MEMORANDUM

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To: MIAS

Our Ref.

Date: 24 November 1988

Your Ref.

DISCOVERY CRUISE 134

There is no published Cruise Report.

These notes, lists, track charts etc are a copy of the embryonic Cruise Report which Tim Francis intended to write but it never came to realisation, so could presumably be called an abortion. Dr Roger Searle collected together this material and anyone wanting further information should refer to him or other cruise participant. The documents are at present stored in the Marine Geophysics Department.

This copy of Dr Searle's compilation is for MIAS' reference only and is not for Library use.

DISCOVERY 134

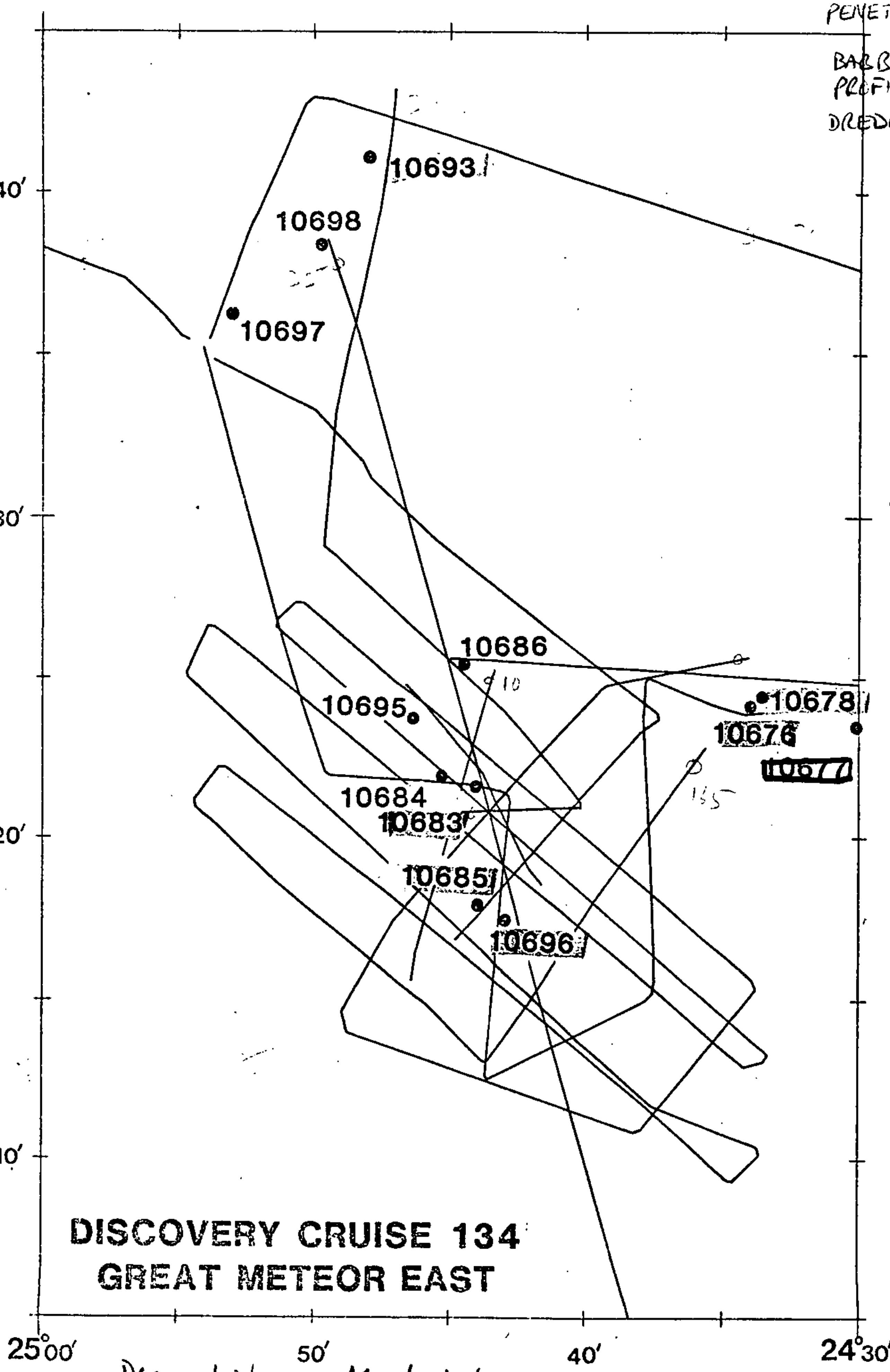
CORE

WASP

PENETRATOR

BARB PROFILER

DREDGE



Dep. Lisbon March 1st

Arr. Funchal March 26th.

Sheet 1

DISCOVERY 134

Geophysical Log Sheet

* Mean position for station and corresponding depth.

† Position of ship and depth at time instrument reached bottom.

Station No. ....

Station	Type	Start Time	End Time	Position Latitude		Position Longitude		Water Depth corr. metres	Comments
10653	Driscoll Core	2239/063	0230/064	41°	52' N	23°	51' W*	3737	Unsuccessful. Corer pre-triggered with 3290m wire out due to excessive heave of ship.
10654	High Res. Deep Profiler	0246/064	0520/064	41°	52' N	23°	52' W	3741	Unsuccessful. Lowered to 100m of bottom but found to be excessively noisy. On recovery bottom 200m of conducting cable found tangled.
10655	Survey Camera	0928/064	1138/064	41°	52' N	23°	51' W	–	Unsuccessful. Near Bottom Echo Sounder very noisy, locking on minimum range most of time. Camera lowered to only 747m, then recovered.
10656	Survey Camera	1354/064	2159/064	41°	52.7 N	23°	49.5 W*	3746	Successful in spite of NBES still responding to noise. Photographing bottom from 1636 – 2032.
10657	High Res. Deep Profiler	2255/064	0354/065	41°	52.8 N	23°	51.4 W*	3743	Successful. Traversed 2km in approx 3 hr. near bottom.
10658	Driscoll Core		0910/065	41°	53' N	23°	51' W	3737	Unsuccessful. Corer pre-triggered with 3000m wire out and wire pulled out of termination. ~~[illegible]~~ ~~main~~ Corer lost, trigger, corer and trigger mechanism recovered.
10659	Heat Flow Probe	1129/065	1803 ~~1640~~/065	41°	39' N	23°	37' W*	3680	Unsuccessful. 6 penetrations but data not logged.
10660	Benthic Dredge	2014/065	0354/066	41°	51' N	23°	44' W*		Successful. Remarkably small haul of 6 pebbles and some biological material after dragging 6 km along seabed.

