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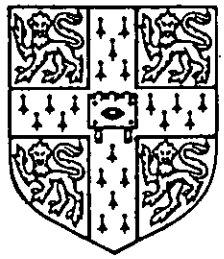


Department of Earth Sciences

Cruise Report

R. R. S. Charles Darwin

14A / 86

R.R.S. CHARLES DARWIN CRUISE 14A/86

Jedda - Seychelles

CRUISE REPORT

1. Cruise Objectives

This cruise was initiated as a 3-day extension of the Patras-Seychelles passage leg, intended for site surveying in the Red Sea for the Ocean Drilling Program. The site survey work depended upon gaining permission to work in Saudi Arabian, Sudanese and Ethiopian waters. In the event permission was granted only to work in Sudanese waters of less than 1000m depth. No response was received from the Ethiopian government, while Saudi Arabia and the Saudi-Sudanese Commission for Red Sea Resources refused permission in their waters. Since all the high priority drill sites were in the central rift area, the original objectives for this cruise had to be abandoned.

As the 3 days of ship time for scientific work still existed in the schedule, an alternative scientific was adopted, that of mapping the poorly known older series of magnetic anomalies in the Somali abyssal plain.

Preparation of geochemical equipment and fitting out the new containerised clean laboratory were concurrently made in readiness for cruise 15/86. Atmospheric dust sampling and sky photography was carried out, while the RVS party were busy with the maintenance of numerous bits of the ship's scientific equipment.

2. Data Collected

a. Geophysics: magnetic anomalies relative to IGRF 1980.0.
soundings corrected according to Carter (1980).
gravity anomalies relative to IGSN71.

b. Dust particles from atmospheric sources.
c. 1 CTD station near 1°25.3'N 54°36.3'E.
d. Sky photographs.

3. Personnel

Scientific personnel

Dr. C.A. Williams	Cambridge University	Geophysics (PSO)
Mervyn Greaves	" "	Geochemistry
Dr. Nick Morley	Southampton "	"
Dr. Peter Statham	" "	"
Dr. Kevin Murphy	Liverpool "	Dust Sampling
Amanda Berry	" "	" "
Ivor Chivers	RVS	
Mike Davies	"	
Steve Jones	"	
Kay Potter	"	
Stan Smith	"	
Phil Taylor	"	
Dr. Mustafa Moammar	King Abdulasis Univ.	Saudi Observer
Lt. Abdulkhaliq Shamrani	Saudi Military Survey	" "

Ships Personnel

Keith Avery	Master	Geof Gimber	2nd Engineer
Simon Jackson	Chief Officer	J. Anderson	3rd Engineer
Syd Sykes	2nd Officer	Jeff Baker	Radio Officer
Phil Evans	3rd Officer	Doug Lutey	Electrician
George Batten	Chief Engineer	Glen 'Tiny' Pook	Bosun

4. Narrative

The ship sailed from Jeddah at 1540Z/210 (29th July, 1986). The navigation echo sounder (using hull transducer) and gravimeter were running. Once in Sudanese waters of less than 1000m depth the magnetometer was deployed for a traverse across the Sudanese delta - a potential ODP drill site. Gas blow-out fissures were observed here and this site may well be rejected on safety grounds. After 5½ hours of magnetometer deployment, the magnetometer was brought inboard on instructions from the bridge, as we had reached Ethiopian waters.

From then on only the echo-sounder and gravity meter were run, through the Gulf of Aden and out into the Indian Ocean to 200 n.m. beyond the Somali coast. The weather was fine, though with poor visibility and progress was good through the Red Sea and Gulf of Aden. The ship's speed was limited only by the high temperature of the water (31°C in the Red Sea and 27°C in the Gulf of Aden), and its ability to cool the engine. We averaged 11.5 kts. Five hours were lost however by following the directive from RVS to take the median line between the Yemeni and Somali coasts till the passage between Cape Guardafui and Abdul-al-Kuri island was reached (see track chart).

Once round Cape Guardafui on day 214 the weather changed and we headed into a Force 8-9 SW monsoon with rough seas and a northward current of 4 kts. The Charles Darwin does not take kindly to these conditions and our speed was reduced, at times down to as little as 2 kts. The minimum progress of 58 nm was made between noon/215 and noon/216. At times we were heading 170° to make 220° and our leeway equalled our forward progress. With hindsight and, now, some knowledge of how the ship handles in these conditions, I would have opted to tack to our position, choosing courses such that the ship took the seas on the quarter, not on the bow and the speed could have been increased. I would have appreciated some guidance on this at the time. By noon/217 we were 2 days behind schedule. At this point news was received of the terminal illness of one of the crew's mother. The Master then made the unilateral decision to head direct for the Seychelles on the assumption that a flight home earlier than 0715/223 would be available.

