

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD  
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK NR33 OHT

1989 RESEARCH VESSEL PROGRAMME

REPORT : RV CORYSTES : CRUISE 8

STAFF : P Gurbutt (SIC)  
N Pearson  
J Rees  
D Allington )  
D Denoon ) 14-19 July  
A Young )  
R Chapman  
M Green (University of Cambridge)  
M Mason (University of Cambridge, 19-21 July)  
J Atherton (University of Cambridge, 19-27 July)  
S Rehman (University of East Anglia, 19-21 July)  
P Thorne (Proudman Oceanographic Laboratory, 21-27 July)

DURATION: 14-27 July 1989  
Sailed : 1730 GMT Friday 14 July  
Docked : 0430 GMT Thursday 27 July

LOCALITY: North East Coast

AIMS:

1. To undertake a sidescan sonar survey of the working area.
2. To work one 24 hour thorium anchor station.
3. To work a line of thorium stations normal to the front.
4. To work 3 anchor stations to test the new tetrapod. This will include a comparison of the MOBS, the ABM and the transmissometers, a test on the settings on the MOBS and an examination of the influence of the tetrapod frame on the measured currents.
5. To work a line of CTD stations along the line of current meter moorings laid by CIROLANA 6/89 at intervals during the cruise.
6. To recover moorings laid by CIROLANA 6/89.

NARRATIVE

RV CORYSTES sailed from Lowestoft on the evening tide of Friday, 14 July and proceeded to the working area in Marsden Bay, near the mouth of the River Tyne. On arrival, a side-scan sonar survey of the region from Souter Point to the Tyne was undertaken. Early the following morning the new tetrapod was launched for a 24 hour thorium anchor station. CTD stations were worked every hour to collect water for the measurement of suspended load. On alternate hours, 100 l of water was collected from both surface and bottom for thorium analysis. As there was no Craib corer, Reinecke core samples were taken instead at the beginning, in the middle and at the end of the 24 hours. The tetrapod was successfully recovered and a preliminary examination of the data made.

As the cores taken during the anchor station were sandier than expected, a short Day grab survey of the Bay was made which revealed a variation of seabed type from mud, through sandy mud, muddy sand to colliery waste and rock.

A CTD line was run normal to the coast across what was expected to be a front. However, the prolonged calm weather had allowed thermal stratification to develop

close to the coast. On the basis of this section, locations were selected for the line of six thorium stations (water and sediment samples), which were completed the following day.

After a change of scientists on the morning of Wednesday, 19 July, the tetrapod was launched for a second time at the same location as earlier. This time the deployment differed in that instead of logging 5 e/m current meters at 1 Hz, 2 were mounted at right-angles about 90cm above the seabed and sampled at 5 Hz. Two Quisset stations were also worked together with hourly CTD dips for suspended load and particle size measurements. The tetrapod was recovered the following morning and the data examined. During the remainder of the day, about one tonne of mud was collected for the Weymouth laboratory using the Day grab.

On Friday, 21 July, after a second change of scientists, the tetrapod was redeployed for a third time, at a site which was found to be muddier than the previous one. This time two e/m current meters were arranged horizontally at about 50cm and 120cm above the seabed and sampled at 5Hz. During this deployment the wind speed rose to 20 knots for a brief period and fell back to the normal 5 knots or less. 5 Quisset stations were worked together with hourly CTD dips for suspended load and particle size measurements.

After recovery of the tetrapod, a line of CTD stations were worked normal to the coast to examine the structure of the front again.

On Sunday, 23 July, there were two deployments of the tetrapod. During the first the surface rope remained attached to the ship. The e/m current meters were shielded to test their zero stability and just before recovery the back-up recovery system was tested. The second deployment had 5 current meters sampling at 1 Hz and was accompanied by hourly CTD stations for suspended load and particle size measurements.

Thick fog delayed the recovery of the tetrapod on Monday, 24 July, and when it was retrieved it was found to be damaged and no longer useable during the remainder of the cruise. A repeat of the line of CTD stations normal to the coast was undertaken.

To complement the work on the Flamborough Front undertaken in 1988, a grid of CTD stations was worked between the Tees and Flamborough Head.

As CIROLANA 6/89 had recovered the current meter moorings it had deployed, RV CORYSTES then returned to Lowestoft and docked on the morning tide on Thursday, 27 July.

## RESULTS

1. The side-scan sonar survey revealed a relatively flat seabed with no major features.
2. The thorium anchor station was completed successfully and the samples returned to Lowestoft with the scientific staff leaving on 19 July.
3. The prolonged calm conditions had led to the disappearance of the front running parallel to the coast in this area, so unfortunately, it was not possible to locate the thorium stations on both sides of a front to examine the effects of frontal stratification on the resuspension of particles.
4. The tetrapod and all its instruments worked well and all tapes were translated on board. Results from the MOBS showed similar characteristics to those

from the e/m current meters (Figure 1 shows current spectra with a peak at about 10 seconds as does the MOBS). The triple frequency back-scatter probe results showed perhaps that there is a lagged relationship between the tidal speed and the amount in suspension at 46 and 86cm above the seabed (Figure 2). However, the conditions were so calm most of the cruise that very little wave action was observed.