KTF

Geophysical Log Sheet

Station No. ....

Station	Type	Start Time	End Time	Latitude		Longitude		Water Depth Corr. metres	Comments
10661	Gravity Core	0506/066	0813/066	41°	51.7 N	23°	56.7 W†	3734	Driscoll head with 5 m barrel used as untriggered gravity corer. 3.85 m core recovered
10662	Heat Flow Probe	~~0938~~ 0845/066	1748/066	41°	47' N	23°	52' W*	3750	Very successful. 10 penetrations.
10663	Kastenlot Core	2212/066	0126/~~066~~ 067	41°	29.3 N	23	14.1 W†	3720	4m Kastenlot box attached to 1300 kg Driscoll Head run in at 0.5 m/sec. 4.0 m core obtained.
10664	Survey Camera	0130/~~066~~ 067	1220/067	41°	31' N	23°	10' W*	3870	Successful. Bottom photographed from 0422-1032 along 10 km track.
10665	Kastenlot Core	1525/068	1815/068	42°	17' N	23°	30' W	3567	4m Kastenlot box attached to Driscoll Head. Box bent and no core recovered, probably due to excessive heave.
10666	Gravity Core	1912/068	2159/068	42°	20.1 N	23°	34.5 W†	3552	Driscoll head with 5m barrel used as untriggered gravity corer, run in at 1.5 m/sec. 5 m core recovered.
10667	Gravity Core	2336/068	0223/069	42°	18.9 N	23°	40.4 W†	3534	Driscoll head with 5m barrel used as untriggered gravity corer, run in at 1.5 m/sec. 4.56 m core recovered
10668	High Res. Deep Profiler	0948/069	~~[illegible]~~ 1705/069	42°	56.2 N	23°	04.7 W*	3571	Initial attempt off position. Second attempt within 0.5 n.m. of proposed Leg 94 drill site. Position refers to second lowering.
10669	Survey Camera	0120/070	1229/070	42°	04' N	23°	53' W*	3674	Successful. Bottom photographed from 0414-1058 along 7 km track.

KTF

Sheet 3

DISCOVERY 134
Geophysical Log Sheet

Station No. ....

Station	Type	Start Time	End Time	Position Latitude		Position Longitude		Water Depth Corr. metres	Comments
10670	Gravity Core	1305/070	1548/070	42°	05.'7 N	23°	52.'2 W†	3687	Driscoll head with 5m barrel used as untriggered gravity corer run in at 1.5m/sec. 3.86 m core recovered.
10671	High Res. Deep Profiler	1739/070	2300/070	41°	50.'6 N	23°	45.'5 W*	3732	Successful. Traversed 4 km of bottom between 1908 and 2156.
10672	Gravity Core	2357/070	0525/071	41°	50.'8 N	23°	~~5~~54.'2 W	3675	Driscoll head with 5m barrel used as untriggered gravity corer run in at 1.5m/sec. First attempt failed to recover anything, but 0.7 m core retrieved at second attempt.
10673	Tide Gauge Recovery	1040/073	1315/073	33°	59' N	29°	23' W		Recovery of Tide Gauge
10674	Heat Flow Probe	1315/073	2146/073	33°	56' N	29°	21' W*	3350	Successful. 10 penetrations.
10675	Sonatech System test	0940/074	1410/074	32°	55' N	27°	28' W	4042	Sonatech 12kHz transmitter lowered on wire to 4 km received by hydrophone floated off an spar buoy.
10676	High Res. Deep Profiler	1542/075	2014/075	31°	24.'2 N	24°	34.0 W*	5428	Near bottom 1755–1856. Penetration to c 40m. Prominent reflectors at 5m and 15m matched those observed on Surface 3.5kHz.
10677	Benthic Dredge	2049/075	0741/076	31°	23.'4 N	24°	29.'0 W*	5429	Traversed about 6 km of the seabed in an easterly direction. Small pieces of clinker, a lump of Coal and brittle stars recovered.
10678	Survey Camera	0900/076	1621/076	31°	24.'4 N	24°	33.'7 W*		Bottom photographed from 1238–1424 along 1 km track. ~~Station aborted after Abbreviated failure due to~~ Station cut short by NBET failure.

IF

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Sheet 4

DISCOVERY 134

Geophysical Log Sheet

Station No.

Station	Type	Start Time	End Time	Position Latitude		Longitude		Water depth Corr. metres	Comments
10679	Driscoll Core	1254/077	1625/077	31°	24' N	24°	34' W	5429	Unsuccessful. Corer pre-triggered with 3050 m wire out.
10680	Driscoll Core	1830/077	2103/077	31°	24' N	24°	34' W	5429	Unsuccessful. Corer pre-triggered with 3270 m wire out.
10681	Heat Flow Probe	2100/077	0130/078	31°	23' N	24°	37' W	5422	Lowered twice to c 2000 m but found faulty. Data logger ~~flooded~~ flooded.
10682	Driscoll Core	0130/078	0514/078	31°	24' N	24°	33' W	5436	Unsuccessful. Corer pre-triggered with 3178 m wire out.
~~10683~~	High Res Deep Profiler	0730/078	1727/078	31°	21.5' N	24°	44' W*	5432	Attempted to observe fault observed on several 3.5 kHz passes. Failure to do so possibly due to ~~insufficient errors~~ problems in navigating ~~fish~~ instrument.
10684	Kastenlot Core		2228/078	31°	21.9' N	24°	45.3' W	5434	6 m box attached via adaptor to Driscoll Head. 5.1 m core recovered.
10685	High Res. Deep Profiler	2309/078	0656/079	31°	18' N	24°	44' W		Search for faults seen on 3.5 kHz records.
10686	Penetrator Deployment	0830/079	1100/079	31°	25.5' N	24°	44.5' W	5433	Two 1.9 tonne penetrators fitted with Sonatech transmitters dropped about 1 km apart
10687	Penetrator Deployment	1557/079	1650/079	31°	23.5' N	24°	02.7' W	54	Two 1.9 tonne penetrators fitted with Sonatech transmitters dropped about 0.6 km apart.

Sheet 5

DISCOVERY 134

Geophysical Log Sheet

Station No.

