

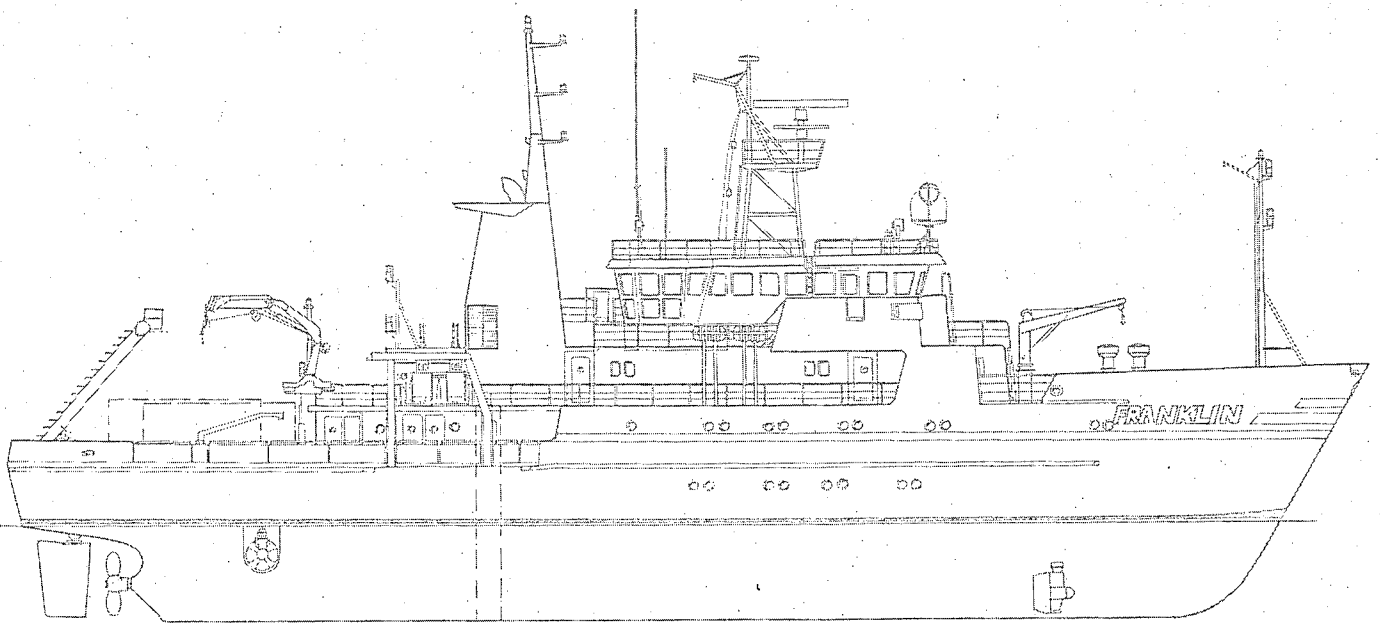
R.V. FRANKLIN

NATIONAL FACILITY OCEANOGRAPHIC RESEARCH VESSEL

CRUISE SUMMARY

R.V. 'FRANKLIN'

FR 7/87



For further information contact
ORV Operations Manager
c/- CSIRO Division of Oceanography
GPO Box 1538, Hobart, Tas. 7001
Telephone (002) 20 6222
Telex AA 57182



R.V. FRANKLIN IS OWNED AND OPERATED BY CSIRO

Cruise Summary

R.V. Franklin

Cruise FR7/87

Itinerary

Departed Fremantle:	0800	4 August 1987
Arrived Fremantle:	1030	24 August 1987

Scientific Program

This was the final cruise of the Leeuwin Current Interdisciplinary Experiment (LUCIE) which was designed to investigate the dynamics of this unconventional eastern boundary current.

Cruise Objectives Achieved

1. All LUCIE moorings were recovered. One current meter was missing, and one meteorological buoy had been recovered on the preceding cruise.
2. Seven CTD sections, each 120 n. miles in length, normal to the coast, were completed.
3. A north/south CTD section along 113°E between the 34°S and Dongara CTD sections was completed, with all stations to the bottom.
4. Three short CTD sections were completed, one across each of the pressure gauge sites which did not lie on a major section.

