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GRAVITY AND MAGNETIC DATA AT THE MID-ATLANTIC RIDGE NEAR 45°N

HUDSON 65-06, HUDSON 66-19 AND HUDSON 68-22

DIGITIZED DATA

RELEASED THROUGH THE GSC OPEN FILE

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GEOLOGICAL SURVEY  
OTTAWA

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## 1. INTRODUCTION

The cruise was undertaken by the Marine Geophysics Group, Bedford Institute of Oceanography and the Institute of Oceanography, Dalhousie University.

The purpose of the cruise was to carry out a reconnaissance survey of the Western Approaches, to map out the seaward extension of the South-West England granites, and to carry out a detailed survey of a section of the Median Valley of the Mid-Atlantic Ridge.

## 2. SCIENTIST-IN-CHARGE

Dr. B. D. Loncarevic

## 3. INSTRUMENTATION

### 3.1 Magnetics

Total magnetic field was obtained by using a modified GSC-60 proton precession magnetometer.

The magnetometer fish was designed and built by the Bedford Institute of Oceanography.

Data were recorded in analogue form on a Leeds Northrup chart recorder and counted by a Hewlett-Packard pre-set counter Model 521 4L, the result then displayed in digital form on paper tape every six seconds.

### 3.2 Gravity

Gravity data were obtained with an Askania Gss2-17 gravity meter mounted on an Anschutz oil erected gyro stabilized platform.

Data were recorded in analogue form on a Honeywell K-17 recorder and the VCO (voltage-controlled oscillator) output was then counted and punched in digital form on paper tape every minute.

### 3.3 Bathymetry

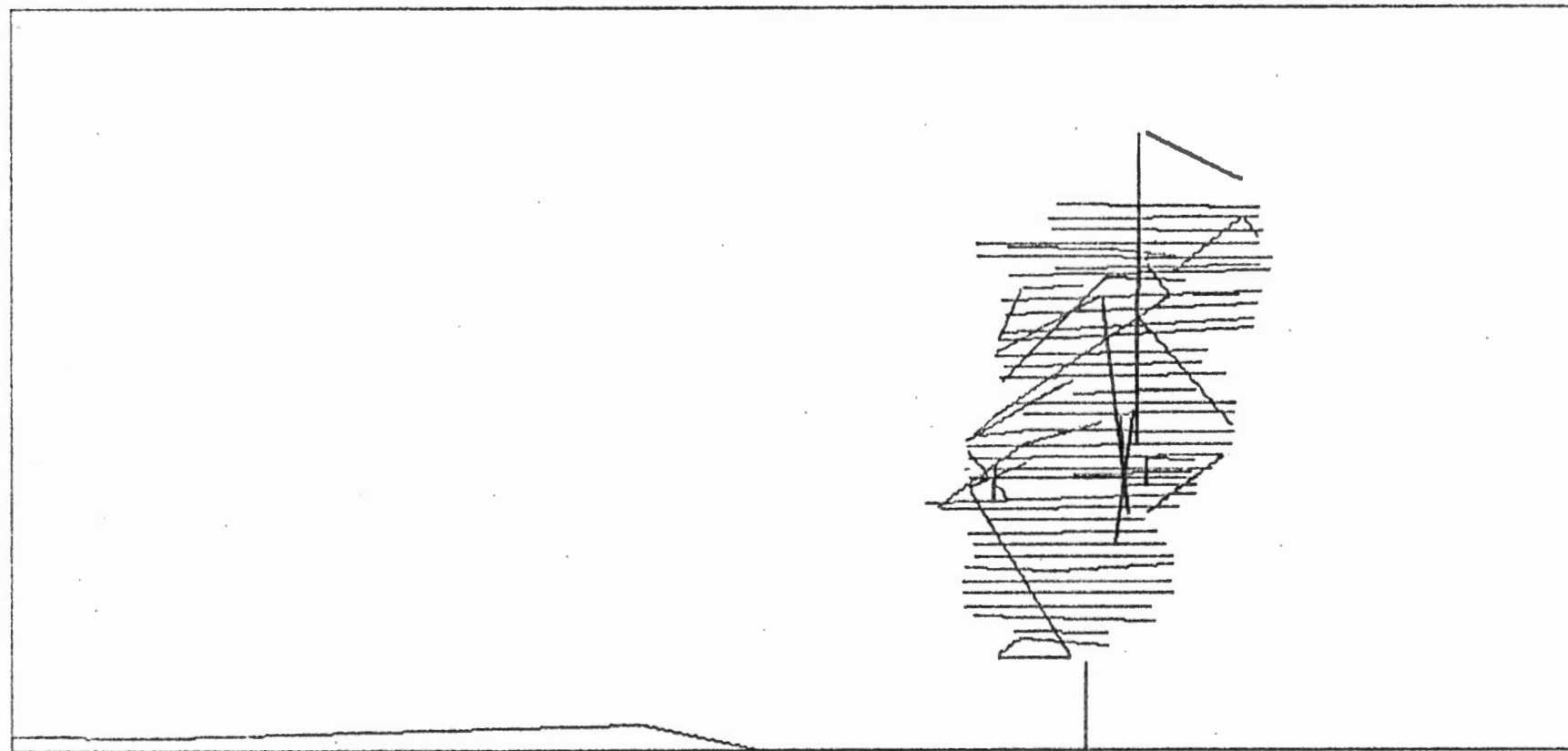
Bathymetry values were recorded by an ALDEN PGR-411 and ALPINE deep sounder, having a velocity of sound in sea water of 4800 ft/sec.