Station	Type	Start Time	End Time	Position Latitude		Longitude		Water Depth corr. metres	Comments
10688	Driscoll Core	2121/079	0408/080	32°	03.'0 N	24°	12.'1 W†	5428	12m barrel fitted. 10m core (+ 1.2m trigger core) recovered. Trawl warp used for first time. Sonatech transmitter in head to monitor heave.
10689	Survey Camera	1600/080	1931/080	32°	39' N	24°	19' W*	4800 – 5200	Bottom photographed from 1321–1756.
10690	Kastenlot Core	2023/080	0140/081	32°	40.'8 N	24°	22.'3 W†	5421	6m box attached via adaptor to Driscoll Head. 2m core recovered. Box buckled in two places.
~~10691~~	~~Driscoll Core~~			~~31~~					~~Pre-triggered at 2700m wire out. 15m barrel fitted.~~
10691	High Res. Deep Profiler	0707/081	~~0745~~ 1145/081	32°	00.'5 N	24°	12.'0 W*	5429	Near bottom 1030–1050. Close to station 10688 position.
10692	Driscoll Core	1724/081	2108/081	31°	37' N	24°	53' W	5435	15m barrel fitted and Trawl warp used. Pre-triggered at 2700m.
~~10693~~ 10693	Survey Camera	2130/081	0930/082	31°	41' N	24°	48' W*	5433	Bottom photographed from 0133–0703. One strop of 4-strop sling ~~broken~~ found broken on retrieval and remaining 3 strops snagged around swivel.
10694	Acoustic Test	1315/082	1445/082	31°	22' N	24°	45' W		Acoustic unlocking device for Corer trigger tested at 500m
10695	Driscoll Core	1445/082	2030/082	31°	23.'7 N	24°	46.'3 W†	5433	15m barrel fitted. Trigger arm unlocked acoustically just before penetration. 12m core (+1.2m trigger core) obtained.

ME

Sheet 6

DISCOVERY 134

Geophysical Log Sheet

Station No. ....

Station	Type	Start Time	End Time	Position				Water Depth Corr. metres	Comments
				Latitude		Longitude			
10696	High Res. Deep Profiler	2135/082	0534/083	31°	~~[illegible]~~ 17.5' N	24°	43'W*	5434	Search for faults seen on 3.5 kHz records. Near bottom 2332-0404.
10697	Driscoll Core	0909/083	1411/083	31°	36'.3 N	24°	53'.1 W†	5433	Pyro fired but unlocking pin jammed. Corer laid on bottom but recovered: ~~[illegible]~~ intact in untriggered condition. 1.2m trigger core recovered.
10698	Driscoll Core	1411/083	2100/083	31°	38'.2 N	24°	49'.8 W†	5433	15m barrel fitted. Trigger acoustically unlocked. 13 m core ~~obtained~~ + 1.4m trigger core (NERC Record) obtained.
10699	Driscoll Core	0242/084	0818/084	30°	43'.8 N	24°	29.0 W†	5431	15m barrel fitted. Trigger acoustically unlocked. 12 m core ~~obtained~~ + c1m soup at top + 1.4m trigger core.

Station No. D134 Notes.

Geophysical Log Sheet

1. Coring — An acoustic release device would operate independently of heave on wire.

2. Get Mike B[illegible] to list peak accelerations during stations.

3. 3.5 kHz — Needs to be fixed port side as useful to keep out to compare with near bottom profiler.
Bringing in & out each time Richard Birch has station [illegible] could damage it unnecessarily.
It should be fixed at boom on port side immediately abaft PES boom.

Stern Rail & area — need uncluttered deck without obstruction when stern rail removed so that sleds etc can be launched without snagging.

NBES — Operates much better — HF Probe than Corer frame — presumably due to rig in better station.

Provide Tim Freeman with Density & Temp. profile for GME water.
Est. of Velocity Gradient in sediments.

Arthur F. < Stern
Gordon — Foot [illegible] 'A' frame [illegible]

Core Catchers & Cutters. .

Clear faults in 3 Site but diff. to see in Bobbie's lab. — Triggering problems through ship?...
Extra more acoustic trigger switch. Travel warp & good wire to handle
Penetration — T — Tide Gauge
2 Good HF then flooding.

Losses
Driscoll Corer + barrels — total. Cutters: bent in
+ bent trigger mechanism
HF Data Logger — flooding
4 m Kastenlot box bent
6 m Kastenlot box bent

DISCOVERY 134 RSK/PJS. — Coring.

A total of 20 coring stations were ~~made~~ occupied during Discovery cruise 134; 9 on the KTF study area and 11 on GME. Of these, twelve ~~res~~ resulted in successful cores: six on each study area.

The amount of movement of the stern of 'Discovery' during coring stations presented a major operational problem and this appeared to be amplified by the warps being used. The first six piston core stations resulted in ~~a~~ pretriggering at around 3000 meters wire out and a corer head complete with three barrels was lost after a warp tension. An acoustic ~~[illegible]~~ safty pin was developed aboard ship employing a command pinger and a pyro release ~~made~~ so that ~~the~~ four successful piston cores were eventually recovered ~~so~~ from the GME study area, ranging in length from 10 to 13 meters. Two Kasten box core stations were occupied in each study area with a 4 meter length barrel at KTF + a 6 meter length at GME. The second KASTEN station in each area resulted in bent barrels that were subsequently unusable. Again this was attributed to ship movement during penetration. The two successful Kasten cores were processed aboard ship, ~~as~~ Archive sections ~~being~~ were taken from each and a range of sub-sample sizes were collected. Because of problems with the cooling system in the core storage container no linered piston or gravity cores were split aboard ship.*

In the KTF study area our plans were to take some cores to characterise one of our so-called 'smooth' low relief areas detected from previous PES + high resolution seismic profiling and also to place cores close to fault scarps, suspected sediment slumps, over areas of hyperbolae identified from the ~~3~~ profiling records and over areas was stripped out during the second ~~ex~~ pretrigger experienced.

INSERT

However, one unsplit core taken close the first penetrator site, was logged using P-wave transducers. This revealed velocities of about 40m/s below that of sea water throughout the core apart from three narrow regions which had velocities about 150 m/s above that of sea water. This is provisionally interpreted as being the base of individual turbidites. The low velocities measured probably account for the apparent velocity increase of the penetrators when they enter the sediment.

bright backscattering detected on Gloria sonograph coverage. Despite the lack of piston coring most objectives were met. Visual & smear-slide analyses of the split Kasten cores and the ends of the liner sections suggest that the 'smooth' areas contain Quaternary sequences of marls & oozes as described from our previous coring in the area whereas the areas of bright backscattering on GLORIA sonographs are not slump features but appear to be ~~Pliocene~~ chalk outcrops ~~older~~ (some Pliocene in age) thinly draped with Quaternary sediment. ~~Areas of~~ hyperbolae. A core from an area of hyperbolae near the edge of a 'smooth' area was over more than half its 74 cm length a Quaternary foraminiferal sand containing quartz & other detrital material and some large erratic pebbles. This is ~~a~~ interpreted as an effect of bottom current activity producing a concentration of coarse material.

