MINISTRY OF AGRICULTURE FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT SUFFOLK NR33 0HT

1991 RESEARCH VESSEL PROGRAMME

REPORT : CIROLANA 1/91

STAFF

P A Gurbutt (SIC)		
J A Durance		
A Reeve		
N D Pearson		(4-18 Jan)
J M Rees		(4-18 Jan)
J N Aldridge		(4-8 Jan)
M O Green	(U Cambridge)	(4-7 Jan)
Z Luo	(U Cambridge)	(4-8 Jan)
A Downing	(UEA)	(4-7 Jan)
D S Kirkwood		(7-23 Jan)
J Brown		(8-21 Jan)
S R Jones		(8-23 Jan)
A Kenny		(8-13 Jan)
S Malcolm		(18-21 Jan)
D C Denoon		(18-21 Jan)

DURATION

Sailed 1100 4 January 1991
Docked 1400 23 January 1991

LOCATION

North Sea - Tyne, Tees, Humber and Wash

AIMS

1. To recover the tetrapod and current meter moorings deployed during Cirolana 10/90 in Marsden Bay.
2. To complete a 48 hour anchor station in Alnmouth Bay with the tetrapod deployed.
3. To complete nutrient transects between the Tyne, Tees, Dogger Bank, Humber and Wash for the North Sea Task Force Monitoring Master Plan.
4. To complete 15 anchor dredge stations to survey the benthos in one marine aggregate extraction site and one prospective site.
5. To complete anchor stations in the Wash and Humber while small boats are collecting water and sediment samples for the JONUS programme.
6. To deploy the tetrapod at two anchor stations in the Wash to provide further data for the sediment transport model being developed by the University of Bradford.
7. To complete off shore sampling for nutrients and sediments for the JONUS programme.

NARRATIVE

RV Cirolana sailed from Lowestoft at 1100 on Friday, 4 January and proceeded to Marsden Bay for first light the following morning. Mooring K (off shore from Marsden Bay) was successfully recovered. An attempt was then made to recover the tetrapod but the recovery line parted. When the back-up recovery line was released the acoustic signal received indicated that the tetrapod was on its side. A second attempt was made to pick up the tetrapod via the backup recovery line but this was lost before it was securely attached to the winch. Also, there were four unsucessful attempts to drag for the missing current meter mooring (J).

During a period when winds were constantly 35 knots or more the ship anchored close inshore. Some CTD stations were completed for calibration purposes.

On Monday, 7 January, a line of CTD stations was worked from the mouths of the Tyne and the Tees to North Sea Task Force (NSTF) stations 14 and 15 respectively and on to JONUS station OS8.

On Tuesday, 8 January, the MAFF diving team, with Dr C Frid from Dove Marine Laboratory, University of Newcastle, located the tetrapod and attached a buff to the recovery line. The rope parted as the ship tried heaving on the line. Further attempts to relocate the tetrapod failed. The divers indicated that the tetrapod was partially buried, and that two current meters were damaged. During this period, the missing current meter mooring (J) was located 1.2 nautical miles out of position and recovered.

Storm force winds prevented RV Cirolana reaching a CTD station on the Dogger Bank (NSTF station 43) so she returned to the Tyne. As the weather was still unsuitable for divers to locate the tetrapod, RV Cirolana steamed south to collect water for nutrients at JONUS station OS7 (off Flamborough) and then on to do 3 anchor dredges off the Lincolnshire coast and 12 off the north Norfolk coast.

NSTF station 17 and lines of CTD stations for nutrients (W1-4 and WOS1-4) were worked in the Wash before RV Cirolana anchored at position A6 (mouth of the Wash) for a 13-hour anchor station.A number of off shore JONUS stations (OS1,OS2,OS6,HOS1-8) and the NSTF station 16 were then completed before commencing a 13-hour anchor station at the mouth of the Humber (A5)

On Sunday, 13 January RV Cirolana was off Marsden Bay with a diving team on the 'Dart'. The tetrapod was finally located and marked just before dusk. It was confirmed that the tetrapod was lying on its side with two legs buried in the seabed. On Monday, 14 January, the divers dug out the tetrapod and attached a steel wire to the lifting eye. The tetrapod was then successfully recovered along with the three guard buoys.