### 3.4 Navigation

Fixes were obtained throughout the cruise by Decca, Loran, VLF (very low frequency), celestial fixes plus ranges and bearings relative to moored buoys during surveys were used as navigational control.

CSS HUDSON 65-006

1/1500000 AT 00 N



30W

27W

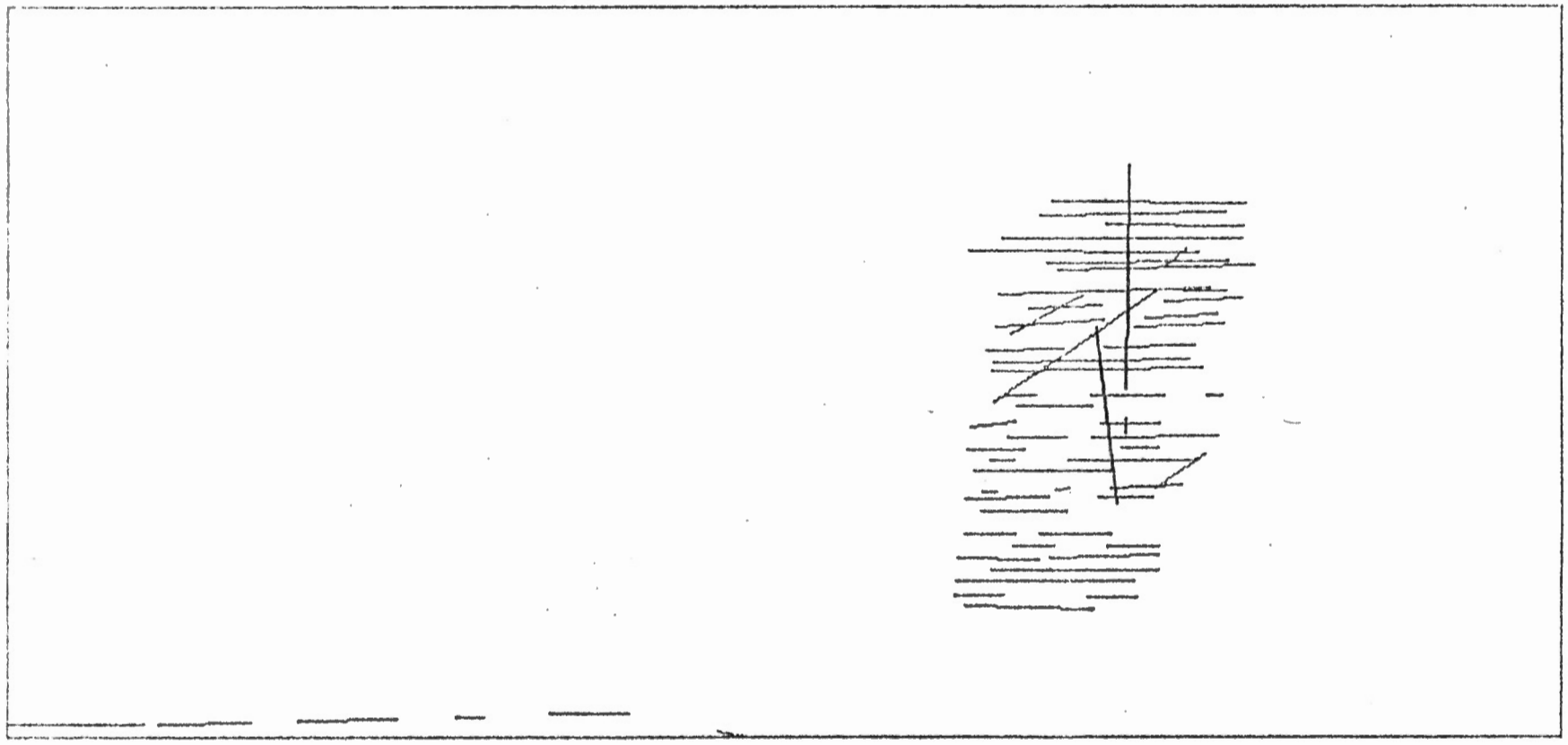
45N

46N

FIGURE 1 - TRACKS ALONG WHICH MAGNETIC DATA COLLECTED

CSS HUDSON 65-006  
171500000 AT 00 N

46N



45N

30W

27W

FIGURE 2 - TRACKS ALONG WHICH GRAVITY DATA COLLECTED

CRUISE: C.S.S. HUDSON 66-019

1. INTRODUCTION

THE CRUISE WAS UNDERTAKEN BY THE MARINE GEOPHYSICS GROUP AND METROLOGY SECTION OF THE BEDFORD INSTITUTE OF OCEANOGRAPHY.

THE PURPOSE OF THE CRUISE WAS TO CARRY OUT DETAILED GEOPHYSICAL INVESTIGATIONS OF A ONE DEGREE WIDE STRIP OF MID-ATLANTIC, BETWEEN 45° AND 46° N FROM 27°40 TO 29°30 W.

2. SCIENTIST-IN-CHARGE

B.D. LONCAREVIC

