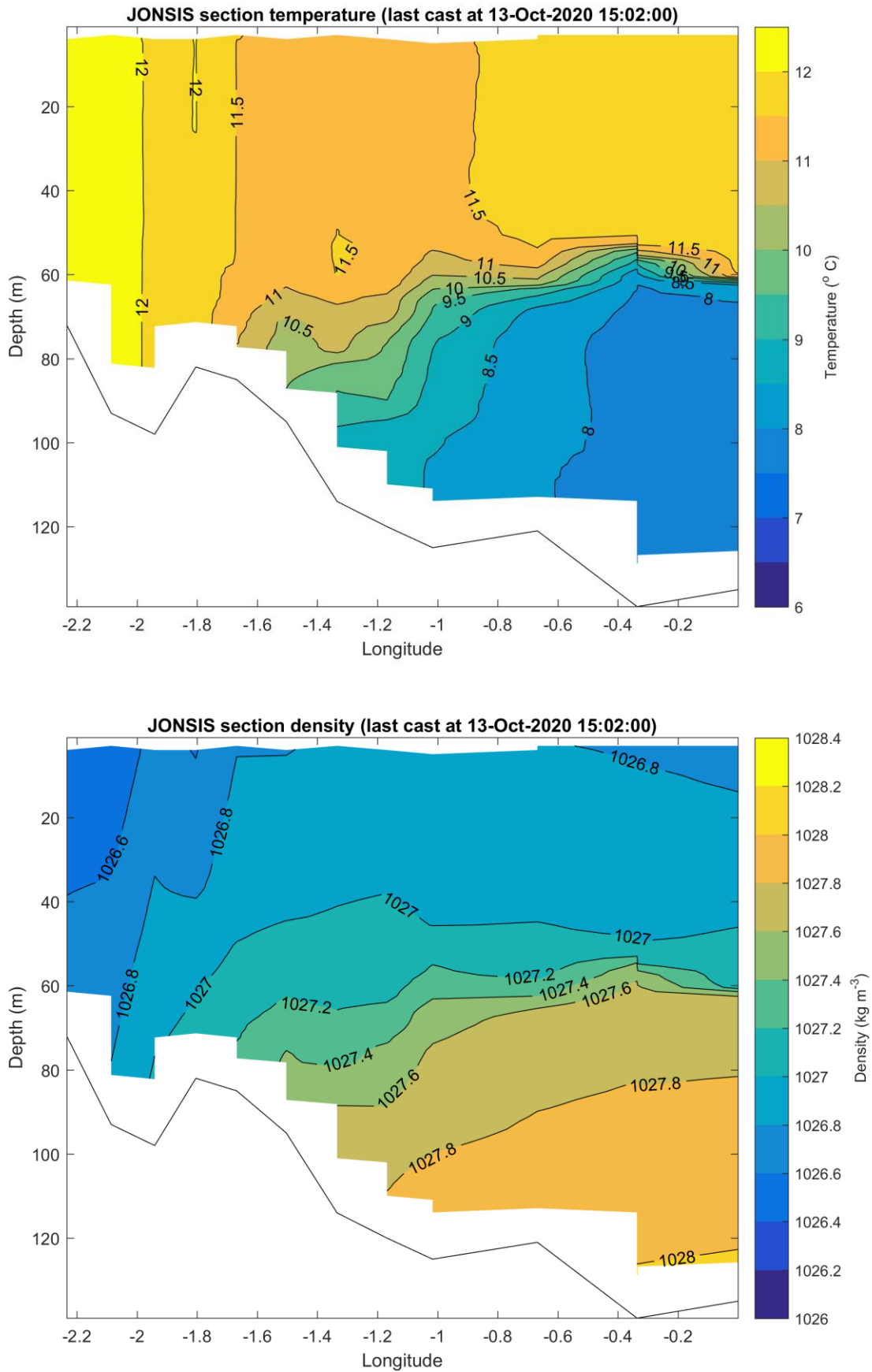


Figure 4: Temperature and density sections from the JONSIS transect during 1520S.

JONSIS Line

#	Name	Latitude	Longitude	Depth	Spacing
01	JO 1	59° 17.00' N	02° 14.00' W	75 m	
02	JO 1A	59° 17.00' N	02° 5.00' W	90 m	4.59 nm
03	JO 2	59° 17.00' N	01° 56.00' W	100 m	4.59 nm
04	JO 3	59° 17.00' N	01° 48.00' W	80 m	4.08 nm
05	JO 4	59° 17.00' N	01° 40.00' W	90 m	4.08 nm
06	JO 5	59° 17.00' N	01° 30.00' W	95 m	5.10 nm
07	JO 6	59° 17.00' N	01° 20.00' W	110 m	5.10 nm
08	JO 6A	59° 17.00' N	01° 10.00' W	120 m	5.10 nm
09	JO 7	59° 17.00' N	01° 0.00' W	125 m	5.10 nm
10	JO 8	59° 17.00' N	00° 40.00' W	120 m	10.20 nm
11	JO 9	59° 17.00' N	00° 20.00' W	140 m	10.20 nm
12	JO10	59° 17.00' N	00° 0.00' W	135 m	10.20 nm
Totals				1180 m	68.36 nm