Our prime coring objective in the GME study area of recovering a north-south transect of long cores interspersed between previous Dutch coring sites was eventually met near the end of the cruise when the successful piston cores were taken.

PENETRATOR TRIALS

This project was a collaborative venture involving IOS, the Building Research Establishment (Department of the Environment) and the Joint Research Centre (Commission of the European Community) at Ispra, Italy.

The penetrator is a torpedo-shaped object which is being considered as a possible vehicle for disposing of high level radioactive waste (HLW) in deep ocean sediments. In their simplest form the penetrators would be allowed to freefall through the water column reaching their terminal velocity before impacting the sediments and burying themselves. Clearly a key parameter to the assessment of the acceptability of this method of disposal will be the depth of embedment achievable. To date estimates of penetration depth have been pure conjecture and these trials represent the first attempt to measure penetrator embedment in the deep ocean.

Four similar penetrators were used in the experiment, each weighing approximately 1900 kgs in air and measuring 3.2 metres in length and 0.325 metres in diameter. These penetrators were intended to be half scale models of a penetrator capable of carrying HLW, but were made of solid steel to maximise ~~the~~ penetration. ~~obtained~~

The instrumentation for monitoring the descent of the penetrators was purchased from Sonatech Ltd in California and works on the doppler-shift principle. A sound source emitting a ~~con~~ constant 12 kHz signal is fitted to the penetrator; this signal is received by a hydrophone suspended from a spar buoy and relayed to a shipset which converts the doppler-shift to a an analogue output which can then be recorded on FM Taperecorder and/or jet pen recorder.

Prior to the trials one of the sound sources was ~~lowered on a wire~~ attached to a wire and lowered on the midships winch (station 10675). At 4000 metres of wire out the signal to noise level appeared to be marginal for operation of the equipment. However, ~~a~~ attenuation records obtained during the penetrator trials showed much better instrumentation performance. A possible explanation for this ~~anom~~ anomoly is that the wire, although appearing vertical, had in fact wandered away from the axis of the hydrophone.

It was felt advisable to wait for optimum ~~weather~~ sea conditions before carrying out the trials for two reasons: firstly to facilitate the handling of the penetrators and secondly to minimise the background noise received by the hydrophone. Favourable conditions prevailed on day 73 and the four penetrators were launched at two stations in the Great Meteor East area (see table 1 for details).

The penetrators were deployed from the fore-deck using the ship's crane; launching was effected by cutting a rope strop with a hydraulic rope cutter. All four penetrators were launched safely and without damage to the penetrators, however this method of launching would not be advisable in other than optimum sea conditions or with heavier penetrators.

A complete record was obtained for the ~~first~~ two penetrators dropped at station 10686, but the signal ~~for~~ from the two penetrators dropped at station 10687 was lost when the penetrators entered the sediment, although in one case the signal returned towards the end of penetration. The poorer signal quality of the station 10687 tests is attributed to ~~the~~ greater signal attenuation ~~caused by~~ due to the presence of coarser particles at the more easterly site.

Signal levels for all four penetrators were very similar during the descent through the water column, and showed the expected attenuation with depth due to geometric spreading and absorbtion. At the point of penetration, the signals were 16dB above the threshold required for satisfactory detection. When the penetrators had come to rest, the attenuation of the signals in the sediment were 3dB in 30m, 13dB in 30m, and 16dB in 27m for drops 1, 2, and 3 respectively. The signal was lost for penetrator 4, so the attenuation was greater than 16dB.

TJF SDMcP

STATION NO	~~DROP~~ PENETRATOR NO	DAY/TIME	POSITION LAT °N	POSITION LONG °W	WATER DEPTH metres	TERMINAL VELOCITY m/s	TAIL ~~PENETRATION DEPTH~~ EMBEDMENT metres	REMARKS
10675	—	074/ 09:40 to 14:00	32°55'	27°28'	4053	—	—	WIRE TEST - RESULTS NOT ENCOURAGING.
10686	1	079/09:50	31° 25.5'	24°44.2'	5433	46.4	30	MORE NOISE ON RECORD FOR ~~DROP~~ PENETRATOR NO. 2 OTHERWISE AGREEMENT BETWEEN TESTS VERY GOOD
	2	079/10:46	31° 25.6'	24°44.7'	5433	48.3	30	
10687	3	079/15:44	31°23.6'	24°02.6'	5425	50.9	c. 27	SIGNAL ~~FELL DROPPED DROPPED OFF~~ LOST ON SEDIMENT ENTRY AND THEN RETURNED TOWARDS END OF PENETRATION.
	4	079/16:22	31°23.5'	24° 02.8'	5425	47.3	unknown	SIGNAL LOST AS ~~SEDIMENT~~ SEDIMENT PENETRATED.

TABLE 1: PENETRATOR TRIALS

Near - Bottom Sediment Profiler : Cruise 134 Report.

Nine stations were occupied. The instrument failed to operate at the first station, apparently because of an electronic fault but actually because the CTD wire had become tangled, damaging the electrical core.

Three stations in the King's Trough area were devoted to searches for features which might ~~have~~ caused the hyperbolic side echoes observed on PES records of the area. No unusual topographic features were found. Considerable difficulty was experienced in manoeuvring the instrument to the required place, and these navigational difficulties, together with the narrow swathe (50 m) of the instrument may explain the failure to find any features of interest.

In the Great Meteor East area, three attempts were made to obtain profiles of features on a 3.5 kHz survey record which had been identified as faults. Again, there were navigational difficulties but there is no doubt that the track of the third station passed within 1/3 mile of two points on the 3.5 kHz track where faults had been noted. No obviously fault-like features were detected, though it is possible they may be revealed by careful measurement of the depth of the deepest observed reflector.