3. INSTRUMENTATION

3.1 MAGNETICS

THE MAGNETIC FIELD WAS OBTAINED BY USING A MODIFIED GSC-60 PROTON PRE-CESSION MAGNETOMETER.

THE MAGNETOMETER FISH WAS DESIGNED AND BUILT BY THE BEDFORD INSTITUTE.

DATA WERE RECORDED IN ANALOGUE FORM ON A LEEDS NORTHRUP CHART RECORDER AND COUNTED BY A HEWLETT PACKARD PRE-SET COUNTER MODEL 521 4L, THE RESULT THEN DISPLAYED IN DIGITAL FORM ON PAPER TAPE EVERY SIX SECONDS.

3.2 GRAVITY

GRAVITY DATA WERE OBTAINED WITH AN ASKANIA GSS 2-17 GRAVITYMETER MOUNTED ON AN ANSCHUTZ OIL ERECTED GYRO STABILIZED PLATFORM.

DATA WERE RECORDED IN ANALOGUE FORM ON A HONEYWELL K-17 RECORDER AND THE VCO OUTPUT WAS THEN COUNTED AND PUNCHED IN DIGITAL FORM ON PAPER TAPE EVERY MINUTE.

3.3 BATHYMETRY

BATHYMETRY VALUES WERE RECORDED BY AN ALDEN PGR-411 AND ALPINE DEEP SEA SOUNDER, HAVING A VELOCITY OF SOUND IN SEA WATER OF 4800 FT/SEC.

