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MRV *Scotia*

Survey 0521S

REPORT

01 – 13 May 2021

Loading: Aberdeen, 29 Apr 2021

Unloading: Aberdeen, 13 May 2021

Personnel

A Gallego (SIC)
H Smith (Co-SIC)
B Rabe
M Geldart
M Rennie
P Diaz
C Dempsey

Out-turn days per project: 13 days: ST05B

Gear

Sea-Bird CTDs (SBE9, SBE25, RBRs, SBE37's and SBE56's), mooring frames and 40" buoys, ADCPs and current meter instrumentation, water filtering equipment, plankton nets, mooring equipment, chemistry sampling equipment.

Objectives

1. Test the SBE911 and CTD carousel (main CTD crane) and take water samples in a position within or adjacent to the Goldeneye oil field – achieved.
2. Perform hydrographic sampling along the JONSIS long term monitoring section in the northern North Sea – achieved.
3. Recover and re-deploy one ADCP (NWSE, RDI Longranger) on a single string mooring at a position on Fair Isle – Munken (FIM) section – achieved.
4. Recover one ADCP (NWER, Sig100) on a single string mooring on the NOL section – achieved.
5. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Nolso – Flugga (NOL) section – achieved.
6. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Fair Isle – Munken (FIM) section – achieved.
7. Deploy ADCPs at mooring locations NWSG (RDI Longranger) and NWSD (Sig100) on the FIM section – achieved.

8. Recover an ADCP (Sig250) in an AL-500 frame north of Solan Bank – largely achieved.
9. Deploy one ADCP (Sig250) in a trawl resistant AL-500 frame in the Little Minch – achieved.
10. Recover one ADCP (Sig500) in steel frame in Loch Carron – achieved.
11. Deploy one ADCP (Sig250) in a trawl resistant AL-500 frame in Linne Crowlin – not achieved.
12. Deploy one ADCP (Sig500) in steel frame in Loch Erisort – achieved.
13. Carry out a line off CTD stations in Loch Ewe between the mouth of the loch and the metocean buoy position – achieved.
14. Run the thermosalinograph throughout the survey – achieved.
15. Run the VMADCP on all the standard sections – achieved.
16. Take water samples for long term storage on Fair Isle – Munken or Nolso – Flugga section stations – achieved.
17. Ancillary sampling: 1) Take water samples for filtration for bacteria at selected stations in the FSC – achieved; 2) Take phytoplankton net samples at selected stations in the FSC – achieved; 3) Take zooplankton net samples for flame shell larvae in Loch Carron – achieved.
18. If weather/time permits conduct CTD sections on the west coast, from the coastline up to the edge of the continental shelf (“Shelf” sections) – achieved. (Shelf 4 and Shelf 3)
19. If weather/time permits repeat the JONSIS line at the end of the cruise and extend to 001° 30’ east – no time.
20. If weather/time permits perform fine scale VMADCP/CTD survey work on the JONSIS line (around 59° 17’ N, 001° 15’ W) – no time.
21. If weather/time permits, perform VMADCP/CTD survey work in the Moray Firth and/or Aberdeen Bay – no time.
22. If weather/time permits, perform CTD deployments along the AlterECO line (offshore from Aberdeen) – achieved.

Narrative

On sailing from Aberdeen *Scotia* made passage to the Goldeneye oil field to test the CTD and carousel water sampler on the main CTD crane and to collect baseline water samples for any potential future Carbon Capture & Storage (CCS) monitoring. Once the sampling was completed, *Scotia* sailed to the JONSIS section to carry out sampling with the CTD and carousel water sampler. On completion of the JONSIS section, *Scotia* made way to the NWSE mooring location in the Faroe Shetland Channel, where an ADCP mooring was recovered and then onto the NWSD location where a mooring was deployed. Passage was then made north towards the Nolso – Flugga (NOL) section to recover a mooring (NWER) and then east towards the eastern start of the line to start collecting CTD profiles and water samples along the section. After the NOL section was completed, *Scotia* headed south to the western

(Faroe) side of the Fair Isle – Munken (FIM) section to carry out standard CTD and water sampling along that line, although work had to be interrupted for approximately 12 h due to adverse weather conditions. On completion of the hydrographic sampling, *Scotia* deployed 2 more ADCP moorings along FIM: one in NWSG and one in NWSE. After the Faroe-Shetland Channel work was completed, *Scotia* proceeded south towards Solan Bank, north of Lewis, where an ADCP in a trawl-proof AL500 bottom frame was recovered. Unfortunately, the haul-up line from the ship was caught (probably on the rudder) on recovery and the process of freeing up the line put too much strain of the Dyneema rope connecting the top and bottom of the frame, which broke and the bottom part was lost, although all instrumentation (in the top part) was successfully recovered. Afterwards, *Scotia* sailed to Loch Ewe and a section of CTD and water sample stations was occupied between the COMPASS metocean buoy and the mouth of the loch, past the 100 m contour. On completion of the transect, *Scotia* sailed past the Linne Crowin (east of Skye) position where we had intended to deploy an AL500 mooring (no longer possible after losing the bottom of the frame in Solan Bank) and proceeded to recover an ADCP in a steel frame with popup buoys in Loch Carron, collecting zooplankton samples there in support of a PhD studentship. *Scotia* then deployed an ADCP in an AL500 trawl-proof bottom frame in the Little Minch and sailed to the mouth of Loch Erisort (on the east coast of Lewis) to re-deploy there the mooring recovered from Loch Carron. Following that deployment, *Scotia* sailed to the Butt of Lewis to start CTD sampling along the Shelf 4 (Lewis to the shelf edge) and Shelf 3 (shelf edge to Cape Wrath) hydrographic sections. On completion of the above *Scotia* sailed to the eastern side of the AlterEco zonal section between 2° E and Stonehaven, to carry out CTD deployments throughout the section and water sampling at the Stonehaven SCObS station, prior to her return to Aberdeen Bay, where the VMADCP was run alongside the location of a fixed ADCP mooring (#948) for a couple of hours to cross-calibrate the instruments.