Cruise Track

See Figure 1.

Cruise Narrative

The ship left Victoria Quay at 0815, almost on schedule. The weather was sunny and calm with light winds. We headed for Cape Naturaliste to recover a tide gauge mooring, then steamed south to start recovery of a

line of three moorings at approximately 34°S. This went quite smoothly in good weather. One sub-surface steel float and one current meter were missing from the top of the second mooring. The shaft about which the Aanderaa current meter and vane rotate had sheared off, so there is no hope of recovering the meter. After recovering the third mooring, we headed south around Cape Leeuwin to Clifty Head to start the first major CTD section and to pick up another tide gauge. The recovery went smoothly, thanks to excellent weather. The UPS failed in the evening and cooked the power supply in the disk drive for micro 6, so we temporarily shut down all ops room micros and instruments, to protect their power supplies from further power surges while the problem was being rectified. The ship's doppler log packed up during the night, so navigation between satellite fixes was by DR unless GPS is available. It did not function properly for the remainder of the cruise.

After finishing the Clifty Head section we steamed east towards the offshore end of the Albany section. The weather remained sunny with a moderate breeze. Late in the evening we started the Albany section, working gradually towards shore. After finishing off the Albany section we headed for the Bunbury area, to see if it is worthwhile doing a frontal transect. There was no cold water inshore near Bunbury, so we proceeded back around the corner and started the Cape Mentelle section at 34°S which forms the southern side of the box section. All casts were to the bottom on the three sides of the box. The weather remained good although the breeze freshened for a short time to 20kt, so operations went smoothly on the Cape Mentelle section. We then turned the corner and started the deep casts on the northward leg. At depths of over 4000m the rosette sampler failed to fire first time (probably a temperature effect), but sampled when triggered a second time. At the deepest part of the section we managed to stream almost 6000m of CTD wire, and the chief engineer took the opportunity to place some extra packing shims in a troublesome spot on the lower layers of wire. It spooled well after that.

As we neared the WOMBAT mooring site on the Dongara line, the good weather did not hold, so we concentrated on picking up current meter moorings in the daytime, and then resumed CTD stations at night. Both activities went well, and we also recovered the Beagle Islands tide gauge. and completed a short CTD section through the site of the tide gauge. These short sections consist of one cast near the mooring site, one 10 miles shoreward, and one 10 miles seaward of the site.

We recovered the WOMBAT buoy the next day in moderate conditions. The ship's boat was used to approach the buoy and the instruments were first removed from the tower and transferred back to the ship. The breeze had freshened to 20kt, but the sea was fairly flat, so after another boat trip to attach the heavy lifting line to the buoy, the operation went smoothly. The buoy was winched on board through the A-frame. Next, we recovered the Geraldton tide gauge and did a short CTD section through its site then we steamed north towards the Carnarvon section.

First we recovered the tide gauge then started the CTD section from the inshore end. The weather was perfect - calm and sunny. We finished the Carnarvon section late the next day, then steamed north for the offshore end of the NW Cape section. On one deep (2000m) station on the NW Cape section, the rosette sampler played up again and the trigger had to be pushed three times before the deck unit showed the first sample as taken, but it later proved to have sampled on the second trigger signal. The NW Cape section was completed early the next morning, and the last tide gauge mooring recovered. The ACR did not respond in ranging mode, but did release on command. The transducer appears to have suffered a knock, which affected its performance. At least we did not have to drag for the mooring.

On the 21st of August, we steamed south all day, heading for the inshore end of the Geraldton section. CTD work proceeded routinely, and we finished the Geraldton section the next day. Trials were performed when time permitted on two instruments - a towed transducer depressor and the ADCP. The towed transducer worked only when the noisy main propellor was disengaged and the bow thruster alone used for propulsion. ADCP calibration trials occupied a few hours. Breezy conditions made it too difficult to swing the ship on its axis for two of the trials, so we steamed slowly in a tight circle instead. This pattern should achieve equivalent results.