Two further stations were spent obtaining profiles for comparison with p-wave logging measurements of cores, one at a future DSDP site, ~~one~~ and one where we had already obtained a

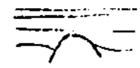
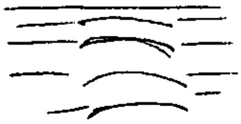
A p-wave velocity profile was obtained for one Driscoll core. The apparatus, in use for the first time, worked well, and measured values (at 18°C and 1 atmosphere) were generally about 1490 ms^{-1}, with four clear anomalies in the core, the anomalies having velocities up to 1640 ms^{-1}!

The acoustic part of the system worked well during this cruise, showing penetration to 50 m in the soft sediments of Great Meteor East, but the improved pressure sensor developed for ~~(...d on)~~ this cruise still has too much ~~[illegible]~~ jitter to be used for heave compensation.

R. J. B.

O'

DISCOVERY 1344 3.5kHz DAY 075

Time	Feature	
1018½ – 1029	?Basement rises to reach 31m of seabed at 1023	
[illegible]	Top 20m of sediment unaffected. Seabed flat	
1108 – 1114	Anticline in deeper layers with upper sediments affected from 1110 – 1111. Seabed flat	
1206½	Fault at depth in sediments, downthrown on west side Max throw 4m.	
1232½ *	Fault extending thru column, progressively greater throw with depth Max throw 6m, downthrown on S side. Seabed flat	
1237½ *	Mirror image of 1232½ fault, downthrown on N side	
1254½ *	Fault extending thru column, progressively greater throw with depth, downthrown on S side Max throw observed 7m	
1343	Fault extending thru column, progressively greater throw with depth, downthrown on SW side, Max observed throw 5m	

* [illegible]

DISCOVERY 134 3.5 kHz DAY 076/077

Time	Feature
1819/076	Fault, downthrown on W
1837½	Fault, downthrown NE
1845	Fault, " NE
1849	Small fault, " NE
1916	? Fault, " SW
1945	Outcrop of hill starts
1956	— " — ends
2056	Outcrop of hill starts
2113	— " — ends
2152	Fault, downthrown SE
2219–2221	? Buckled up sediment
2230	Fault, down on SE
* 2246½	Fault, " NW
2323	Fault, " NW thru to surface, progressively greater offset with depth
* 2352½	Fault, down on NW
* 0034½/077	Fault, down on NW
0057	Fault, down on NW
* 0241	Fault, down on NW
0252	Fault, down on SE
0303	Fault, down on NW
0338–49	Fault, confused but down on NW
* 0434–35	Faulted, rotated strata ? double fault down on NW
0457½	Fault, extending to surface, prog greater offset with depth, down on SE
0618–0620	Outcrop of hill
0622½–0624	
0714½–0724	— " —
0852	Small fault, down on NW
0931	Fault, down on NW
* 1117	Conspic. Fault, down on NE, thru to surface, progressively greater offset with depth.

* More conspicuous than average

DISCOVERY CRUISE 134.

TOWED SURVEY CAMERA.

Adequate results were obtained during the cruise but the overall performance of this system needs to be improved. The damage and wear of the four camera frame towing strops together with the slack warp encountered when lowering the frame suggest it has too high a drag to weight-ratio. This could be improved by adding ballast to the base of the frame and removing the protective front cover. Adequate protection could be provided by replacing this cover with one quadrant of steel tube. If these modifications were made it would be necessary to check the positions and lengths of the four towing strops. It is felt that these modifications would not only improve the towing characteristics but would also reduce the acoustic noise being generated by the frame. This noise caused the near bottom echo sounder to pre-trigger making it difficult to monitor the height of the camera off the sea floor.

The control electronics performed correctly but the logic controlling the operation of the camera needs to be altered to reduce the number of photographs taken in mid water due to spurious noise.

Yet again the Oceanics plugs on the flash units were unreliable. These should be replaced by connectors that are capable of providing good pin contact.

3·5 KHZ PROFILER.

If possible the towing boom for the transducer fish should be repositioned to avoid having to recover the fish each time the midships winch is used. By making some small modifications in the Plot it would be possible to have the 3·5KHZ recorder next to the PES Mufax. This would provide easier intercomparison of the two recorders and would free the bench space in the electronics lab. that is at present taken up by the 3·5KHZ system. If the shipboard system is transferred to the plot it would be best to tow the 3·5KHZ fish on the port side.

The circuit providing the range marks for the recorder needs to be altered to give more positive triggering pulses.

HEAT FLOW PROBE.

The pressure case housing the logger needs to be either shortened so that it is contained within the head of the probe or have its end cap protected so that it cannot be unscrewed by the support strops.

M.J.H.
27-III-83

3·5kHz PROFILING. RBK/TJGF.

The 3·5kHz high resolution profiling system worked remarkably well throughout the cruise with no real downtime. A number of surveys were run in the study areas as well as underway tracks between core sites & between the study areas. Because of the many deep-towed profiler deployments from the midships winch and the need for recovery of the 3·5kHz fish at these times, stations concentrated closely together often had no 3·5kHz profiler tracks run between them.

The 1½ day survey run in the KTF study area & other long tracks on that area showed that some of the 'smooth' areas identified ~~shown on~~ from 10kHz echo sounder tracks were in fact very faulted and or were surrounded by hilly terrain. Thus the number & extent of these so-called smooth areas will likely have to be reduced. The largest 'smooth' areas are in the extreme west & east of the study area and have stratification visible to around 30 meters. These also were found to have areas of hyperbolae close to their edges which were fault bounded but none within. Their 'smoothness' is only a relative effect since the profiler shows small scale faulting along most tracks.

One objective of high resolution profiling on key GME study area was to detect areas of faulting in the upper sediment column as had previous Dutch surveys and to run the deep towed profiler over these. Faults are such a common feature of the southern and west of the study area that there was no difficulty in finding suitable stations. Nevertheless a special 1 day survey was run to establish their trend which appears to follow the basement NNE-S faulting trend that is generated at the Mid-Atlantic Ridge. Most faults do not affect the upper 5 to 10 meters of the sediment column but some were detected that caused a small ~5 meter of offset of the seafloor. Some clearly are associated with buried basement features.

SURVEY CAMERA

The Geophysics Survey Camera System had been modified to replace the ~~frame with~~ ~~carrying~~ adjustable aluminium vehicle frame with a rigid ~~stee~~ permanent steel structure. The system consists therefore of a rigid tubular steel frame 3.3 m long with a Benthos model 372 mounted vertically at the rear. Separated from the camera by 2.3 metres were six flash units mounted to point 10° towards the camera. The whole system is deployed on the ships main warps and controlled by an acoustic monitor which echo sounds to the seafloor at 35 KHZ and relays information to the ship at 10 KHZ. ~~enabling the~~ This enables the operators to "fly" the camera at its optimum altitude off the seafloor of between 9 and 13 metres. ~~by~~ Minor modifications were made throughout the cruise to establish the optimum configuration for the system — these will be described under station headings.