5. Even though the Day grab samples indicated that the bottom was either sandy mud or muddy sand, the camera on the leg of the tetrapod showed linear ripples.

6. CTD stations normal to the coast in Marsden Bay showed that the summer weather had produced stratified water. The brief period of force 5 winds broke down the inshore stratification, but this was quickly re-established over the next 24 hours of light winds.

7. The CTD stations off the North Yorkshire coast and off Flamborough Head showed the presence of the front, with a stronger thermal stratification than last year.

P A Gurbutt  
(Scientist-in-Charge)

SEEN IN DRAFT : R Taylor (Master)  
William May (Fishing Skipper)

INITIALLED : D J G

DISTRIBUTION:

Basic list+

P Gurbutt

N Pearson

J Rees

D Allington

D Denoon

A Young

R Chapman

M Green (University of Cambridge)

M Mason ( " " " )

J Atherton ( " " " )

S Rehman (University of East Anglia)

P Thorne (Proudman Oceanographic Laboratory)

SA452051

$S_{aa}(f)$  [units\*\*2/(1/T)]

pressure

$10^{-7}$   
 $10^{-6}$   
 $10^{-5}$   
 $10^{-4}$   
 $10^{-3}$   
 $10^{-2}$   
 $10^{-1}$   
 $10^0$

VELOCITY-COMPONENT  
SPECTRA HAVE  
NOT BEEN  
GAIN-CORRECTED

TAPE 45

W

$\sim 10s$

IGNORE P  
SPECTRUM  
BEYOND 0.5 Hz

velocity component

$10^{-2}$   
 $10^{-1}$   
 $10^0$   
 $10^1$   
 $10^2$   
 $10^3$

$10^{-3}$  2 3 4 5 6 7 8 9  $10^{-2}$  2 3 4 5 6 7 8 9  $10^{-1}$  2 3 4 5 6 7 8 9  $10^0$  2 3 4 5 6 7 8 9  $10^1$

