9/33/69

CRUISE REPORT

CRUISE 9/69. R.R.S. JOHN MURRAY

3 - 16 NOVEMBER, 1969

Celtic Sea.

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Introduction

The main purpose of the cruise was to complete a detailed survey of a system of submarine canyons on the continental slope some 250 miles west-south-west of Lands End. Three previous attempts have been thwarted by stormy weather and breakdown of equipment.

This research project is a joint investigation by Dr.A.J. Smith, University College, London, and the writer.

Aims of the Cruise

1. Whilst on passage from, and returning to, Barry Docks, in the Bristol Channel:-

   (a) make a continuous seismic profiling and magnetometer survey of the southern part of the Bristol Channel.

   (b) make several E.-W. traverses in the Celtic Sea, using the sparker and magnetometer, to extend the northern boundary of our map of the solid geology of the Western Approaches.

2. In the submarine canyon area, at 47° 30'N. to 49°N, 9° 40'W. to 11°W.:-

   (c) lay 2 current meters to record bottom currents in the heads of the canyon.

   (d) complete the detailed bathymetric survey of the canyon between 2,000 fathoms and 2,300 fathoms, using punched cards to record data for computer processing.

   (e) take a series of grab, core and dredge samples from the canyon.

   (f) record surface sediment features by underwater photography.

See Chart 1 for proposed tracks.

Scientific Party

Mr.D.Hamilton, B.U. (Senior Scientist)
Mr.D.Channon, B.U.
Mr.G.Day, B.U.
Mr.A.Hook, B.U.

Dr.A.J.Smith, U.C.L.
Dr.J.Pendered, U.C.L.
Mr.P.Dolan, U.C.L.
Mr.M.Brasier, U.C.L.

Equipment

(a) N.E.R.C. Research Vessel Unit.
E.G. & G. sparker profiling system
Varian magnetometer
Muirhead P.D.R., using either a hull-mounted or towed fish transducer.
2 Plessey long term recording current meters, with buoys and moorings.

Shipek underwater camera
Discovery type dredge
Shipek grabs
UMEL gravity and piston corers
12 Moore free-fall corers

(b) Own equipment
Cambridge gravity corer
Bristol rock dredge
Bristol pipe dredge for sediments
Laughton underwater camera
Punch card data recording equipment from U.C.L.

Narrative.

3rd November

On arrival of the scientific party at the ship in Barry Docks, the equipment from Bristol was installed, stowed and lashed down. The afternoon was spent on familiarisation of the R.V.U. equipment on board, under the guidance of the R.V.U. staff. At 15.30 three Plessey current meters for our use arrived from the makers and preliminary check revealed that a compass was jammed in one meter, probably as a result of a jolt during transport.

Reports of a force 8 gale in the Lundy area led to a postponement of our sailing time from 2200 hours until the following morning.

4th November

The two current meters and frames were checked and assembled ready for use.

At 1030 BST the ship left the wharf to pass through the Barry Dock and the sparker survey of the Bristol Channel was commenced at 1145 on a southwesterly course, using an output of 500 joules every 1 second. Due to the swell running at the time, the record was only fair. On loading a film into the Shipek camera, the wind-on mechanism was found to have developed a fault and it was necessary to return to Barry at 1700 to have this repaired by Mr. Weaver and Mr. Jones of the R.V.U. By 2020 the sparker survey of the Bristol Channel was resumed at the point where it was abandoned to return to Barry.

5th November

At 0130 the magnetometer was streamed in deeper water in addition to the sparker. A series of N.W. and S.W. tracks were surveyed out to Lundy Island, then S.S.W. parallel to the coast. At 50° 30'N. a westerly course was followed to pass over a number of Bristol core stations, in order to give stratigraphic control to the sparker record. In order to collect sparker electrodes from Penzance, a southerly course over core stations was followed along 5° 30'W. and then south-east to pass between the Scilly Islands and the Seven Stones. A rapidly deepening depression gave rise to force 6 to 7 winds and rising seas, resulting in only fair sparker records.

6th November

The line of core stations on 49° 45'N. was then followed on an easterly course at reduced speed in the heavy seas from the south east. By midday the sparker/magnetometer survey had to be abandoned due to the very heavy seas and a force 8 gale, and the ship made its way into Mounts Bay to pick up the sparker electrodes. These were brought out by the Newlyn lifeboat under quite adverse conditions. As there was no suitable shelter from the south-east gale in Mounts Bay, the ship put out to sea again, rounded Lands End and anchored in the shelter of St.Ives Bay at 2110.