Station 106565

The camera was deployed from the stern on the coring warp with the ship steaming at 0.7 kt. By using the crane davit the whole procedure was achieved in a single stage, very simply. The camera was loaded with 60m of 400 ASA thin based black & white film, the aperture set at f3.5 and focussed between 5m and infinity. The winch was stopped at 300m wire out because the Near Bottom Echo Sounder (NBES) was triggering on noise to ~~the~~ an extent that forced us to abandon the station. The camera was recovered and the for leg steel towing strops were replaced by nylon rope in an effort to decouple the frame from the wire, where we believe the 35KHZ noise to be generated.

Station 10656

The camera was deployed ~~without~~ within 2½ hours of D10655 without reloading or recharging. The noise levels were still high however it was decided to continue to the seafloor. The ship speed was 0.63 kt at 090° and the seafloor was reached with 3780 m of wire out. 866 photographs of the seafloor were shot at heights between 5 and 17 metres, the limits being so great owing to heave on the wire. On recovery it was found that one of the rope strops had parted and the remaining three were badly worn. It was decided that the improvements ~~gained~~ in noise gained by the rope strops were not worth the risk of ~~loosing~~ losing the equipment. During the recovery operation the frame struck the hull with sufficient force to shear three of the flash unit brackets. They were replaced with spares however it was noted that a different design would be needed to withstand the rigours of deployment over rugged terrain.

~~after station D10664~~

~~The film was developed on board (using a continuous process ~~film~~ E6 film processor) and given a preliminary examination. It was decided to run the next station D10669 with the camera 1/2 stop down (f3.5–4)~~

D10664

The camera was set up and launched as in D10656. The camera was focussed from 5m to infinity with an aperture of f3.5 and loaded with 60m of thin based 400 ASA black and white film. The seafloor was reached with 3796m of wire out and the 35 KHz noise problems were much reduced. This was attributed to the use of nylon "anti rattle" washers on the supporting shackles and on the flash unit support frame, and the removal of a shackle above the swivel. This station was run over variable topography with up to 80m of relief and constant adjustment to the wire length was needed. 1496 seafloor photographs were taken at heights between 9.5 and 17 metres and the camera frame was recovered without difficulty or damage.

DEVELOPMENT

The two films from D10656 and 10664 were developed before any further camera stations were run. On preliminary examination it was decided to reduce the camera aperture by 1/2 stop. At station D10664 a large object 22cm across presumed to be a glacial erratic, was observed on the seafloor, along with other debris including wine bottles!

Station 10669

The camera was deployed as before, with 60 m of 400 ASA Black and white film, with an aperture reduced to f3.5-4. On launching one of the flash units was inoperative, however we continued with the station. The weather was marginal with a wind blowing up to 30 kt. The seafloor was reached with 3743 m of wire out and 1496 photographs of the seafloor taken. 35 kHz noise was increased on the previous station, a condition that was attributed to the high winds & sea causing slack wire above the frame. On recovery, one of the nylon fairings was missing and the lifting strops badly worn, presumably due to ships heave & slack wire.

Station D10678

Launched in the usual fashion, the camera was lowered to the seafloor loaded with 60 m of 400 ASA B&W film focussed from 5 m - infinity with an aperture of f3.5-4. The seafloor was reached with 5531 m of wire out after one hour and fifty minutes the NBES trace locked out maximum range and the camera began firing erratically, the station was abandoned with only 382 seafloor photographs having been taken and camera recovered. It was found that the acoustic monitor had leaked seawater, ~~and~~ It was cleaned and tested and appeared to be functioning correctly

Station D10689

Launched and loaded as ~~for~~ in D10678 the camera was lowered over a low abyssal hill with relief of up to 500 m. 35 kHz noise problems were severe and extreme care had to be taken to 'fly' the camera over such high relief. 920 seafloor photographs were taken and the camera was hauled in having run from the base to the top of the abyssal hill.

On recovery, no apparant reason could be found for the high 35 kHz noise levels. It was decided to reposition the NBES so that it was level with the base of the towing vehicle.

Station 10693

The camera was ~~launched~~ loaded and launched as in D10678 with a repositioned NBES. The 35KHZ noise problems were the worst experienced so far, so much so that at one stage we had ~~to~~ to haul the camera 420 m off the sea floor for fear of causing damage. 1012 photographs of the seafloor were taken and the camera ~~recovered without problems~~. hauled in. On recovery it was found that one of the lifting strops had parted and the remaining three had taken a bite around the swivel rendering it inoperative.

DEVELOPMENT

The remaining exposed films were developed and all the stations had been run successfully. It was noted however that the camera frame was extremely unstable and underwent ~~of~~ a lot of movement in the water.

Conclusions

In future the upper limits on the weather ~~to~~ for the deployment of this system should be about 30 kts of wind and or ~~4m~~ 6m swell.

The towing vehicle was unstable and will require extra ballast weight and the removal and replacement of the protective cowl on the front with tubular bars. The lifting strops were vulnerable to wear ~~and~~ so rigid bars may be preferable.

The 10 KHZ acoustics ran well, however the 35KHZ NBES was picking up too much noise. It was felt that either a shielding arrangement or a change in frequency is required

A total of 6172 seafloor photographs were taken and ~~the ma~~ all the photographic objectives of the cruise achieved.

BENTHIC SLEDGE

The geophysics benthic sledge was deployed on two occasions in order to sample glacial erratics and other coarse material lying on sediment surfaces. The system comprised ~~as~~ a strengthened IOS Benthic sledge with a 1.3 mm net. It was fitted with a stereo camera to photograph the seafloor and the bottom bar of the net in order to check on the fishing efficiency of the sledge.

Station D10660

The sledge was deployed from the stern using the crane davit with the stern rail removed. It was lowered to the seafloor with the ship steaming at 1.5kt. and wire being payed out at 0.6m/s.

The seafloor was reached with 4625 m of wire out and was hauled over the seafloor for 3h 21m.

The sledge was recovered in good condition using the crane davit and ships capstan. The net contained 5 erratics ~ 2cm in diameter and some biological specimens which were fixed in formalin solution.