After completing the last of the towed transducer trials near the shelf edge on the 24th of August, we proceeded to Fremantle, picked up the pilot at 1000 and were alongside at 1030.

Equipment

Gyro - During the preceding port period, the ship's gyro-compass was serviced, but it was incorrectly re-aligned, so that there was a residual error of about 5°. The Master expressed considerable dissatisfaction with the instrument's history of performance, and noted that the repeaters on the bridge wings were not functioning either. Since we use the gyro for DR navigation between satnav fixes and for ADCP real time data reduction, it is essential that it be absolutely reliable.

Doppler Log - To make DR navigation even more difficult, the ship's Doppler log did not operate properly for most of the cruise. It could be an electronic problem, or simply marine fouling of the transducer.

CTD Transport - The pneumatic transport to take the CTD from the wet lab to the deck needs overhauling. The driving motor is not powerful enough, and will not move the CTD against the roll of the ship. Also, the air hoist chain block is stiff and extremely rusty. Any attempt at manually assisting it results in grimy hands which are then unsuitable for

subsequently touching sample bottles or computer terminal keys.

Computers - There has been a considerable improvement in the ease of operation and reliability of the ship's computer system since I used it over a year ago. It was reassuring to have a computer person on board to sort out any problems which did arise, and I think that this practice should continue.

ADCP - This is difficult to drive for a 'beginner', using the existing manual. I understand that new software is on the way which should make the job of obtaining good data easier.

Electronics - A full report is attached.

Personnel

Scientific

A. Forbes (Chief Scientist)
N. White
F. Boland
K. Miller
D. McLaughlan
J. Butt
E. Madsen
R. Beattie
R. Plaschke
M. Rayner

Marine

N. Cheshire (Master)
M. Stanton (1st Mate)
R. Dougal (2nd Mate)
I. Mann (Chief Engineer)
P. Noble (2nd Engineer)
H. Wlodarczak (Electrical Engineer)
P. McClure (Greaser)
M. Taylor (1st Cook)
B. Marshall (2nd Cook)
R. Alcock (Steward)
Y. Hansen (Bosun)
J. Hughes (AB)
C. MacLean (AB)
D. Dickson (AB)