Nolso-Flugga (NOL)

#	Name	Latitude	Longitude	Depth	Spacing
01	NOL-01	60° 56.00' N	01° 00.00' W	110 m	
02	SEFN1	60° 58.70' N	01° 17.70' W	125 m	9.00 nm
03	SEFN2	61° 01.40' N	01° 35.40' W	155 m	8.99 nm
04	NOL-02	61° 04.00' N	01° 53.00' W	270 m	8.91 nm
05	SEFN3	61° 06.00' N	02° 01.50' W	440 m	4.57 nm
06	NOL-03	61° 08.00' N	02° 10.00' W	550 m	4.57 nm
07	SEFN4	61° 09.30' N	02° 17.50' W	630 m	3.85 nm
08	NOL-3a	61° 11.00' N	02° 25.00' W	730 m	3.98 nm
09	NOL-04	61° 14.00' N	02° 40.00' W	1080 m	7.82 nm
10	NOL-05	61° 21.00' N	03° 10.00' W	1370 m	16.03 nm
11	NOL-06	61° 28.00' N	03° 42.00' W	1235 m	16.84 nm
12	FARN2	61° 32.00' N	03° 57.00' W	1200 m	8.18 nm
13	NOL-07	61° 35.00' N	04° 15.00' W	990 m	9.08 nm
14	FARN1	61° 38.00' N	04° 33.00' W	530 m	9.07 nm
15	NOL-08	61° 42.00' N	04° 51.00' W	235 m	9.44 nm
16	NOL-09	61° 49.00' N	05° 21.00' W	180 m	15.84 nm
17	NOL-10	61° 54.00' N	05° 45.00' W	290 m	12.37 nm
18	NOL-11	62° 00.00' N	06° 12.00' W	125 m	14.04 nm
Totals				10245 m	162.60 nm

Fair Isle - Munken (FIM) (Amended for presence of Foinaven oil platform*)

#	Name	Latitude	Longitude	Depth	Spacing
01	FIM-01	60° 10.00' N	03° 44.00' W	150 m	
02	SEFF1	60° 13.00' N	03° 51.50' W	170 m	4.74 nm
03	FIM-02	60° 16.00' N	03° 59.00' W	200 m	4.84 nm
04	SEFF2	60° 18.00' N	04° 04.50' W	330 m	3.36 nm
* 05	<i>FIM-03</i>	<i>60° 20.00' N</i>	<i>04° 10.00' W</i>	<i>390 m</i>	<i>3.03 nm</i>
06	FIM-04	60° 25.00' N	04° 19.00' W	655 m	6.88 nm
07	FIM-05	60° 29.00' N	04° 26.00' W	995 m	5.45 nm
08	FIM-06	60° 35.00' N	04° 45.00' W	1090 m	11.15 nm
09	FIM-6a	60° 38.00' N	04° 54.00' W	1030 m	5.33 nm
10	FIM-07	60° 43.00' N	05° 06.00' W	915 m	7.70 nm
11	FIM-08	60° 47.00' N	05° 16.00' W	830 m	6.34 nm
12	FIM-09	60° 51.00' N	05° 29.00' W	600 m	7.36 nm
13	FARF3	60° 56.70' N	05° 42.80' W	333 m	8.90 nm
14	FIM-10	61° 02.00' N	05° 57.00' W	280 m	8.68 nm
15	FARF2	61° 07.20' N	06° 09.40' W	250 m	7.95 nm
16	FIM-11	61° 12.00' N	06° 22.00' W	240 m	7.67 nm
17	FARF1	61° 16.40' N	06° 37.70' W	100 m	8.80 nm
Totals				8,558 m	108.18 nm

* FIM-03 was moved to 60° 19.50' N 004° 11.12' W (410 m) because the above position was occupied by the Foinaven development.

Shelf 1 CTD Line

	Name	Latitude	Longitude	Depth	Spacing
01	S3_1	58° 38.83' N	05° 02.09' W	51 m	
02	S3_2	58° 42.42' N	05° 08.79' W	81 m	5.00 nm
03	S3_3	58° 46.03' N	05° 15.69' W	79 m	5.08 nm
04	S3_4	58° 49.65' N	05° 22.48' W	100 m	5.04 nm
05	S3_5	58° 56.83' N	05° 35.98' W	104 m	10.00 nm
06	S3_6	59° 03.90' N	05° 49.81' W	93 m	10.02 nm
07	S3_7	59° 11.04' N	06° 03.57' W	115 m	10.03 nm
08	S3_8	59° 18.23' N	06° 17.29' W	162 m	10.03 nm
09	S3_9	59° 25.32' N	06° 31.02' W	222 m	9.95 nm
10	* S3_10	59° 28.00' N	06° 51.00' W	900 m	10.49 nm
Totals				m	75.64 nm