LIVERPOOL RVS Cruise Report of Proceedings CONFIDENTIAL

Ship RRS SHACKLETON Cruise No 9B/79

Cruise Dates (Inclusive, port to port) 4th - 17th October 1979

It is requested that the following aspects of the cruise may be covered in this report of proceedings for dispatch or delivery to the Director, Research Vessel Base, immediately on return to port.

a) Main objectives of the cruise.
b) Geographical area. Reference stations or points in latitude and longitude.
c) Sea and weather conditions encountered.
d) Conduct of cruise, main problems encountered and success or otherwise of the programme
e) Equipment performance.
f) Ship performance.
g) Any recommendations.
h) Signature and date.

Brief comments are preferred but if necessary please continue on another sheet.

The aim of the cruise was to investigate the thermohaline step structure which underlies the Levantine Intermediate Water in the Tyrrhenian Sea.

Liverpool personnel embarked in Gibraltar on 2nd October. Some delay was encountered in unpacking our equipment (already on board) because the electronics lab. was full of geophysical gear which had to be stripped and stowed before our equipment could be set up. The ship sailed pm 4th October, arriving at Sta.α, (1930 on 7 Oct.) which comprised a working test for both the STD and CTD systems to a depth of 1500 m. (On this and all subsequent hydrographic stations, a reversing water bottle carrying 3 protected thermometers was mounted immediately above the probe to provide calibration checks throughout). Some problems with the STD at Sta.α, and later at Sta.1 were rectified overnight. The first leg of Phase I had to be abandoned as it lay within the firing range of the U.S. 6th Fleet who were particularly active in the area. Extra stations were added later.

Phase I proceeded with stations at 15 mile intervals, northwards along the second leg, with all equipment working well. En route to the 4th station (40°00'N; 12°00'E) the ship was diverted to aid a Greek tanker on fire some 15 miles to the east. Shackleton stood by the casualty until her help was no longer required and then returned to Sta.4 which was resumed at 2000 8th October. After this station a deep (3000 m) pressure sensor was fitted to the STD as the results to date had indicated that more step layers were present below 1500 m. The next 3 stations were probed to 1800 m. On Stas. 9 and 11 the STD was lowered below 2500 m revealing new (unreported) interfaces at 1820 and 2200 m. Unfortunately this depth proved too much for the pressure transducer on the salinity sensor, although it was designed to operate to 3000 m. The loss of the salinity signal necessitated changing to the Niel Brown CTD, used thereafter for the remainder of the cruise. The rest of Phase I (Stas. 12-23) proceeded uneventfully using the CTD to 1600m, its maximum depth. Good weather was experienced throughout this phase.

Sta. 24 (39°35'N; 12°20'E) comprised an examination of the step interfaces at high resolution followed by a 16 hour time series of the

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whole profile. As deteriorating weather conditions were causing undue vertical movement of the probe it was decided to postpone the rest of the Phase II programme and proceed to Phase III, a network of stations at 5 mile intervals centred on a sea mount at 39°51'N; 12°37'E. The first station of this survey (No.25) was occupied in rough but workable conditions, at 1130 on 12th Oct. Work proceeded according to plan except for a 5 hour interruption due to bad weather. The survey finished with Sta.36 at 1800 on 13th Oct. and the ship then returned to the previous Sta.24 position for Sta.37, a continuation of the Phase II experiments.

At Sta. 37, an Aanderaa current meter was suspended below the CTD and a 25 metre thermistor chain was mounted on the probe wire immediately above the CTD. Work with this equipment over the side continued until the next afternoon when it was brought inboard for a check and change of tapes while the ship regained position. The experiment then continued as Sta. 38 until interrupted by the passage of another frontal storm at 0230 on 15th October. Work resumed at a new position Sta.39 later that morning and continued until 1800 on 16th October when a final line of CTD stations, Nos.40-46, running northwards from the sea mount, commenced.

Scientific work ended after Sta. 45 at 0830 on 17th October when an emergency run to Naples was required for medical treatment for the Bosun. Most of our equipment was re-packed in the transit cases by the time the ship arrived in Naples. The majority of the Liverpool team took advantage of an early charter flight home the next day in view of threatened strike of Italian airways.

Apart from the problem with the STD, all our equipment worked well throughout (although the Aanderaa and thermistor chain tapes have yet to be verified). A pronounced step structure was found at nearly all the stations worked and a large amount of valuable data was obtained. Throughout the cruise, weather permitting, the Liverpool chemists ran their bow mounted air-sampling apparatus and although this was only intended as a trial of this equipment, some good results were achieved. The only item on the programme not carried out was the acquisition of some deep water samples requested by the chemists at Liverpool. Two casts using the large Niskin bottles were planned at Sta. 37 but this was abandoned because of mechanical problems with the winch which prevented a change over to the hydrographic wire. The intention to do these casts at the end of the cruise, using the CTD wire if absolutely necessary, was thwarted by the early termination of work.

With good results being obtained, morale on board was high. We enjoyed the fullest co-operation from the Captain, Officers and Crew throughout

Summary:

Time available 312.9 hrs.

Time used :
- Passage time 152.4 hrs.
- Station time 147.5 hrs. (45 stations completed)

Delays :
- Weather 11.9
- Distress call 1.1

Total time used 312.9 hrs.

R. I. Tait
29th October, 1979.