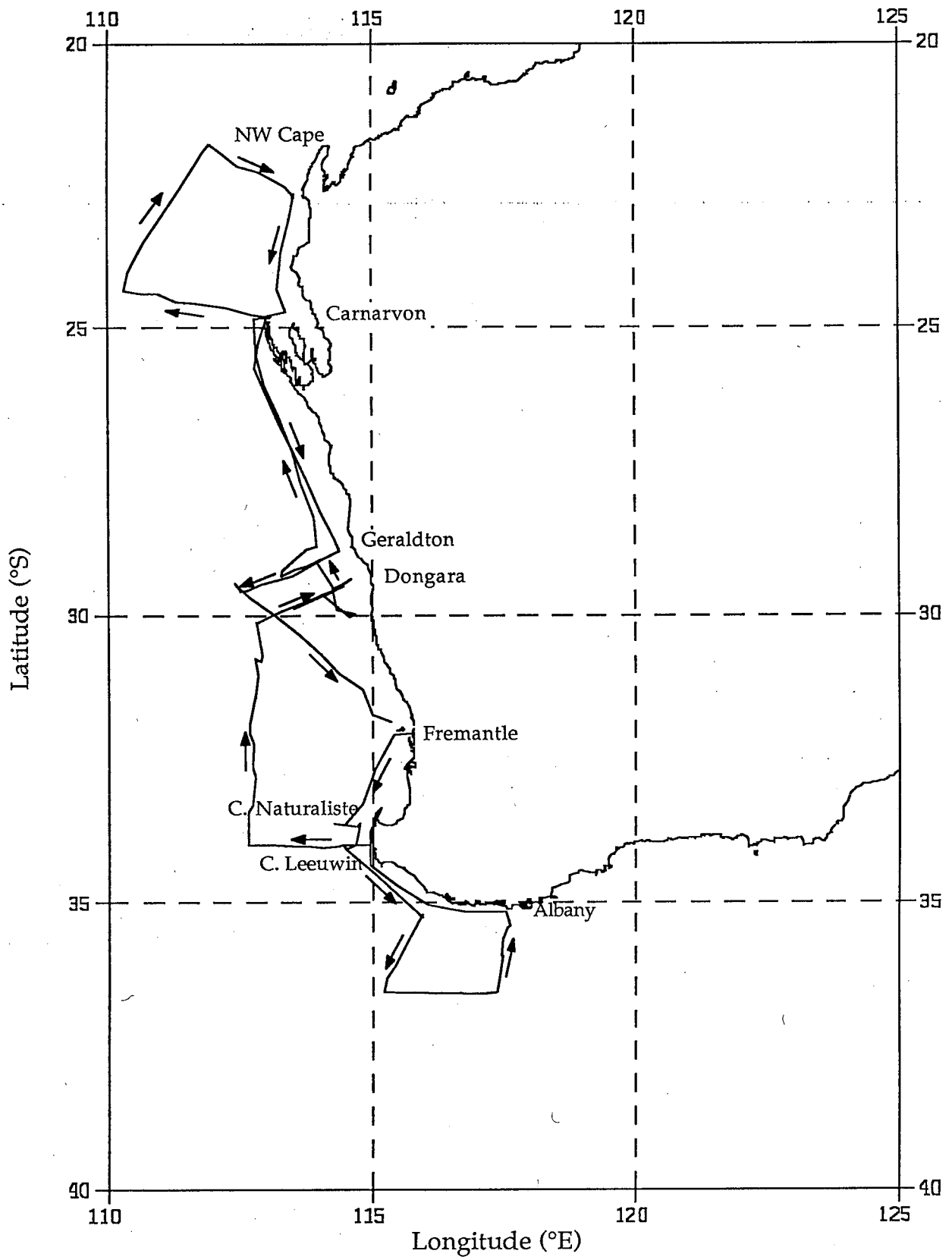


Figure 1. Cruise track , FR 7/87

=====

CTD UNDER WATER SYSTEM

CTD UNIT 1 WAS UNPACKED AND LEFT IN THE WET LAB. OVERNIGHT MONDAY 4 AUGUST, ON CHECKING IT TUESDAY AFTERNOON IT WAS FOUND TO HAVE THE PH SENSOR BROKEN, WHETHER THIS WAS DONE DURING TRANSPORT OR OVERNIGHT IN FREMANTLE IS NOT CLEAR, HOWEVER I STRONGLY RECOMMEND THAT A GUARD SIMILAR TO THE ONE ON THE CONDUCTIVITY SENSOR BE FITTED PRIOR TO NEXT TRIAL.

CTD UNIT 2 WAS USED FOR THE ENTIRE CRUISE AND PERFORMED SATISFACTORILY.

1150 DECK UNIT

APART FROM LOCKING UP COUPLE OF TIMES THIS WORKED WELL.

ROSETTE SAMPLER

ON THE DEEP STATIONS >3000 M. I EXPERIENCED SOME PROBLEMS WITH THE SAMPLING MECHANISM, THE BOTTOM BOTTLE DID NOT FIRE AT FIRST ATTEMPT, HOWEVER A SECOND ATTEMPT USUALLY SUCCEEDED. AFTER A FEW STATIONS THE OF THE ROSETTE WAS REMOVED AND THE SPINDLE CLEANED, THIS SEEMED TO CURE THE PROBLEM.

SPOOLING

DURING A DEEP STATION IAN MANN REPACKED THE CTD WINCH WITH THE RESULT THAT LAYERING IS MUCH BETTER, BUT THE REPAIR IS ONLY TEMPORARY.

TRIMBLE GPS

ON A FEW OCCASIONS THIS APPEARED TO BE LOSING TIME, ONLY TO RESET ITSELF AGAIN, EVENTUALLY IT CAME UP WITH A CHANNEL 2 FAULTY MESSAGE. I THEN FOUND THAT THE NEW SPARE CHANNEL CARD DID NOT WORK WITH THE GPS, (ERROR CHANNEL M) BUT LUCKILY ENOUGH THE OLD CARD WORKED AGAIN ON REINSERTION.