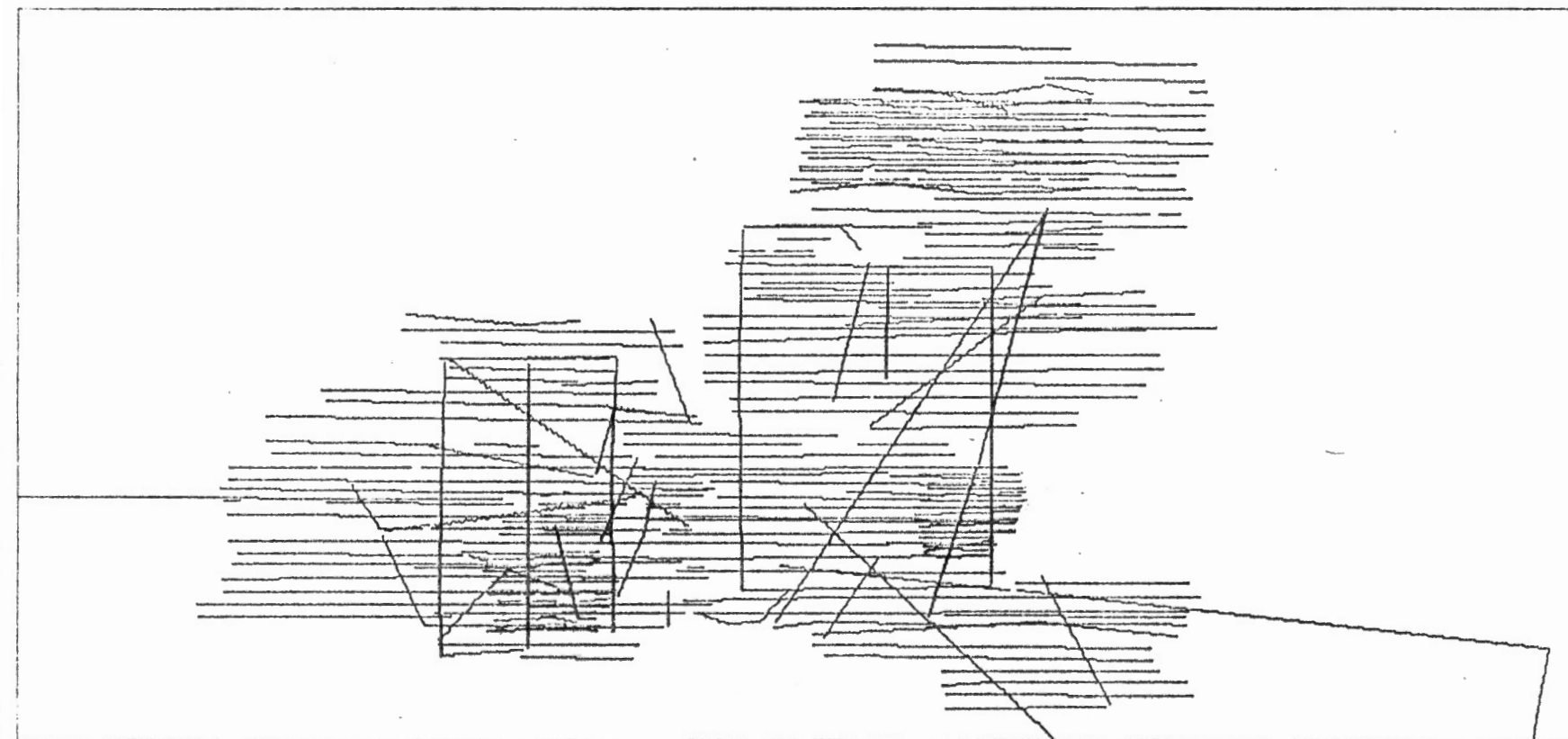
3.4 NAVIGATION

FIXES WERE OBTAINED THROUGHOUT THE CRUISE BY DECCA, LORAN, VLF (VERY LOW FREQUENCY), CELESTIAL FIXES PLUS RANGES AND BEARINGS RELATIVE TO MOORED BUOYS. SURVEYS WERE USED AS NAVIGATIONAL CONTROL.