On Tuesday, 15 January, RV Cirolana anchored in the Wash at the mouth of the Ouse (A2) and commenced a 13-hour anchor station. During this time the ship's searider was launched and a number of STD stations and surface water stations were worked up towards Kings Lynn.

On Wednesday, 16 January, RV Cirolana anchored off the Nene (A1) and completed a 13-hour anchor station while the Seeker completed sediment and water samples along the Nene.

On Thursday, 17 January, an anchor station was commenced at the mouth of the Ouse (A2) in anticipation of the Seeker doing further sampling in the area. This was abandoned as the conditions were too rough for the Seeker and CTD transects were worked across the Wash at different states of the tide before RV Cirolana moved the anchor in the Boston Deep (A3). A 13-hour anchor station was worked the following day while Seeker collected water and sediment samples from along the Witham and Welland. Scientific staff were changed via the Seeker.

On 19 January, Reineck and Calvert cores were collected from the centre of the Wash (WSP1) before the off shore Humber CTD stations (HOS1-HOS8) were worked. After collecting a 50 l sample of off shore water, RV Cirolana anchored at the Bull Anchorage on the Humber. Reineck and Calvert cores were collected with mixed success, as the bottom was a mixture of sand, mud and stones. A 13-hour anchor station was completed (A5).

On 21 January, RV Cirolana moved to the North Killingholme site (A4) where Reineck and Calvert cores were collected and a 13-hour anchor station completed. On the following day a second 13-hour anchor station was worked while water samples were collected along the estuary using the Wyke. These samples were returned to RV Cirolana for analysis before she sailed for Lowestoft, collecting surface water samples en route at OS5 and OS4.

RESULTS

1. One of the two current meters recovered had a full record but there were some bad data on the one which had been towed.

2. A preliminary examination of the full data set from the tetrapod revealed that it had fallen over between 0630 and 0730 on 8 December 1990. This coincides to a period of storm force northerly winds. Figure 1 shows the pressure record and Figure 2 one component of the velocity at 128 cm above the sea bed for the 10 minute period starting at 0330 on 8 December. It is clear there are pressure variations of up to 5 dbar and velocity fluctuations nearly 300 cm s^{-1} occuring over periods of about 10 seconds.

Figure 3 shows the mean pressure for each burst plotted against the time in hours. A clear spring/neap cycle is visible. The dislocation near the right hand side of this plot shows the time when the tetrapod fell over. Figure 4 presents the estimates of the wave height for the same 600 hours as Figure 3. All previous deployments of the tetrapod had measured values similar to those for the first 500 hours. The tetrapod was toppled when the wave height exceeded 5m and orbital velocities 1m above the seabed exceeded 100 cm s^{-1}. The period of the waves for this 600 hour period (Figure 5) was generally about 11 seconds.

An examination of the acoustic backscatter data shows high concentrations away from the seabed particularly during the storm when the tetrapod fell over.

3.All except one NSTF and one off shore JONUS station were visited. Most nutrient determinations and suspended load filtrations were completed and the results stored on computer before the end of the cruise.

4. Of the 13 anchor dredge samples which were collected, 12 were taken from an area licenced for the prospecting of marine aggregates. These 12 stations, show certain similarities in their physical and biological properties. Each sample has a high content of broken shell and fragments of echinoderm tests. These in turn, provide a substrate for the development of a rich assemblage of organisms. The sponges and ascidians are common, particularly the solitary ascidian Dendrodoa spp. Other organisms, such as the horse mussel, modiolus modiolus, and the chiton Tonicella spp. suggest a stable community type.