Overall, 100 hydrographic stations were occupied, and the following number of samples was taken:

332 nutrients
 167 chlorophyll
 132 salinity
 108 dissolved oxygen
 142 TA/DIC

In addition, 8 triplicate samples (7 stations) for oil degrading bacteria (Heriot Watt University collaboration), 10 zooplankton samples (5 stations) and 25 phytoplankton samples (25 stations) were taken.

Mooring Positions (Recovery)

NWSE	60° 16.348' N 004° 23.038' W	Short single string mooring
NWER	61° 07.887' N 002° 05.114' W	Short single string mooring
SOLB	59° 10.606' N 004° 58.684' W	AL-500 trawl resistant frame (base lost on recovery)
LC2010	57° 21.433' N 005° 40.408' W	Steel ADCP seabed frame

Target Mooring Positions (Deployment)

NWSE	60° 16.356' N 004° 23.054' W	Short single string mooring
NWSD	60° 27.060' N 004° 22.440' W	Short single string mooring
NWSG	60° 30.480' N 004° 34.020' W	Short single string mooring
CRO	57° 19.480' N 005° 52.120' W	AL-500 trawl resistant frame (not carried out due to loss of the base on recovery from SOLB)
MIN	57° 28.800' N 006° 57.600' W	AL-500 trawl resistant frame
LE	58° 06.610' N 006° 21.520' W	Steel ADCP seabed frame

Submitted:

Alejandro Gallego
Date: 13 May 2013

Approved:

Iain Gibb
Date: XX May 2013

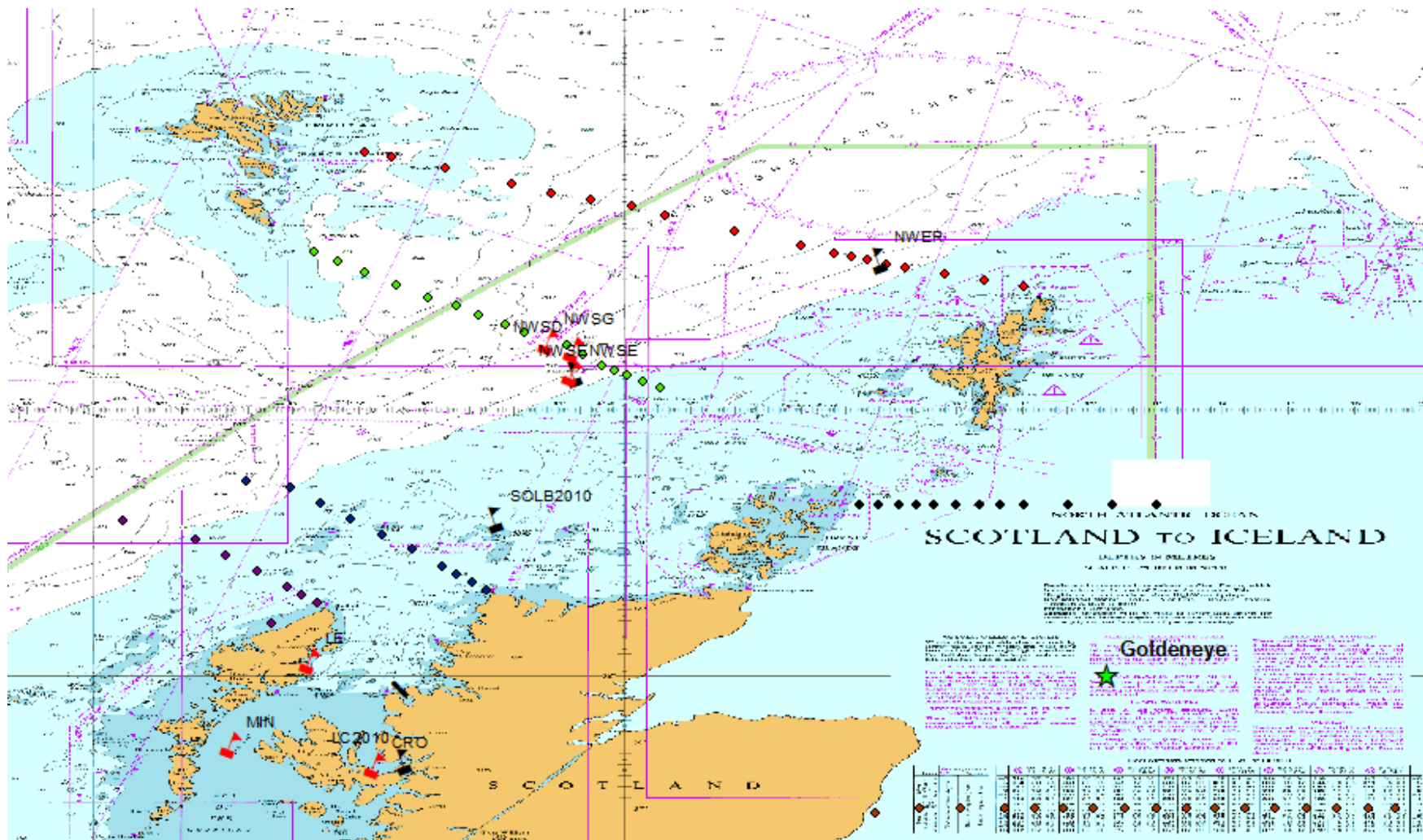


Chart showing key activities on 0521S