The echo-sounder and magnetometer were deployed in international waters at 0430/218. By then the weather had moderated and the ship was steaming at 9.5 to 10.0 kts We learned by telex from Barry that no earlier flight home was possible for the seaman. We were now catching up on our schedule and although it was now too late to make the westing to reach the survey area, an alternative survey plan was made. Its implementation was thwarted however by another telex from Barry saying that no mention had been made of permission to work in Seychellois waters. As no useful geophysics appeared to be possible at that time, it was decided to do a CTD test station just outside Seychellois waters. The two dips took place between 1440/219 and 0230/220.

A surprising thing then occurred when at 0900z/220 the Master found a copy of a telex from Barry, received during the previous leg, stating that we did after all have clearance to work in Seychellois waters. At this late stage the only possible useful track that could be fitted in was between 1°S and 3°40'S at longitude 53°30'E. We altered course immediately and arrived at the northern end of the line at 1810/220 and completed it at0824/221. We then headed for Port Victoria, arriving alongside the new pier at 0600/222 for a gravity base connection and for bunkers.

5. Gravity base stations

Great confusion abounds at the moment as to the corrections between the old Potsdam system to IGSN71. This involves no only a change of -14 mGals in the value for Potsdam but also a sphericity correction. Various conversion tables and equations exist, none of which appear to concur in their correction.

Patras: The tie in for CD Cruise 13/86. The g value here was updated using an equation lacking a latitude component. As its credibility was suspect it was decided to base cruise 14A gravity on Falmouth.

Falmouth: The value by the 6th bollard on North Pier of 981 088.09 was well linked to a station at Troon (NGRN73 = IGSN71) by Steve Jones prior to the cruise. The value at the ship's berth in Falmouth = 981 089.41.

Jeddah: A gravity tie-in here was not possible as the pier upon which the WHOI base station No. 794 was sited was demolished in 1980/81. Also we had no permission to make a gravity connection between the airport and the new islamic port.

Port Victoria: A link was made between the HMS Owen station on the old, now fish, pier and the new pier by S. Jones and C.A. Williams. The WHOI correction of -14.29 mGals was used to convert the old pier value from Potsdam to IGSN71.

6. Atmospheric dust sampling

K. Murphy and A. Berry rigged air particulate collection filters on the ship's bow to collect dust during head wind conditions. The dust would be analysed at Liverpool University for its metallic content. Unfortunately the filter holder was washed overboard on day 215, shortly after rounding Cape Guardafui.

7. CTD test dips

The new RVS system consisting of a Neil Brown CTD coupled to a General Oceanics rosette of 12 106 Go-Flo bottles was tested on day 219 near 1°25.3'N 54°36.3'E. The first lowering was down to 500m to test the new rosette itself and also to learn its sink characteristics and the appropriate veer and heave rates for the winch. The CTD software was also tested and also the level A logging onto the ship's computer system. All appeared satisfactory. The dissolved oxygen probe on the CTD worked only intermittently and finally ceased to function entirely and will be replaced for cruise 15/86. It was also noted that with the fluorimeter removed for casts deeper than 3000m that a modification was required to the CTD voltage.

The second lowering began at 1900Z/219 to 4500m. With still 4,300m of wire out and just one bottle triggered, problems developed with the winch. The hydraulic seal on the receiving gear had failed. Repairs were completed by 0130Z/220 and the station finished at 0430Z/220.

8. Surface samples: One set of surface water samples were taken from the bow on day 221 near 3°30'S 53°28'E. These samples will be analysed for nutrients and salinity and dissolved trace metals.

9. Sky Photographs: 36 exposures were taken each day from the sky camera mounted on the monkey island. These will be analysed at Liverpool University.

10. Factors contributing to the loss of survey opportunity during this cruise (in addition to bad weather.

1. Overcaution regarding UNCLOS agreements:

a. No reply was received from the Ethiopian government to our request to work in their waters. I understand this can be taken as implicit non-objection for e.g. underway measurements such as magnetics, water sampling etc. Yet we had to switch off our magnetometer.

b. When ostensibly not surveying, as was our condition coming through the Gulf of Aden, the ship is classed as a merchant ship, despite its blue ensign. As such we had right of "innocent passage" via the most direct route through the Somali territorial sea outside its 12 mile limits. I consider the directive from RVS in this instance was overcautious. 50 miles could have been saved from out passage.

2. Whilst every humane action should be taken in the event of an emotional crisis, such as the news of the seaman's dying mother, it was not sensible to abort the entire scientific programme at the point when it was still not known whether a flight was available earlier than our scheduled arrival in port. The scientific programme received no priority at this time. When later it was learned that no flight was available, it was too late to try and reach the survey area.