CSS HUDSON 66-019

1/1500000 AT 00 N

46N



45N

30W

FIGURE 3 - TRACKS ALONG WHICH MAGNETIC DATA COLLECTED

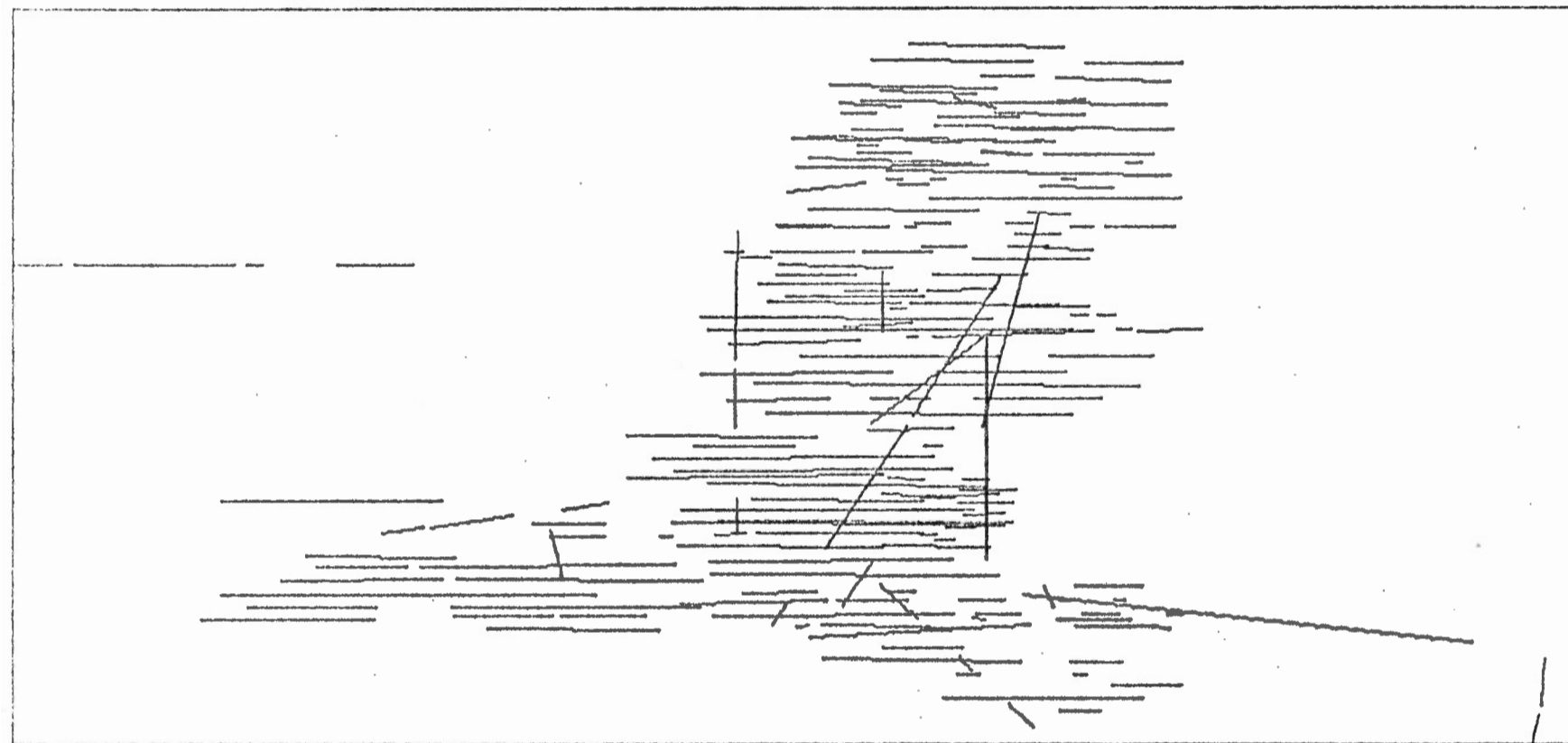
27W



CSS HUDSON 66-019

171500000 AT 00 N

46N



45N

30W

27W

FIGURE 4 - TRACKS ALONG WHICH GRAVITY DATA COLLECTED

CRUISE: C.S.S. HUDSON 68-022

## 1. INTRODUCTION

THE CRUISE WAS UNDERTAKEN BY MARINE GEOPHYSICS AND METROLOGY SECTIONS OF THE BEDFORD INSTITUTE OF OCEANOGRAPHY.

THE PURPOSE OF THE CRUISE WAS (1) TO TEST THE RELIABILITY OF THE DATA RECORDING AND PROCESSING EQUIPMENT BEFORE PROCEEDING TO THE MID-ATLANTIC RIDGE; (2) TO CARRY OUT A DETAILED GEOPHYSICAL INVESTIGATION OF A ONE DEGREE WIDE STRIP OF THE MID-ATLANTIC, BETWEEN  $45^{\circ}$  AND  $46^{\circ}$  N. THIS STUDY IS A CONTINUATION OF SURVEYS CARRIED OUT IN 1966 BY R.R.S. DISCOVERY II, IN 1965 AND 1966 BY C.S.S. HUDSON.

## 2. SCIENTIST-IN-CHARGE

B.D. LONCAREVIC

## 3. INSTRUMENTATION

### 3.1 MAGNETICS

TOTAL MAGNETIC FIELD WAS MEASURED BY A PROTON PRECESSION MAGNETOMETER. DATA WERE RECORDED IN ANALOGUE FORM ON A MOSELEY 680 STRIP CHART RECORDER AND IN DIGITAL FORM ON PAPER TAPE AT SIX SECOND INTERVALS.

### 3.2 GRAVITY

GRAVITY MEASUREMENTS WERE MADE WITH A GRAF-ASKANIA SHIPBORNE GRAVIMETER MOUNTED ON AN ANSCHUTZ GYRO STABILIZED PLATFORM. DATA VALUES WERE RECORDED IN ANALOGUE FORM ON A MOSELEY 680 STRIP CHART RECORDER AND IN DIGITAL FORM ON PAPER TAPE EVERY SECOND.

### 3.3 BATHYMETRY

SOUNDING VALUES WERE RECORDED BY A PESR ALPINE RECORDER.

