Cruise Report R.R.S. John Murray 4/79, 3rd - 26th April, 1979

Introduction

The objectives of the cruise were as follows:-

a) To clarify aspects of the near surface geology in St. George's Channel, Cardigan and Caernarvon Bays arising out of previous research cruises.

b) To compare and contrast the performance of various seismic profiling equipment over known geological sequences in Cardigan Bay with the intention of establishing a series of test lines for the evaluation of seismic profiling equipment.

c) To carry out a calibration of the newly acquired La Coste Gravimeter (S 86) over the Blackstones Bank gravity range, to the S.W. of Mull.

d) To establish a grid of Gravity, Magnetic and Air-gun seismic profiling traverses across the Hebrides Terrace Seamount and to sample the Seamount using a rock dredge.

Narrative

The R.R.S. John Murray left Barry on the morning of the 3rd of April 1979 with an additional R.V.S. technician Mr. A. Cummings on board. Under the supervision of Mr. Cummings all the geophysical equipment was set up and tested in the S.W. of Cardigan Bay. Considerable trouble was experienced with the Air-gun due to leaking seals but after several strip down and cleaning sequences correct performance of the gun was obtained. During the night of the 4th/5th a Sparker seismic line was obtained in indifferent weather conditions in the center of Cardigan Bay. The vessel entered Fishguard harbour at mid-day on the 5th April where Mr. A. Cummings disembarked and returned to Barry.

From the afternoon of the 5th to the evening of the 9th a series of test runs were carried out in Cardigan Bay over I.G.S. borehole positions with various combinations of Sparkers, Air guns, Pingers, Boomer and Hydrophones. Routine Sparker profiling was run during each night to further elucidate the near surface geology of Cardigan Bay. During the night of the 10th a Sparker profile was run across St. George's Channel to a position Longitude $5^{\circ}22'W$, Latitude $52^{\circ}34'N$ where previous surveys had suggested possible rock outcrop at the sea floor. A series of lines were run across the position with both a Sparker and a Pinger and an area of basement rock outcropping at the seabed was delineated. On the afternoon of the 10th a number of dredge samples were obtained from the seafloor in this vicinity. A Sparker profiling traverse was then run from this area to Caernarvon Bay where a number of short traverses were run over I.G.S. boreholes to assist in the geological interpretation of the area. The vessel entered Holyhead on the evening of the 11th of April on the completion of the first leg of the cruise which had been fortunate to encounter ideal weather conditions for most of the time.

Following an exchange of Aberystwyth scientific personnel and a delay due to technical problems with the Gravimeter the John Murray left Holyhead at mid-day on the 12th of April and made full speed passage to the area of the Blackstones Bank

(50°5'N, 7°10'W). From the evening of the 13th to the evening of the 14th a Sparker, Magnetometer and Gravimeter survey was run over part of the Blackstones Bank in poor weather conditions, the vessel then headed west towards the shelf edge at 56°30'N. During the afternoon of the 15th at about 9°W the Sparker profiler was replaced by the Air-gun and a survey line ran out across the Continental Shelf edge to the Hebrides Terrace Seamount at 56°25'N, 10°15'W. A grid of survey lines with Gravity and Magnetic measurements and Air-gun seismic profiles was then established in the immediate vicinity of the Seamount until the morning of the 18th of April. Two dredge samples were then attempted on the southern edge of the Seamount, however the dredge and 1560 m. of the ship's main warp was lost on the first attempt and the dredge and bucket on the second attempt. Deteriorating weather conditions culminating in a severe gale led to the abandonment of all scientific activity for 43 hours.

Geophysical surveying re-commenced in the early afternoon of the 20th and continued until the evening when bad weather again forced abandonment of the scientific programme. In view of the continuing bad weather forecast and the exposed nature of the area it was decided to curtail further investigations of this area and to spend the remaining part of the cruise in the Southern Irish Sea. Accordingly the John Murray made passage in difficult conditions from the Hebrides Terrace to Caernarvon Bay which was reached during the evening of the 22nd. A Sparker seismic traverse was then run from Caernarvon Bay to the bedrock outcrop site in the centre of St. George's Channel (5°22'W, 52°34'N) where during the day time of the 23rd further attempts at dredging the seafloor were made. During the night of the 23rd/24th a Sparker seismic profile was run into Cardigan Bay until bad weather in the early morning of the 24th again forced cessation of the scientific programme. Sparker profiling was resumed in the late afternoon of the 24th and a series of traverses ran in the entrance to St. George's Channel until the afternoon of the 25th when a failure in one of the ship's main engines necessitated concluding the geophysical surveying and the vessel returned to Barry using one engine only.

Results

An assessment of the performance of the various seismic profiling equipment in Cardigan Bay is being made by D. Taylor who is an external research student of the Department. Thegeological interpretation of the seismic profiling in St. George's Channel, Cardigan Bay and Caernarvon Bay has been incorporated into the 1:250,000 U.T.M. geological maps of Cardigan and Caernarvon Bays to be published by the I.G.S. These maps were prepared by P. Croker and W. Martindale of the I.G.S. and M.R.Dobson and R.J.Whittington of Aberystwyth. Regrettably no diagnostic rock was obtained from the dredge site in the centre of St. George's Channel. The geophysical surveys in the area of the Blackstones Bank have been worked up and are presently being written up by C. Uruski formerly a research student in this department, now at the University of Durham. The geophysical studies of the Hebrides Terrace Seamount will be incorporated into a major study of the oceanic/continental crust boundary in the region 55° - 57°N, 9° - 11°W which will commence in October 1981.

R.R.S. John Murray Cruise 4/79. Captain P. H. Warne

Scientific Party

Leg 1. 3rd - 11th April

Dr. R. J. Whittington	Senior Scientist	U.C.W., Aberystwyth.
Mr. D. Taylor		U.C.W., Aberystwyth.
Mr. C. Uruski		U.C.W., Aberystwyth
Mr. R. Robinson		R.V.S. Barry

Leg 2. 12th - 26th April

Dr. R. J. Whittington	Senior Scientist	U.C.W., Aberystwyth
Mr. C. Uruski		U.C.W., Aberystwyth
Mr. M. Williamson		U.C.W., Aberystwyth
Mr. M. Drury		U.C.W., Aberystwyth
Dr. A. Weighell		U.C.W., Aberystwyth
Mr. R. Robinson		R.V.S. Barry
Mr. J. Taylor		R.V.S. Barry

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