7-9 November

Sheltering at anchor in St.Ives Bay. A stationery depression, with its centre located to the north of Scotland, deepened to 958 mbs., giving gales of force 7 to 8 and squalls of 9 and 10. The anchor dragged during these squalls so the ship was moved to within 2·3 cables of the breakwater to gain protection from the southerly wind and reduce the rolling of the ship from the heavy swell coming onto the bay.

The Shipek camera was set up for time lapse photograph and a trial film exposed in the laboratory gave satisfactory negatives. Recorder of the sparker serviced.

10th November

Winds decreased from force 8 to force 6 during the morning but changed to westerly, from which there is no protection in St.Ives Bay. With further north-west gales predicted, Captain Perry decided to weigh anchor at 1100 and seek shelter in the Helford River, on the east of the Lizard. Both the sparker and magnetometer were streamed on leaving St. Ives Bay, but the record was very poor even at slow speed. After an hour, the survey was abandoned to allow better headway in the heavy seas and an early arrival at Helford River, where the anchor was dropped at 1920 in 36 feet of water.

During the evening both the Shipek and Laughton cameras were tested on the bottom. Both worked satisfactorily but the negatives showed poor definition due to the high turbidity. One Plessey current meter was water tested by suspending it over the stern during the night.

11th November

During the day seven other ships joined us at anchor as gales continued in the area. After going ashore in the morning, the cameras were tested on time lapse and on touch release during the afternoon, and the current meter recovered.

12th November

Gales of force 6 to 9 persisted in all adjacent areas but a slight improvement in the weather occurred during the afternoon when deck practice was held in the use of grabs, corers and dredges. With better weather prospects, the ship weighed anchor at 2005 and a sparker/magnetometer survey was commenced in a strong swell off the east and south of Lizard Peninsula.

13th November

The heavy swell from the south-west made a survey impossible of the west coast of the Lizard; a westerly track along 49° 45'N. was followed to 6° 35'W., then north-northwest to cross over Chalk/slate contacts. On a west to east track along 50° 15'N., rough ground suggestive of a granite was noted west of Cornwall Bank.

14th November

Continued sparker/magnetometer survey along 50° 25'N., but returned to area where rough ground was noted on 50° 15'N. The feature was difficult to re-locate as it is only 3-400 yards across and the frequent heavy rain squalls constantly upset the Decca. In an attempt to collect solid rock from this feature eight dredgings were made during the day, but without success. The three ton shear pins in the dredge were sheared, indicating the presence of solid rock. Soon after resuming the sparker/ magnetometer survey in the evening, the wind increased rapidly from the north-west reaching gale force + 9. The survey was abandoned at 2110 and the ship brought into the wind to ride out the storm.

15th November

Gales continued, making conditions too rough for any survey work. Shelter sought in lea of Lundy Island, but as force 8 was forecast for the area, it was decided to resume the sparker/magnetometer survey of the Bristol Channel overnight.

16th November

On completion of the survey docked in Barry at 0900.

Summary of Work at Sea

Of the fifteen day cruise planned, 5 days and 23 hours were spent at sea, during which records and sampling were made for 4 days 19½ hours. Throughout the whole of this time the sea and weather state was between force 5 and force 9.

Sparker and Magnetometer Survey

Some 446 miles of sparker and 410 n. miles of magnetometer tracks were surveyed. Good records of the sub-surface structure of the Bristol Channel were obtained by using the sparker at 500 j. output, 1 second firing interval, recording at ½ sec. sweep with the helix, using a short hydrophone with three circuits shorted out and the 80 to 200 hz bandpass filter on the recorder.

The records of the track parallel to the coast from Hartland Point to 50° 30'N. were indifferent, the usual results over the strongly deformed Palaeozoic rocks. Good structural patterns were obtained in the area north-west of Lands End and two previously unrecorded "?granite" masses, only about 100 feet and 400 feet across were found. Determined attempts to dredge in situ samples from the larger mass were unsuccessful due to very adverse sea conditions.

Magnetometer records were made concurrently with the sparker records, except in the shallower areas of the Bristol Channel.

Current Meters

Moorings, using spherical sub-surface buoys, were made up in readiness to lay the newly received Plessey recording current meters in the heads of the submarine canyon. These however were not laid, though one meter was given a trial run whilst at anchor in the Helford River.

Sediment Sampling and Underwater Photography

Though none of the planned programme was carried out, trials of samplers and two underwater cameras (the Shipek and a Laughton Camera) were carried out whilst at anchor in the Helford River. It was not possible to do any deck work whilst at anchor in St.Ives Bay as squalls were gusting up to force 10.