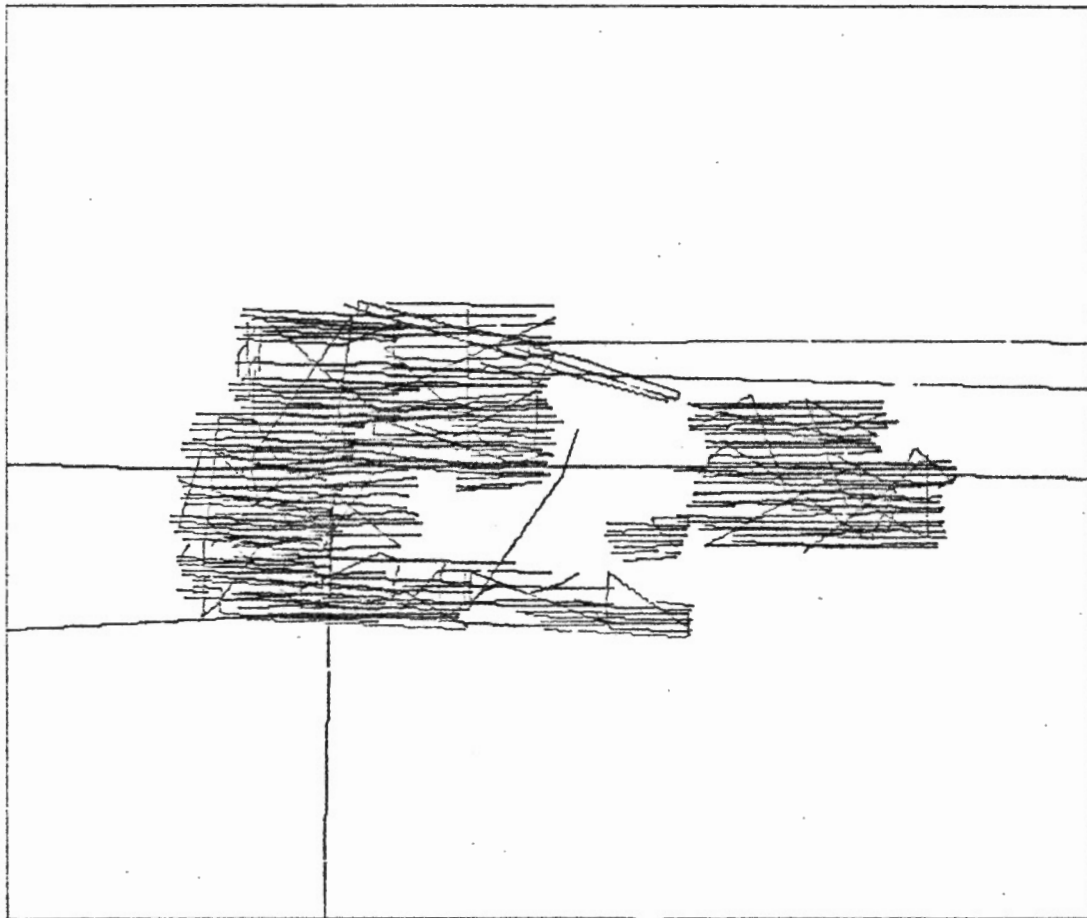
### 3.4 NAVIGATION

POSITIONING OF THE SHIP'S TRACKS WAS CONTROLLED BY DECCA, DR, RADAR RANGE AND BEARINGS WITH RESPECT TO CLAN BUOY AND SATELLITE NAVIGATION.