3. The question of clearance to work in Seychellois waters was subject to administrative bungling. This permission was not required by the original programme, but had the appropriate piece of paper been found in time, it would have allowed a useful alternative scientific survey to have been carried out.

4. Overtight scheduling for passage making. The Admiralty hand book states that the incidence of winds of force 8 and above should be expected for greater than 10 days per month at this time of year near Cape Guardafui. Without the donation of scientific time to the passage, the ship would not have arrived in port on schedule.

11. Comment on equipment aboard RRS Charles Darwin

There are many advantages in the new ship, particularly in the electrical system for coupling instruments and in the arrangements for launching the E/S fish. The main disadvantage is obvious in that the afterdeck can be dangerously wet in rough weather.

A small capstan for hauling in the magnetometer etc. is needed aft of the multichannel array. This, I believe, is already in hand.

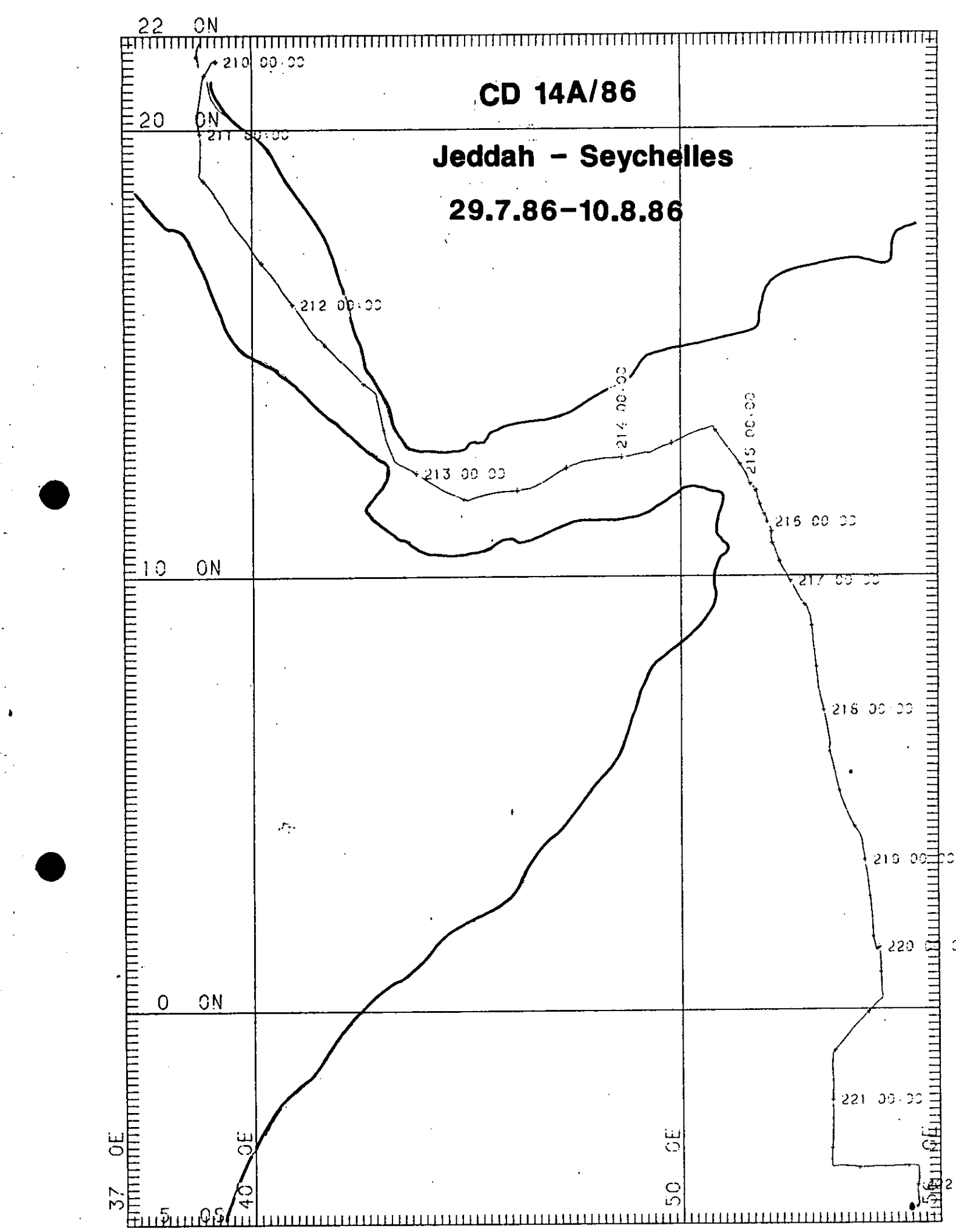
The drawers in the scientific plot are not large enough to take a standard 1:1m chart (1020 x 760 mm). The bench beside the light table in the plot is wide enough but the drawers have been made too small. Also the existing drawers jam and need the addition of metal runners.