P A Gurbutt
(Scientist-in-charge)

23 January 1991

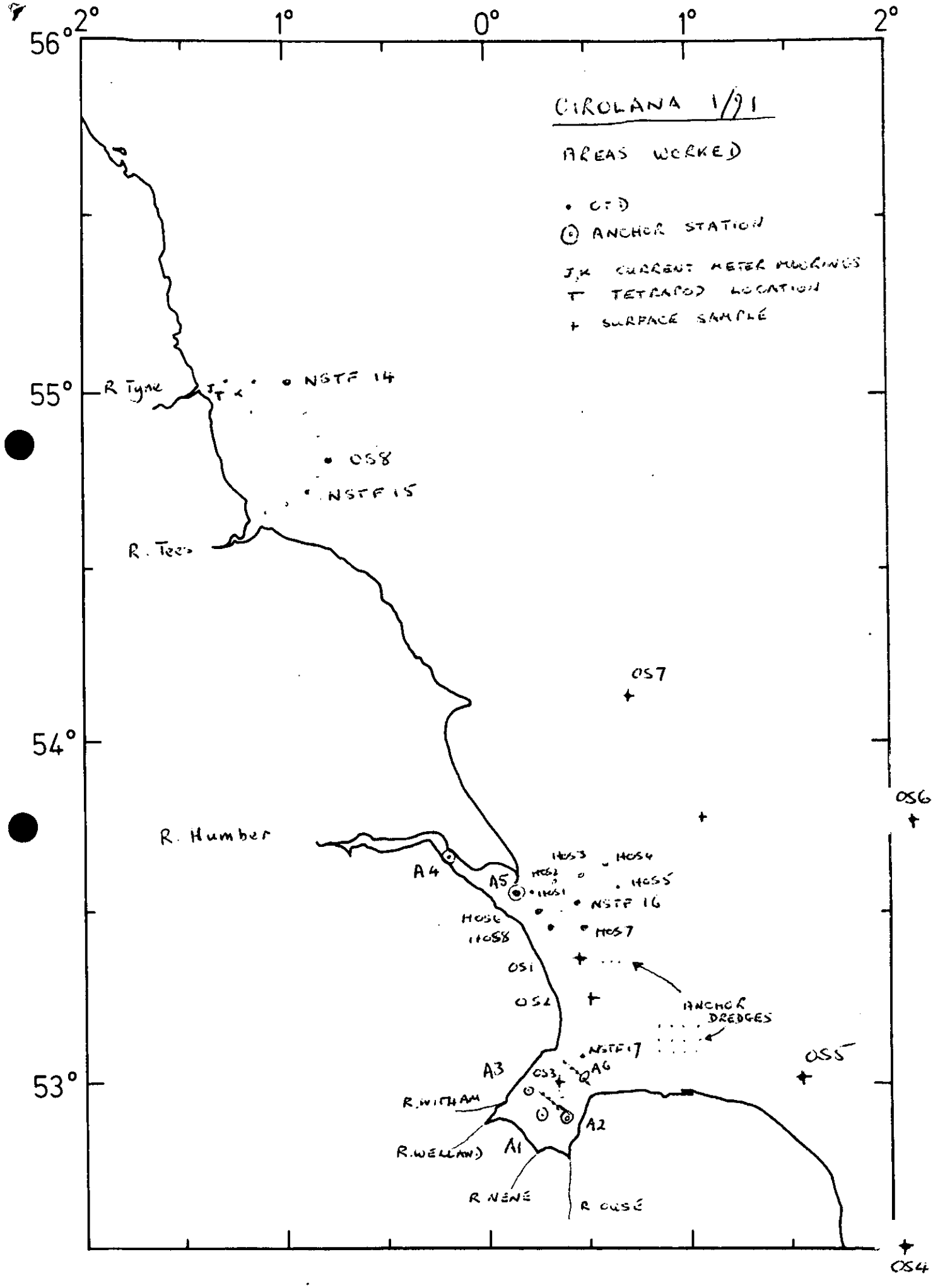
Seen in draft BC (Master)

PM (Fishing Skipper)

Initialled CEP 28 January 1991

DISTRIBUTION

Basic List +
P A Gurbutt (SIC)
J A Durance
A Reeve
N D Pearson
J M Rees
J N Aldridge
M O Green (U Cambridge)
Z Luo (U Cambridge)
A Downing (UEA)
D S Kirkwood
J Brown
S R Jones
A Kenny
S Malcolm
D C Denoon