CSS HUDSON 68-022

1/4000000 AT 00 N

47N



44N

31W

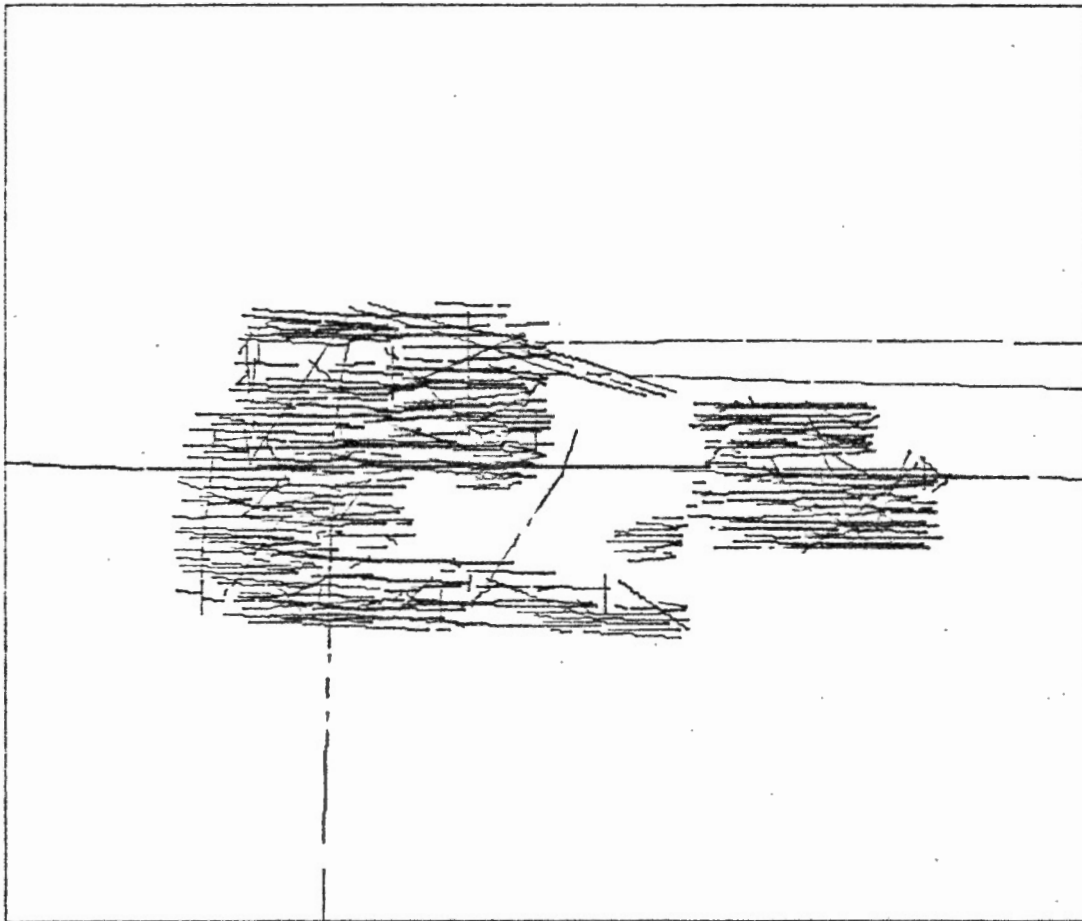
FIGURE 5 - TRACKS ALONG WHICH MAGNETIC DATA COLLECTED

25W

CSS HUDSON 68-022

1/4000000 AT DD N

47N



44N

31W

26W

FIGURE 6 - TRACKS ALONG WHICH GRAVITY DATA COLLECTED

DATA COVERAGE:

THE NUMBER OF 2-MINUTE INTERVAL STATIONS IN  $1^{\circ} \times 1^{\circ}$  GRID SPACE,  $1^{\circ} \times 1^{\circ}$  GRID MEAN FREE AIR AND  $1^{\circ} \times 1^{\circ}$  GRID MEAN MAGNETIC ANOMALY CENTRED AT THE GIVEN LATITUDE AND LONGITUDE ARE GIVEN IN THE FOLLOWING TABLES.

THE DIGITIZED DATA INCLUDE TIME, LATITUDE, LONGITUDE, BATHYMETRY, MAGNETIC ANOMALY, TOTAL MAGNETIC FIELD, FREE AIR GRAVITY AND SIMPLE BOUGUER ANOMALY.

MAGNETIC STATIONS

|    | 30   | 29   | 28   | 27   | 26  | 25  |
|----|------|------|------|------|-----|-----|
| 50 | 0    | 0    | 0    | 0    | 0   | 0   |
| 49 | 0    | 0    | 0    | 0    | 0   | 0   |
| 48 | 0    | 0    | 0    | 0    | 0   | 0   |
| 47 | 0    | 0    | 60   | 90   | 89  | 89  |
| 46 | 1736 | 4336 | 4789 | 1574 | 233 | 43  |
| 45 | 3430 | 6240 | 5383 | 2152 | 372 | 306 |
| 44 | 215  | 100  | 538  | 197  | 303 | 262 |
| 43 | 131  | 42   | 197  | 371  | 345 | 252 |
| 42 | 169  | 174  | 177  | 380  | 329 | 304 |
| 41 | 130  | 134  | 132  | 348  | 93  | 264 |
| 40 | 131  | 232  | 33   | 154  | 180 | 267 |
| 39 | 174  | 295  | 63   | 42   | 184 | 268 |
| 38 | 29   | 291  | 188  | 159  | 294 | 167 |
| 37 | 0    | 175  | 107  | 106  | 9   | 0   |
| 36 | 0    | 0    | 0    | 0    | 0   | 0   |
| 35 | 0    | 0    | 0    | 0    | 0   | 0   |
| 34 | 0    | 0    | 0    | 0    | 0   | 0   |
| 33 | 0    | 0    | 0    | 0    | 0   | 0   |
| 32 | 0    | 0    | 0    | 0    | 0   | 0   |
| 31 | 0    | 0    | 0    | 0    | 0   | 0   |

