

Report 1, RRS John Murray Cruise 9/79

Objectives

The most important objective of the cruise was to detonate explosive charges for the South West England Seismic Experiment. Charges were detonated at the southernmost (or easternmost) point of six lines across S.W. England, and also at ten points along a line between the Lizard and Start. Because of a timing transmission breakdown, one shot had to be repeated, and in all some 37 shots were successfully detonated with no misfires. Charge sizes ranged from 100 m to 800 m of 'Superflex' and for the larger charges (400 m +) line charges were streamed in parallel (though strapped together at the firing cable end) so that the charge length was never longer than 300 m. Not one of the charges 'blew out'. Wherever possible, shot points were checked for fish kill. For most of the checked points fish kill was negligible, with only a few small fish (a few centimetres in length) being found. At one point the kill could however be described as moderate to heavy, with significant numbers of small fish and some up to ten or fifteen centimetres length being noticed, though only in the immediate area of the shot. Navigation to the shot point was of high quality. All the shot points were occupied (for the shot) to within a few cables of their pre-determined positions. Furthermore, the shot could be fired at the shot point within one minute of a pre-determined time. Only on one occasion was a shot delayed, and then only for two minutes due to a fishing boat coming too close to the 'John Murray'.

Disposable sonobuoys were also deployed at five locations. Although operated successfully it is as yet too early to determine whether or not the shots from the Bristol Channel were recorded. Three of the sonobuoys were recovered, as it seemed possible that they would have been picked up or washed on to the shore, where they might have stimulated environmental objections!

Shot Firing Procedure

Although the conventional cable and ball system with the 'Bays' blaster was used for the first few shots (or line 8), the new system was used for all the rest of the shots. The system, previously used on small boats, proved convenient and reliable, though some minor improvements should make it virtually fool-proof. These could include:

- (i) strengthening and waterproofing connections from end of firing cable to interconnecting (firing - detonator) lead;
- (ii) increasing size of detonator hole on charge connector (on 'John Murray' we strapped the detonator to the charge);
- (iii) easy 'snap on' connections from detonator leads to firing cable;
- (iv) some form of protection for detonator - firing cable leads, to avoid risk of damage on sea bed if ship speed is low and water shallow.

The firing cable should be checked with an Avo after every shot.

After early trials and discussion with Captain Warnes, the following time schedule was adopted for shot firing.

30	minutes	before	agreed	shot	time	- warning from bridge; explosive and detonators out
						- initial connecting up of Superflex lengths
20	"	"	"	"	"	- warning from bridge; charges start to be streamed for long charges
						- bridge informed when charges streamed
10	"	"	"	"	"	- warning from bridge; shot firers inform bridge when charge ready to arm, bridge then informs shot firers if OK (ie, radio silence).
						Charge armed and deployed. Shot firers inform bridge that charge is deployed. Radio and radar resumed.
5	"	"	"	"	"	- warning from bridge.
2	"	"	"	"	"	- " " "
1	"	"	"	"	"	- " " "
0	"	"	"	"	"	- charge fired.
						Firing cable retrieved, bridge informed when cable on deck, check fish damage (if possible).

Other Work

Continuous seismic profiling (with a sparker) was carried out at all shot points, but this of course still left a considerable amount of free time. In addition, therefore, three separate pieces of work were also undertaken.

- (a) detailed magnetic survey of the Eddystone-Start magnetic anomaly complex;
- (b) seismic reflection profiling off the mouth of the major rivers to attempt to delineate infilled river channels;
- (c) regional seismic profiling, principally between the Lizard and Start Point.

In addition, some Shipek grab samples were taken. Gravity coring was attempted but proved unsuccessful.

Time Lost

The weather on the cruise was excellent and no time was lost because of poor sea conditions. The only serious instrumental breakdown was a break in the cable to the sparker frames. When removed for refitting the new frame, it was found that the original frame cables had been incorrectly connected. However, though a new frame had to be picked up from Plymouth, little time was actually lost as it was possible to alter the profiling and magnetometer programme. Other, minor, problems with the sparkers were quickly solved.

General Comments

The excellent weather conditions, the skill and help from the ship's officers and crew, and the technical and administrative back-up from RVB, made this a most successful cruise. Most of my colleagues in the scientific personnel were inexperienced and they found the cruise both socially enjoyable and academically rewarding.

P. N. Chroston,
School of Environmental Sciences,
University of East Anglia, Norwich.
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