CIROLANA 1/91
AREAS WORKED
• CTD
⊙ ANCHOR STATION
J,K CURRENT METER MOORINGS
T TETRAPOD LOCATION
+ SURFACE SAMPLE
2°
1°
0°
1°
2°
56°
55°
54°
53°
R Tyne
R. Tees
R. Humber
R.WITHAM
R.WELLAND
R NENE
R OUSE
NSTF 14
OS8
NSTF 15
OS7
OS6
OS4
OS5
NSTF 16
NSTF 17
HOS1
HOS2
HOS3
HOS4
HOS5
HOS6
HOS7
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OS1
OS2
OS3
A1
A2
A3
A4
A5
A6
ANCHOR DREDGES

N70.545

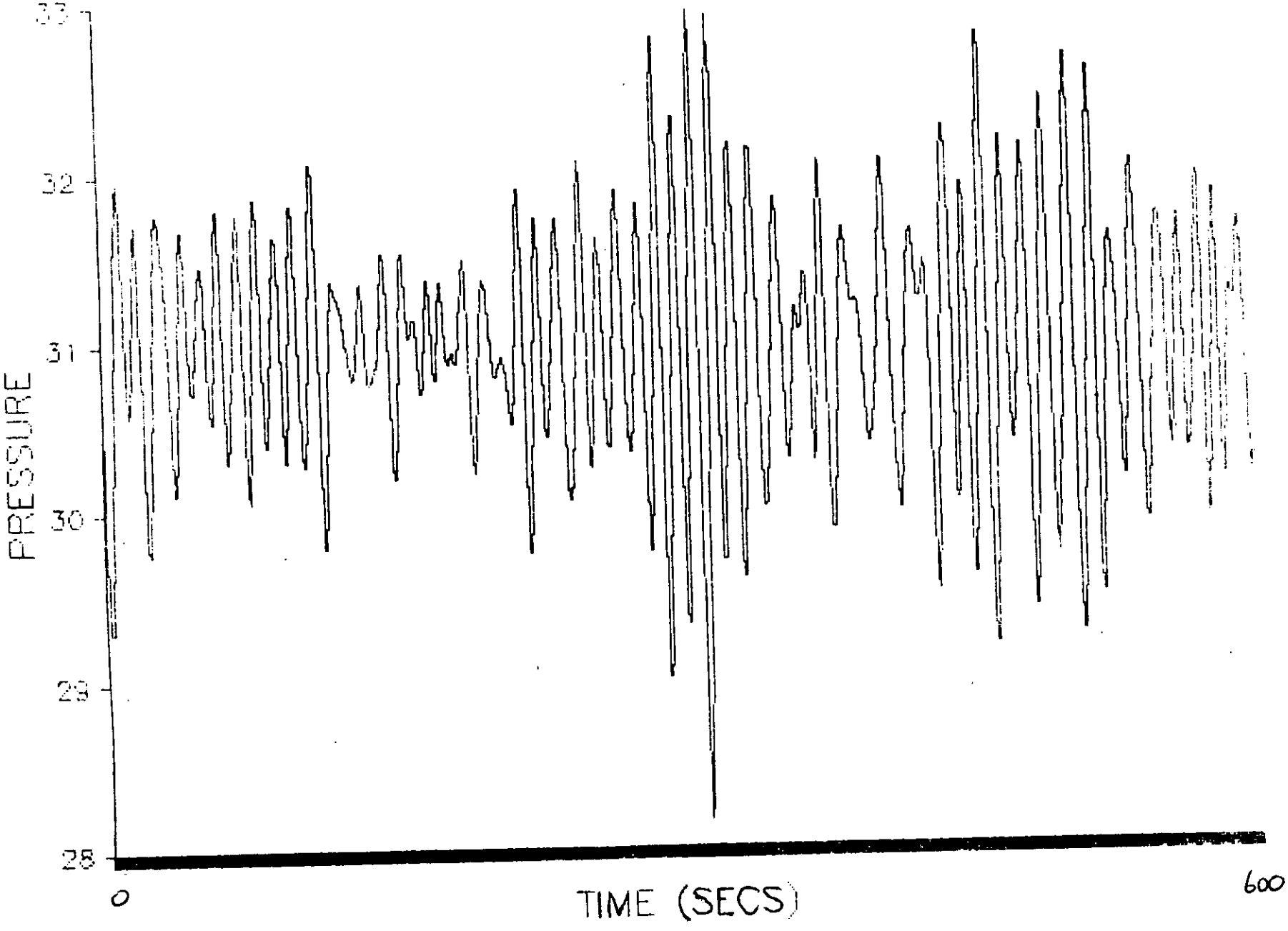

FIGURE 1

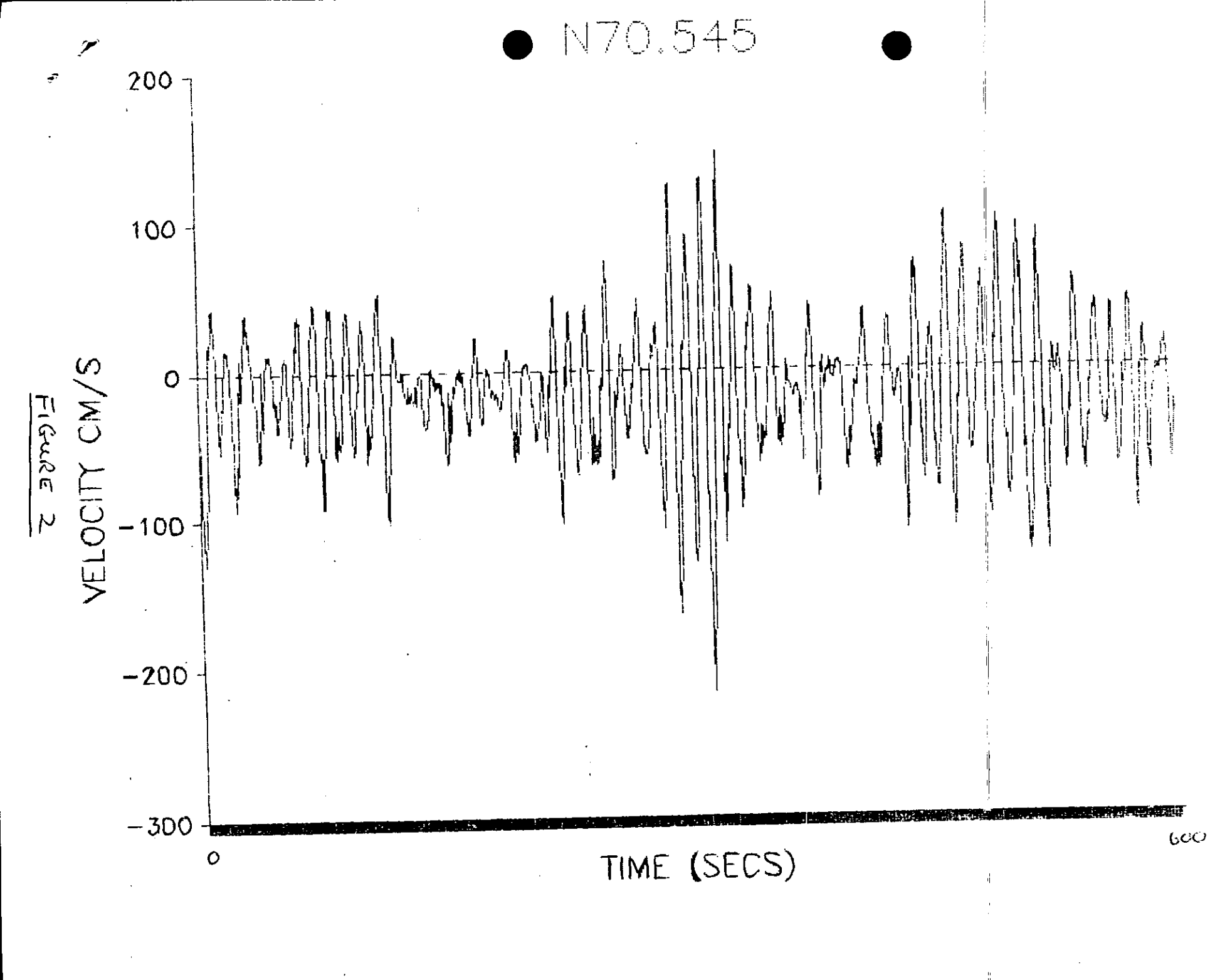

FIGURE 2

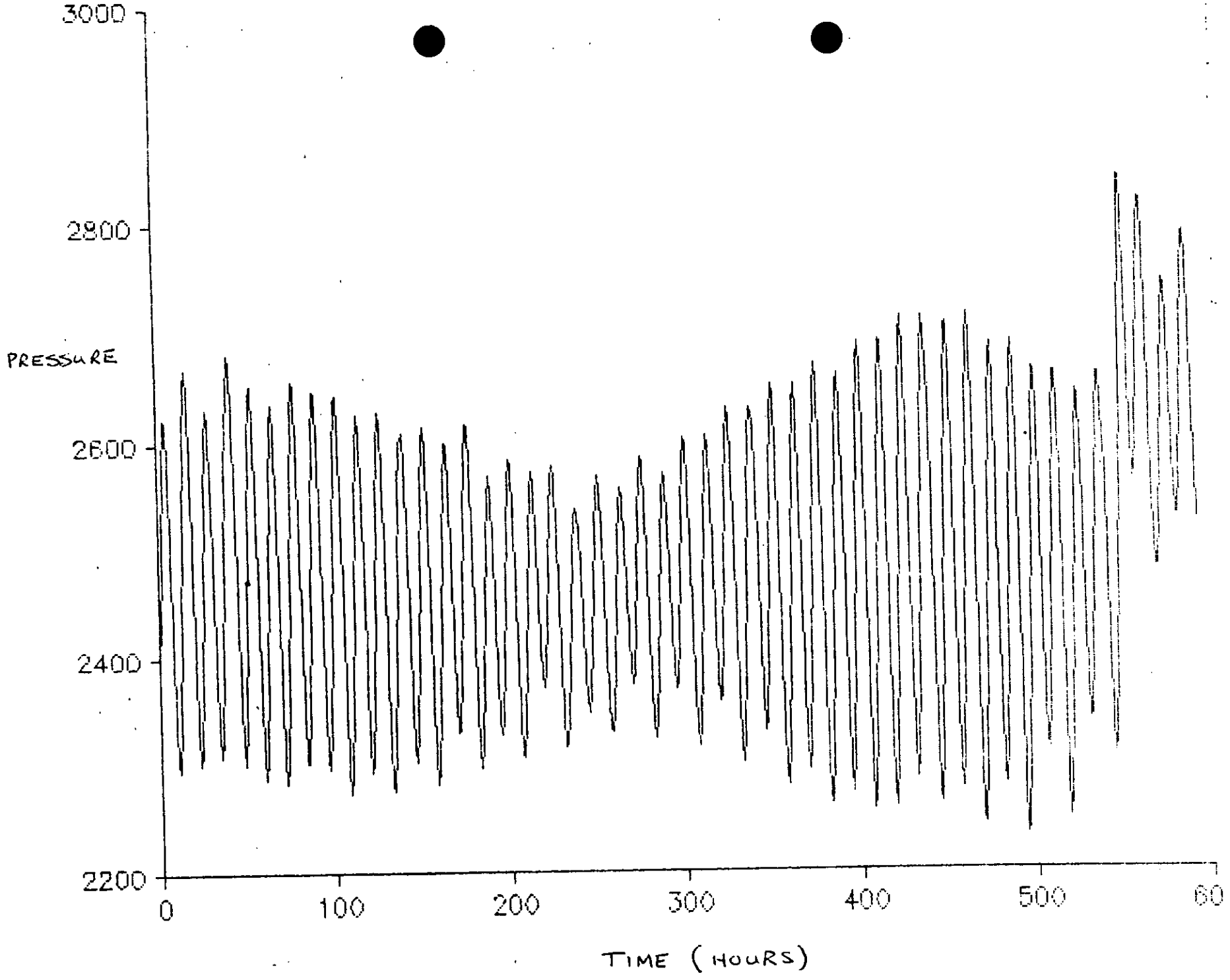
3000
2800
2600
2400
2200
PRESSURE
0
100
200
300
400
500
60
TIME (HOURS)