Bathymetry

Our intention of completing the bathymetry of the lower part of the submarine canyon system was thwarted for the fourth time.

Acknowledgments

I should like to thank all those who assisted in the preparations for this cruise, at the R.V.U. at Barry, at University College London, and at Bristol University. Our thanks also to Captain Perry, his officers and crew who gave us every opportunity to make the best use of our limited time at sea.

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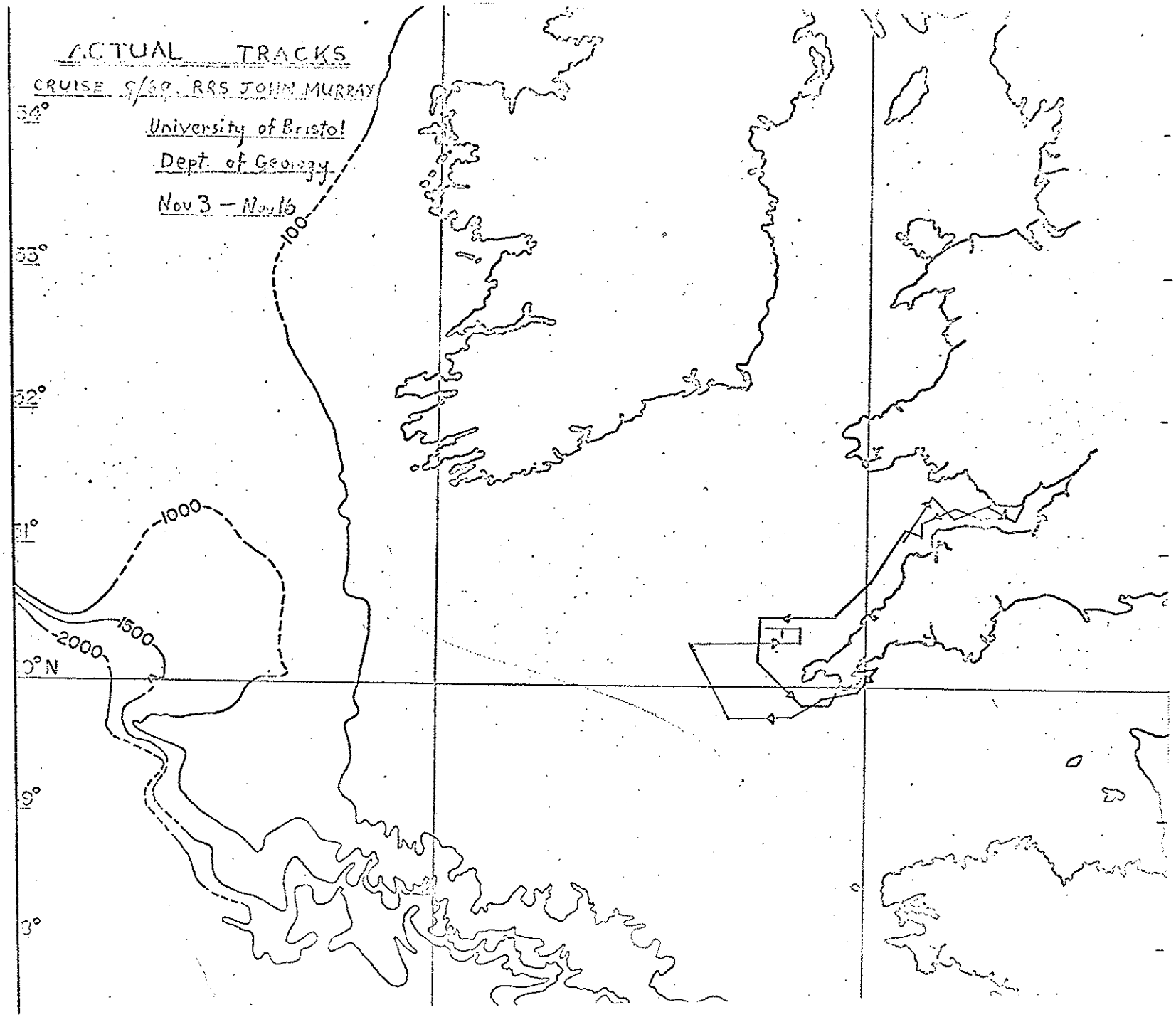