THERMO/SALINOGRAPH

THE NOISE ON THE REFERENCE LEVEL (5V P/P) WAS FOUND TO EMANATE FROM THE RS232 BOARD, THE NOISE SPIKES DISAPPEARED WHEN THE RS232 CONNECTOR WAS REMOVED. A 68UF ELECTROLYTIC CAP. ACROSS THE REFERENCE REDUCED THE NOISE TO 0.55 V P/P. REPLACING THE I/O CARD DIDN'T MAKE ANY DIFFERENCE.

RS232 FAN + CONCENTRATOR

THE FAN OUT IS ONLY CONNECTED TO THE GPS, FANNING TO MICRO3 AND ADCP TERMINAL. THE CONCENTRATOR IS CONNECTED FOR CTD AS MAIN USER AND THE ADCP AS SECONDARY USER, WHILST THE CTD MICRO CAN COMMUNICATE AT 9600 BAUD, THE ADCP CAN NOT TRANSMIT FASTER THAN 1200 BAUD WITHOUT THE PRINTER RUNNING OUT OF BUFFER SPACE, THIS IS DUE TO THE CONCENTRATOR MODE IS TRANSMIT ONLY AS FAR AS THE SECONDARY INPUTS ARE CONCERNED.

EK400 SOUNDER

APART FROM A FEW OCCASIONS WHERE THE BOTTOM DIGITISING DID NOT WORK, THIS INSTRUMENT PERFORMED WELL DURING THE ENTIRE CRUISE

NEWPORT CLOCK

THIS DEVELOPED ERRATIC STROBE ON THE ECHO SOUNDER WHICH WAS TRACED TO EXCESSIVE DELAY IN THE CLOCK PULSE BETWEEN THE CLOCK AND THE INTERFACE, THEN THE INTERNAL STROBE BIT TO BCD1, IN THE CLOCK DIED, THIS WAS TRACED TO A FAULTY WIRE WRAP. IT NOW WORKS WELL.

ACOUSTIC DOPPLER PROFILER

ANOTHER DRV11 INTERFACE CARD WAS MOUNTED IN THE POP11/73 TO ACCOMMODATE THE DOPPLER LOG INTERFACE FOR WHICH CABLING HAD BEEN RUN EARLIER.

TESTING OF THIS INTERFACE REVEALED SOME DESIGN PROBLEMS AROUND THE HAND SHAKE NETWORK. IN AS MUCH AS THE INVERTER IC 90 IS NOT REQUIRED, THIS WAS REMOVED AND WE GOT REASONABLE SPEED NUMBERS, BUT THE BLINK BIT IS NOT RELIABLE, FURTHER TESTS SHOULD BE DONE WHEN THE DOPPLER LOG HAS BEEN SERVICED.

THE NEW VERTICAL GYRO CABLE WAS TERMINATED AT ONE END TO THE ADCP AND THE OTHER DIRECT TO THE VERTICAL GYRO. THE SYSTEM WAS TESTED, BUT IT WAS FOUND THAT THE ROLL POTENTIOMETER WAS STICKING, IT WOULD HAVE A POSITIVE ROLL UNTIL THE GYRO WAS TILTED ABOUT 75 DEGREES AND THEN SUDDENLY SWITCH TO FULL SCALE NEGATIVE ROLL. THE PITCH POTENTIOMETER WORKED OK. THE NOISE ON BOTH PITCH AND ROLL CABLES IS ABOUT 50 MILLIVOLT P/F AND IS EMINATING FROM THE 400 HZ. SUPPLY TO THE GYRO. THE GYRO FILTER DID NOT SEEM TO HAVE ANY VISIBLE EFFECT ON THE NOISE.

D.E.L.P.

ON THIS CRUISE THE COMPAQ IN THE ELECTRONICS LAB. WAS EXTENSIVELY USED FOR CURRENT METER TAPE READING AND FILE TRANSFERS TO THE VAX, HENCE VERY LITTLE TIME COULD HAVE BEEN UTILISED AS D.E.L.P. MONITORING, ALTHOUGH REQUESTS FOR SUCH WERE VOICED BY THE MASTER AND DECK OFFICERS.