The odometer wheel, designed to give information on distance run over the seafloor failed to operate. ~~It was felt~~ The nylon bearings on the wheel were enlarged before the next deployment as it was felt that they were responsible for the malfunction.

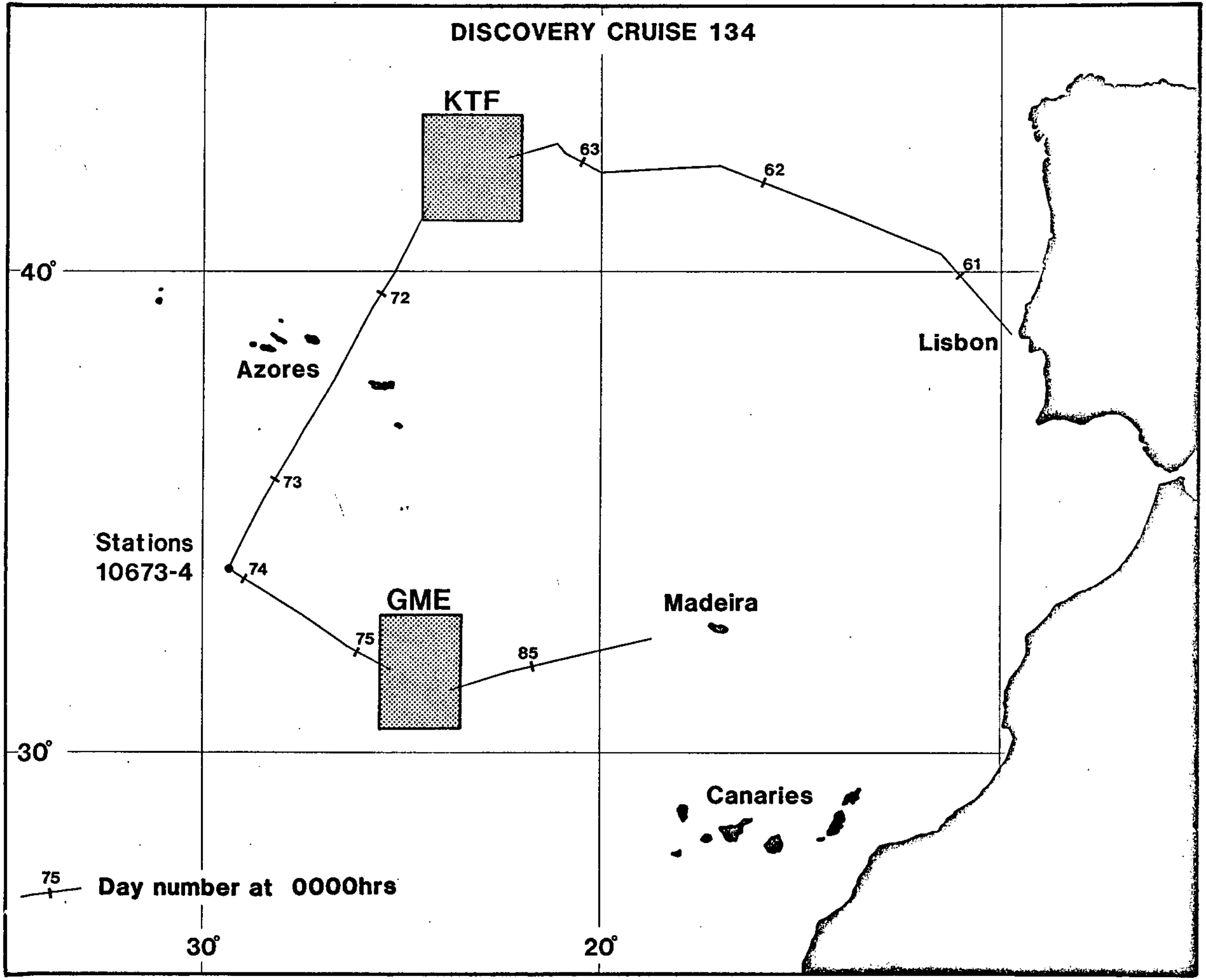
The photographs revealed a bioturbated seafloor ~~with~~ and though the bottom bar was out of shot, the quantity of sediment being thrown up suggests that the sledge was fishing as intended.

Station D10677

Deployed as before the sledge was launched with an apparent malfunction in the camera. The sledge was lowered to the seafloor at 0.5/0.6 m/s with a ships speed of 1.3 kt. Up to 7800 m of wire were used and at this range we experienced problems with finding the acoustic signal from the sledge's monitor. The seafloor was reached at approximately 0100 # with 7300 m wire out, and the sledge lifted off at 0347 with 7030 m of wire out. Throughout the station the signals were poor however we did believe that the modifications to the O.D. wheel had been effective.

The sledge was recovered without problems and the net contained six brittle stars and some pieces of clinker.