Computer software: The current software is not able to reproduce latitude-longitude grids on exactly the same scale as Admiralty 1:1m sheets. This is presumably because a different sphericity equation is being used. It would be appreciated if the software could be standardised to the charts.

12. Acknowledgements

I thank those concerned at NERC HQ for their flexibility in approving both the original and the alternative programmes at very short notice. Three days working time in isolation is a risk, but might well have proved fruitful. I would not like the experience of cruise 14A to jeopardise future decisions to squeeze in additional scientific work where possible. My thanks also to those on board for their co-operation and good company.

C. A. Williams
August 1986.



RVS MERCATOR PROJECTION

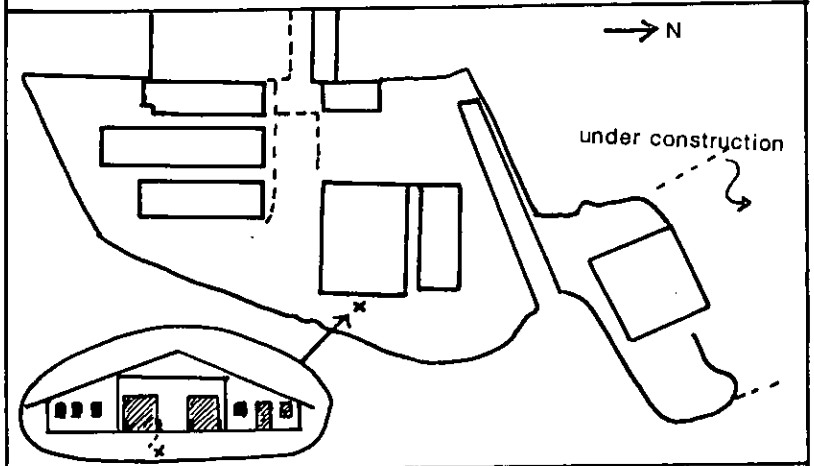
GRID NO. 1

SCALE 1 TO 10000000 (NATURAL SCALE AT LAT. 35)

INTERNATIONAL SPHEROID PROJECTED AT LATITUDE -1

Port Victoria Fishermen's Pier
Seychelles

Lat. -4°37.15' S
Lon. 55°27.42' E



g_{obs} = 978 115.5 IGSN71 (According to correction Potsdam to IGSN71 of -14.29 mGal by WHOI).

Description: On old, now fish pier, outside shed 2m from doorpost on right hand side of southern door. (Shed modified since previous g station occupancy). = WHOI stn. No 419.

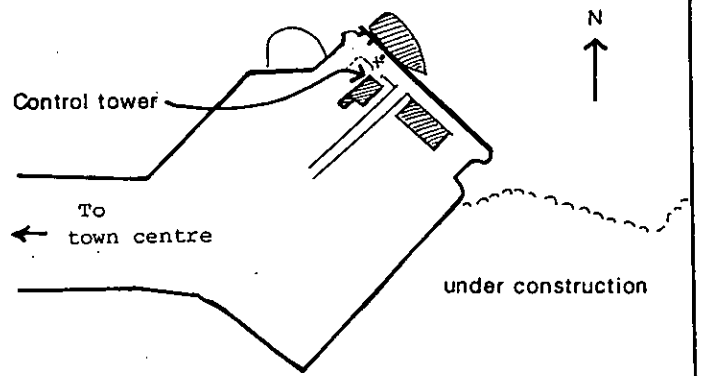
Established: H.M.S. Owen 1962. Admiralty Marine Science Pub. No 4 Part 1, 1963. g=978 131.0

Connections: 3 single connections to Manor House Hotel, Mombasa.
1 connection to Karachi airport.
2 connection WHOI base 317 1964)
1 connection WHOI base 802 1971) g=978129.79

Bullard Laboratories, Cambridge.

Port Victoria New Pier
Seychelles

Lat. -4°37.49' S
Lon. 55°27.77' E



g_{obs} = 978 116.27 mGals (IGSN71)

Description: Beside 3rd bollard from NW end of pier.

Established by S. Jones & C.A. Williams, RRS Charles Darwin 14A/1986 using Worden Master No 647.

Connection: To base on fishermen's pier, Port Victoria. (See note on correction Potsdam to IGSN71).

R.V.S. Barry / Bullard Laboratories, Cambridge.