INTECH SATNAV.

ON TWO OCCASIONS THIS DEVELOPED A CLOCK ERROR RESULTING IN THE NAV PROGRAM REJECTING THE DATA AS BEING OLD AND ONCE THE CPU BOARD FROZE UP ALTOGETHER, THIS WAS REMEDIED BY REMOVING ALL ROM'S, I/O'S AND CPU, CLEANING THEIR SOCKETS AND RESEATING THEM ALL.

SHIPMATE SATNAV

ALTHOUGH THIS DIDN'T HAVE ANY BREAK DOWNS, I WAS INFORMED THAT THE SATELITE DATA QUALITY DISPLAY IS NOT WORKING SINCE THE HONEYWELL PEOPLE HAD A LOOK AT IT. THIS SHOULD BE REPAIRED DURING NEXT PORT PERIOD.

SHIPS DOPPLER LOG.

THIS FAILED COMPLETELY DURING THE CRUISE, GIVING ERRATIC SPEEDS. I FOUND THAT THE TWO DOPPLER SIGNALS WERE NOT DEVIATING EQUALLY FROM THE NORMAL AND ADJUSTED THE RECEIVER LOADS ACCORDINGLY. THE DOPPLER LOG THEN WORKED WELL FOR THE NEXT WEEK, AFTER WHICH IT STARTED GIVING ERRATIC SPEEDS AGAIN. I ADVISED THE CHIEF ENGINEER THAT THE LOG SHOULD BE SERVICED IN PORT AND THE TRANSDUCER MIGHT NEED CLEANING.

UPS

THIS FAILED A COUPLE OF TIMES WITH BURNED OUT 100 AND 200 AMP FUSES, I ASSISTED THE ELECTRICAL ENGINEER IN THE REPAIR. WE EVENTUALLY DREW THE CONCLUSION THAT HEAT WAS THE MAJOR PROBLEM AND HE INSTALLED THREE FANS WHICH I SUPPLIED FROM THE ELECTRONICS LAB. RACKS

TOWED HYDROPHONE

PRELIMINARY TEST, USING THE MOORING GROUP'S TRANSMITTER WORKED WELL, UNFORTUNATELY THE MOORING WE TESTED ON DID NOT ACKNOWLEDGE RECEIPT OF SIGNALS, BUT WE COULD HEAR BOTH THE EK400 TX. AND THE SHIPS PROPELLOR THROUGH THE HEADPHONES.

THE SECOND TEST WHERE THE PINGER WAS TOWED BEHIND THE SHIP AND THE TRANSDUCER WAS COUPLED TO THE EK400 VIA 12 KHZ. TRANSDUCER PORT 4 WAS UNSUCCESSFUL DUE TO PROPELLOR NOISE. WE THEN TRIED RUNNING ON THRUSTERS, WHICH IMPROVED THE NOISE FACTOR, BUT STILL NO SIGN OF THE PINGER ON THE PDR. NEXT WE COUPLED FRED'S BOX TO THE TOWED FISH AND COULD HEAR BOTH THE PINGER AND THE EK400 VERY CLEARLY.

I DID NOT ATTEMPT THE THIRD TEST AS THE EK400 MINIMUM POWER SETTING IS 100 WATT ABOVE THE MAX. RATING OF THE TRANSDUCER.

I THINK, THAT IN ORDER TO USE THE TOWED FISH WITH THE EK400 WE MUST OVERCOME THE IMPEDANCE MISMATCH, AND WITH A MINIMUM OF ATTENUATION.

CLOSED CCT TV.

THE MONITOR IN THE OPERATIONS ROOM FAILED DURING THE NIGHT OF 22/3, INVESTIGATION LATER SHOWED THE PICTURE TUBE WAS SHORTED INTERNALLY, THIS WAS EVENTUALLY REMEDIED USING A CALIBRATED SCREENORIVER HANDLE, AS THE FAULT CONDITION COULD NOT BE REPEATED I ASSUME THE TUBE TO BE OK.