FIGURE 3

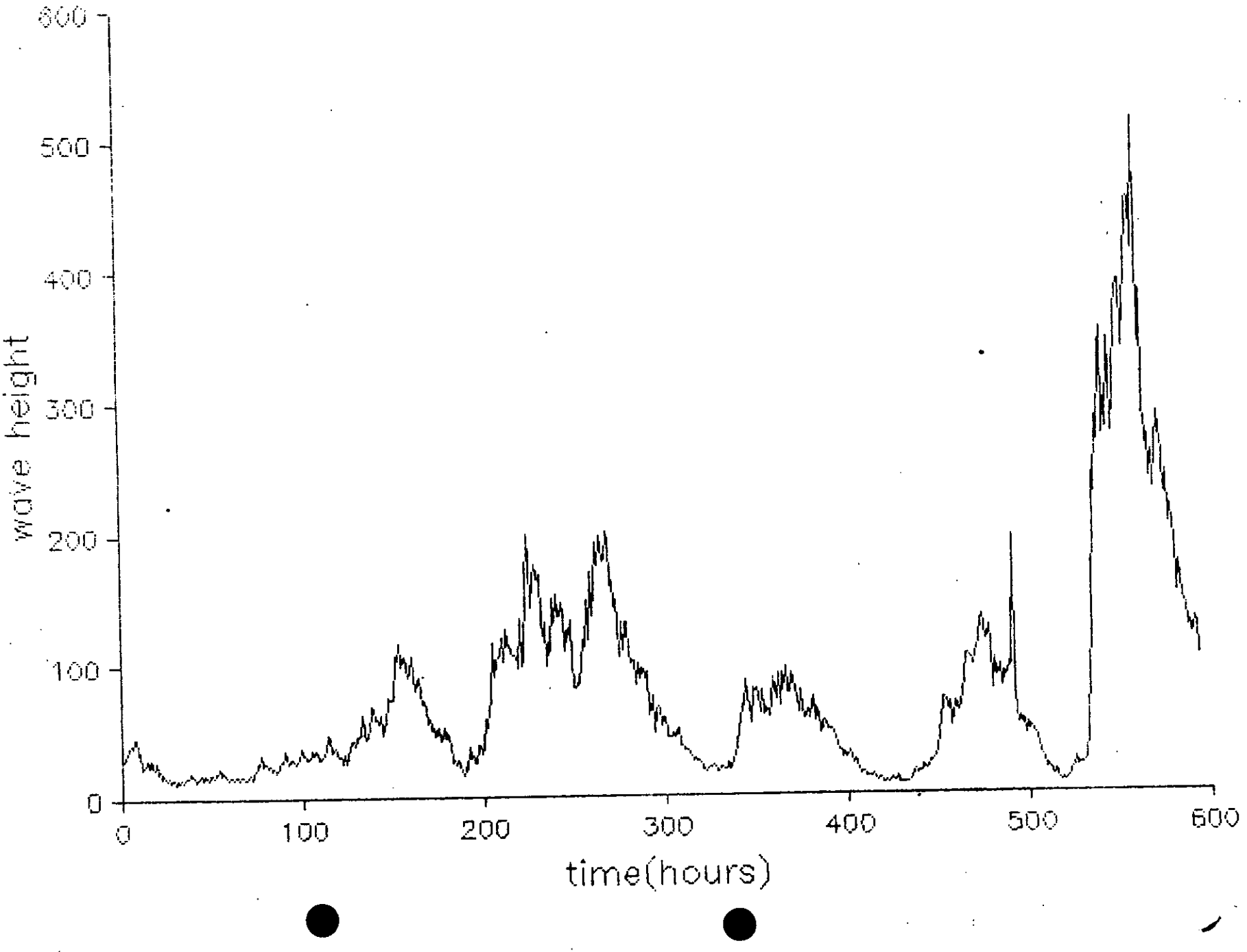

FIGURE 4