Hz

SA452054  
SA452053  
SA452052  
SA452051

Figure 1a

ABP Normalised mean square signal  $\{V/W_0\}^2$

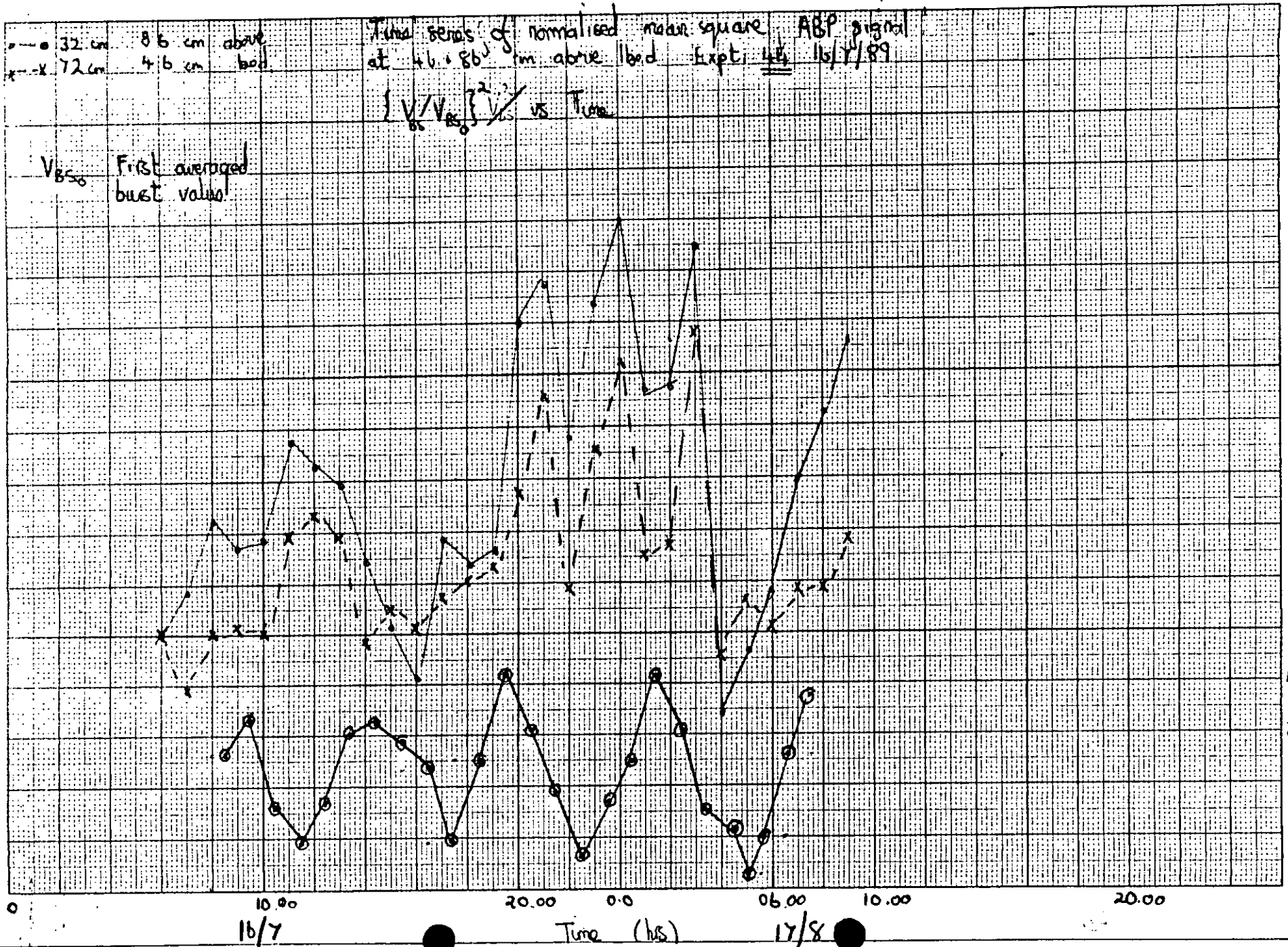


Figure 2

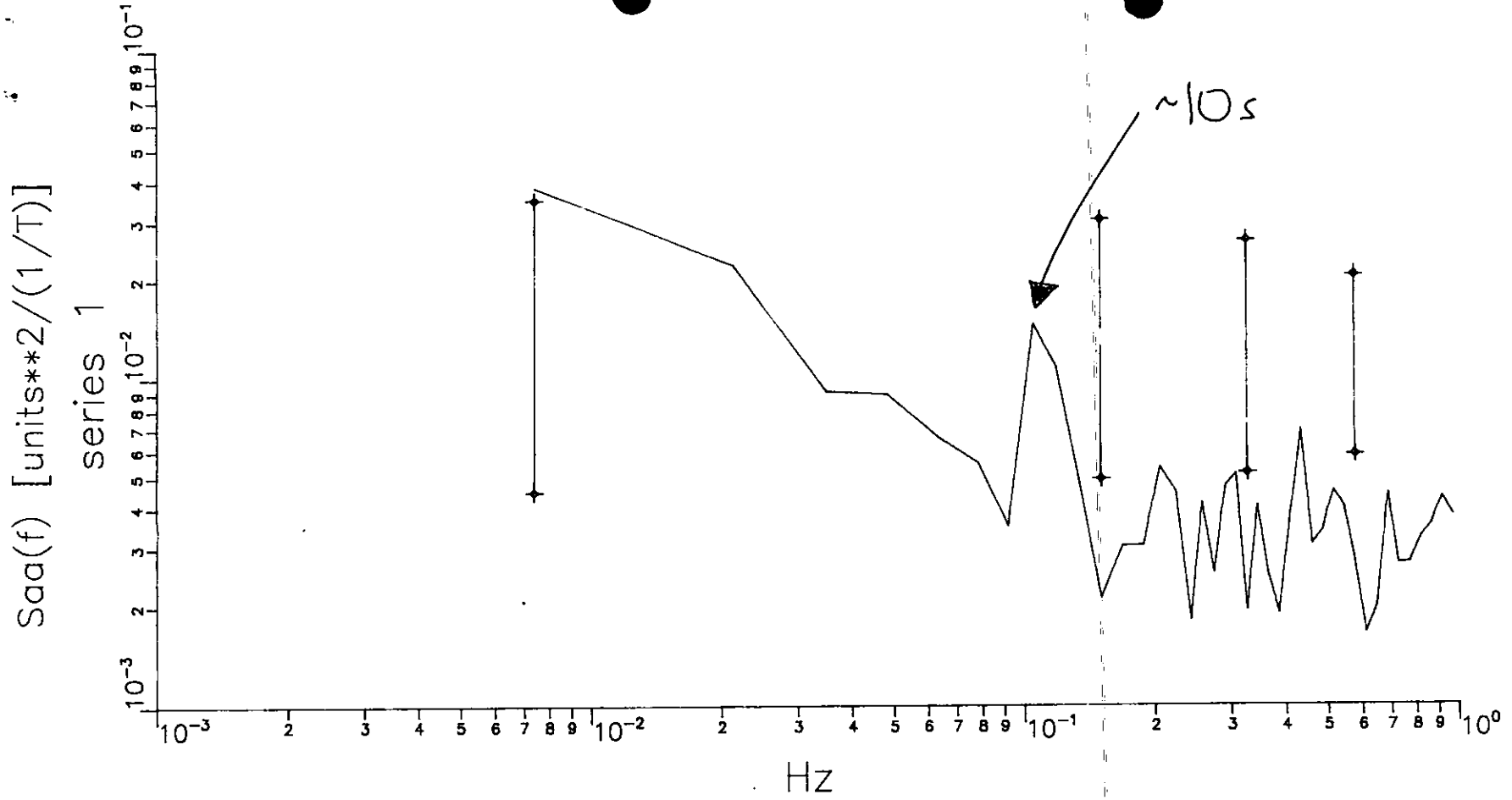


Figure 1b

TAPE 45: MOBS

# CRUISE TRACK