FOR ELECTRONICS.

E. MADSEN

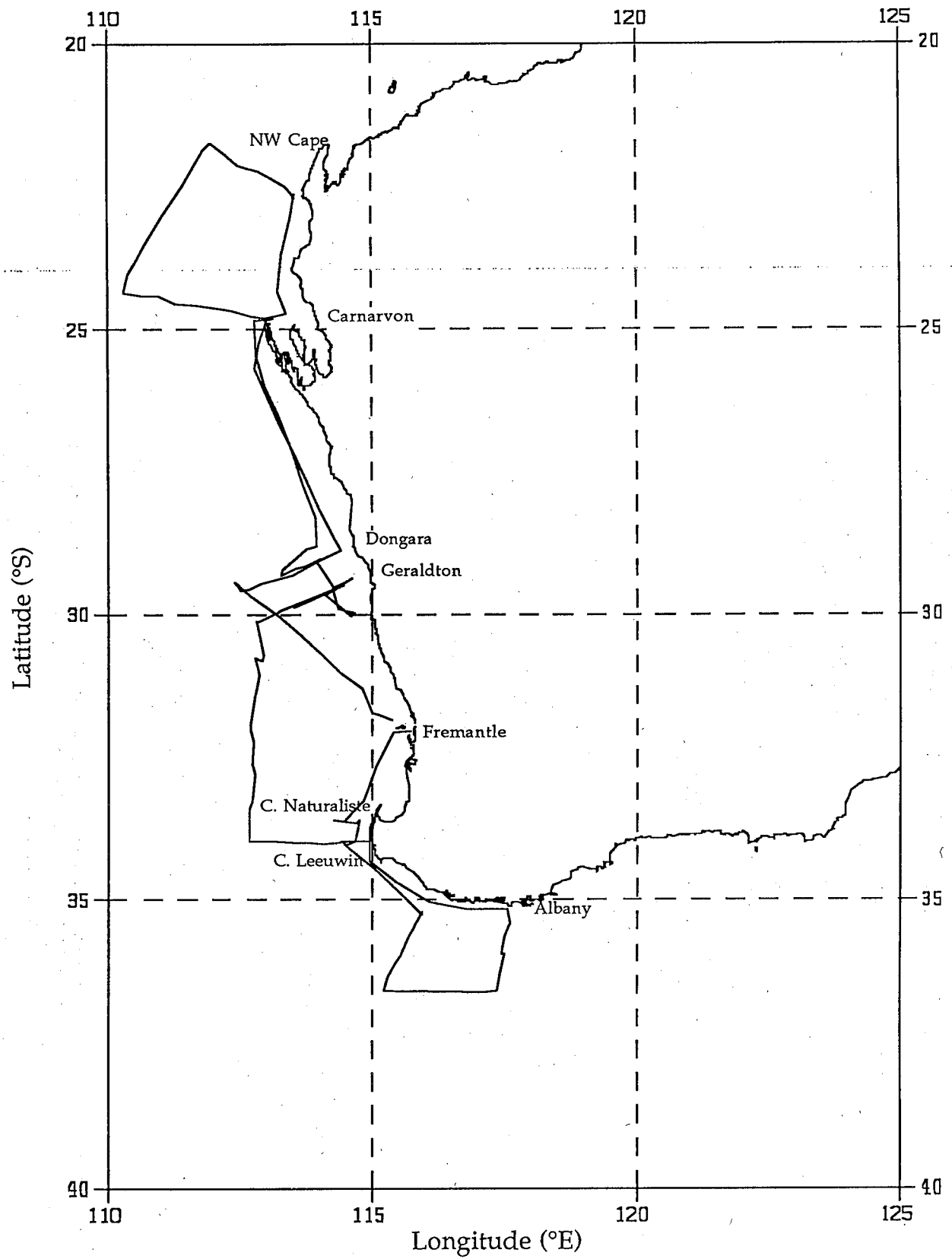


Figure 1. Cruise track, FR 7/87