GRAVITY MEAN

|    | 30 | 29 | 28 | 27 | 26 | 25 |
|----|----|----|----|----|----|----|
| 50 | 0  | 0  | 0  | 0  | 0  | 0  |
| 49 | 0  | 0  | 0  | 0  | 0  | 0  |
| 48 | 0  | 0  | 0  | 0  | 0  | 0  |
| 47 | 0  | 0  | 57 | 56 | 43 | 39 |
| 46 | 35 | 35 | 44 | 53 | 36 | 48 |
| 45 | 39 | 37 | 53 | 47 | 32 | 35 |
| 44 | 42 | 59 | 54 | 42 | 0  | 36 |
| 43 | 58 | 52 | 40 | 26 | 0  | 31 |
| 42 | 7+ | +5 | 54 | 54 | 0  | 20 |
| 41 | 50 | 50 | 54 | 41 | 0  | 32 |
| 40 | 33 | +4 | 54 | 34 | 28 | 34 |
| 39 | 45 | +1 | 37 | 0  | 33 | 40 |
| 38 | 04 | 52 | 51 | 33 | 28 | 40 |
| 37 | 0  | +3 | 49 | 45 | 42 | 0  |
| 36 | 0  | 0  | 0  | 0  | 0  | 0  |
| 35 | 0  | 0  | 0  | 0  | 0  | 0  |
| 34 | 0  | 0  | 0  | 0  | 0  | 0  |
| 33 | 0  | 0  | 0  | 0  | 0  | 0  |
| 32 | 0  | 0  | 0  | 0  | 0  | 0  |
| 31 | 0  | 0  | 0  | 0  | 0  | 0  |

GRAVITY STATIONS

|    | 39   | 29   | 28   | 27   | 26  | 25  |
|----|------|------|------|------|-----|-----|
| 50 | 0    | 0    | 0    | 0    | 0   | 0   |
| 49 | J    | 0    | 0    | 0    | 0   | 0   |
| 48 | J    | J    | J    | J    | J   | J   |
| 47 | 0    | 0    | 40   | 63   | 69  | 69  |
| 46 | 1412 | 3326 | 3201 | 978  | 209 | 40  |
| 45 | 2096 | 3561 | 3142 | 1594 | 142 | 258 |
| 44 | 167  | 38   | 263  | 95   | 0   | 221 |
| 43 | 105  | 34   | 160  | 102  | 0   | 214 |
| 42 | 126  | 123  | 99   | 112  | J   | 227 |
| 41 | 109  | 94   | 112  | 110  | 0   | 231 |
| 40 | 122  | 175  | 23   | 65   | 29  | 234 |
| 39 | 119  | 231  | 57   | 0    | 127 | 227 |
| 38 | 29   | 165  | 111  | 130  | 179 | 62  |
| 37 | 0    | 145  | 65   | 102  | 9   | 0   |
| 36 | J    | 0    | 0    | 0    | 0   | 0   |
| 35 | 0    | 0    | J    | J    | 0   | J   |
| 34 | J    | 0    | 0    | 0    | 0   | 0   |
| 33 | J    | 0    | 0    | 0    | 0   | 0   |
| 32 | J    | 0    | 0    | 0    | 0   | 0   |
| 31 | J    | J    | J    | J    | J   | 0   |



MAGNETIC MEAN

|    | 30   | 29   | 28   | 27  | 26  | 25  |
|----|------|------|------|-----|-----|-----|
| 50 | 0    | 0    | 0    | 0   | 0   | 0   |
| 49 | 0    | 0    | 0    | 0   | 0   | 0   |
| 48 | 0    | 0    | 0    | 0   | 0   | 0   |
| 47 | 0    | 0    | -77  | 12  | 30  | 2   |
| 46 | 9    | 30   | 16   | -7  | 4   | 29  |
| 45 | 14   | 5    | 5    | -27 | 25  | 12  |
| 44 | -13  | -20  | 63   | 71  | 4   | -13 |
| 43 | -113 | -298 | 36   | 1   | 8   | 0   |
| 42 | -131 | -63  | -62  | 11  | 0   | 29  |
| 41 | -193 | 1    | -67  | -45 | -8  | 11  |
| 40 | 264  | -61  | -146 | 76  | -40 | -14 |
| 39 | -64  | -55  | -54  | 147 | -27 | -34 |
| 38 | -267 | -13  | 43   | 105 | 15  | -39 |
| 37 | 0    | -12  | 45   | -41 | 30  | 0   |
| 36 | 0    | 0    | 0    | 0   | 0   | 0   |
| 35 | 0    | 0    | 0    | 0   | 0   | 0   |
| 34 | 0    | 0    | 0    | 0   | 0   | 0   |
| 33 | 0    | 0    | 0    | 0   | 0   | 0   |
| 32 | 0    | 0    | 0    | 0   | 0   | 0   |
| 31 | 0    | 0    | 0    | 0   | 0   | 0   |