ACTUAL TRACKS
CRUISE 5/69. RRS JOHN MURRAY
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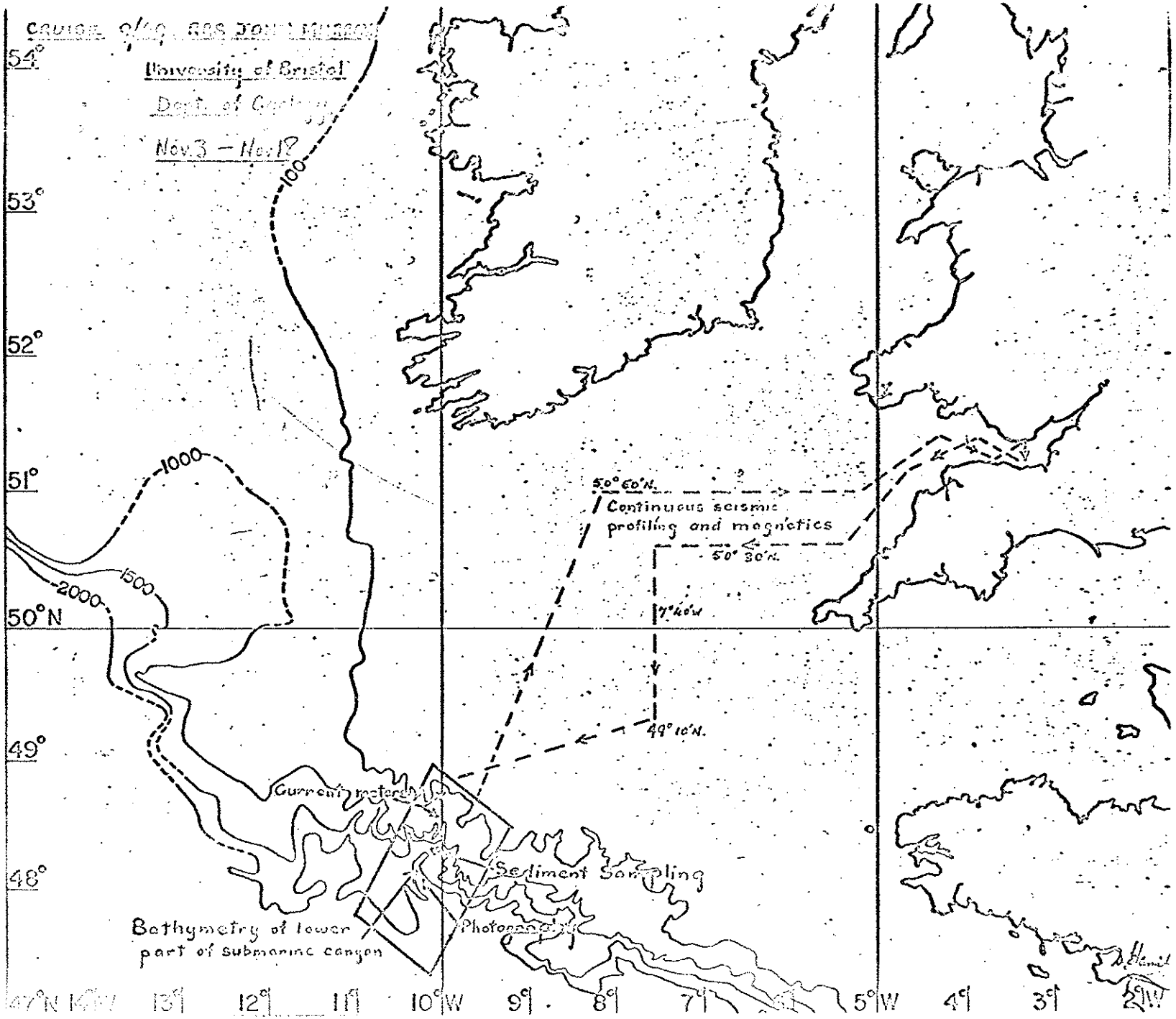
Nov 3 – Nov 16
54°
53°
52°
51°
9°
3°
0° N
100
1000
1500
2000


CRUISE 9/69 RRS JOHN MURRAY
University of Bristol
Dept. of Geology
Nov 3 – Nov 18
54°
53°
52°
51°
50°N
49°
48°
47°N
100
1000
1500
2000
50° 60'N.
Continuous seismic profiling and magnetics
50° 30'N.
7° 40'W
49° 10'N.
Current meters
Sediment Sampling
Bathymetry of lower part of submarine canyon
Photography
14°W
13°
12°
11°
10°W
9°
8°
7°
5°W
4°
3°
2°W