The flash unit had burnt out and no photographs taken.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GME
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72
73
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75
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Lisbon
Stations
10673-4
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Canaries
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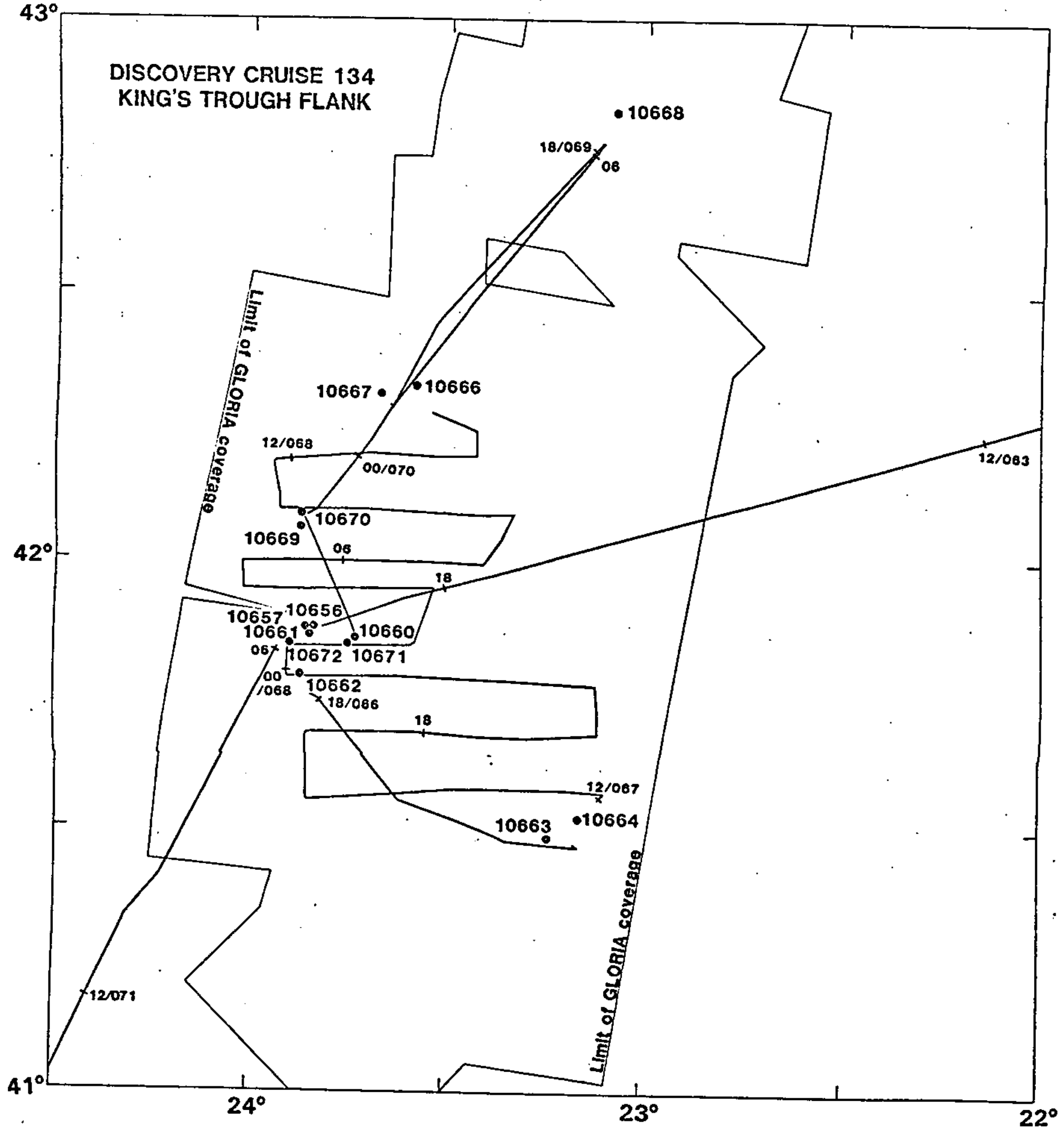

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DISCOVERY CRUISE 134
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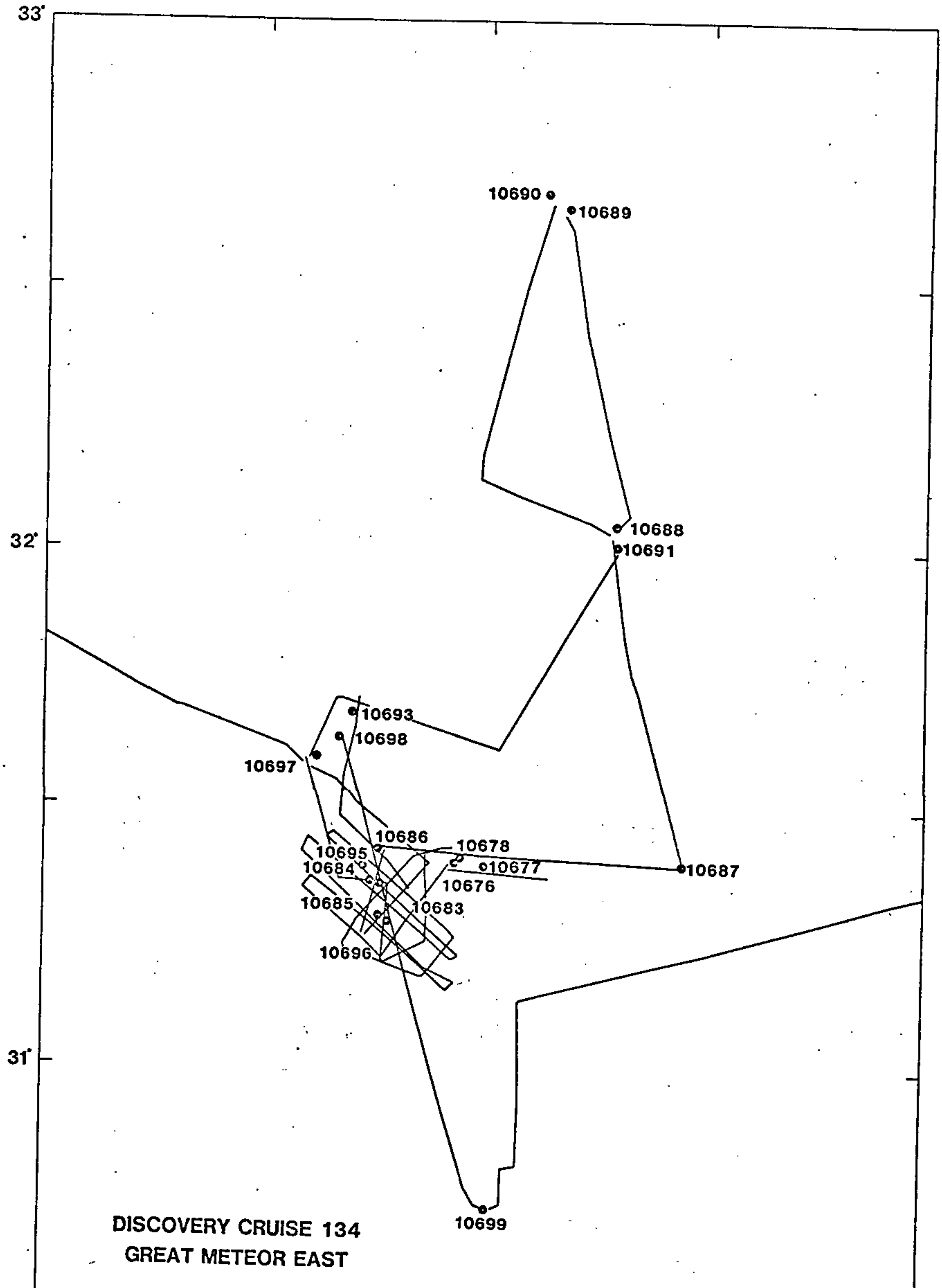

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DISCOVERY CRUISE 134
GREAT METEOR EAST