START BAY VESSEL: M.F.V. DEVONIAN

CRUISE PERIOD: 2 September 1980 to 20 September 1980

PERSONNEL:

D.N. Langhorne	S.S.O. (Senior Scientist)
E.J. Moore	HGCD/PTO III (Diving Officer and Cruise Leader)
A.J. Marks	S.S.O. (Electronics and Diving Team)
J.D. Humphery	H.S.O. (Senior Diver)
B. Norman	A.S.O. (Diving Team)
P.M. Hooper	H.S.O. (15-18 September)
G.N. Crisp	H.S.O.
R. Reed	Bath University

ITINERARY: M.F.V. Devonian operated on a day running basis from Dartmouth.

2/9/80 2100-2400 Loaded Devonian, launched inflatable set up equipment.

3/9/80 0700-2000 D.N.L. and B.N. ashore in Land Rover to set up trisponder at Strete and Start Point picked up at Start Point 1015. Examined sandwave area with Echo sounder and dropped buoy on suitable sandwave. Divers checked sandwave, installed two Aanderaa current meters, line of 10 Eprom stakes and line of stakes for normal measurement.

4/9/80 0830-2030 Divers put extra air in current meter buoyancy, installed more stakes, measured Eproms and carried out full set stake measurements. Second set measurements at next slack water and 17 sediment samples taken. Shore transits noted.

5/9/80 0830-2100 Two sets slack water stake measurements. Corrosion observed on Eproms, thereafter cleaned on every dive. 1630 B.N. ashore Start Point to collect Land Rover and return to Dartmouth.

6/9/80 0600-2230 Three sets slack water measurements. Took on water Kingswear jetty 2230-2330.

7/9/80 0700-1730 Two sets stake measurements. Search for A.U.W.E. equipment. Carried out Echo sounder run over sandwaves but abandoned due to poor sea conditions.

8/9/80 0730-1930 Two sets measurements measured Eproms before and after moving.

9/9/80 0800-1800 Two sets measurement. Trisponder found to be unserviceable, repaired by replacing Low Voltage card in Master Unit. Trisponder co-ordinates logged for stake positions.

10/9/80 0700-1930 B.N. ashore 0700 to return to Taunton. Two

sets stake measurements, trials with G. Crisp's spar buoy. Trawler seen operating $\frac{1}{4}$ mile E of stake area.

11/9/80 0830-1900 B.N. returned from Taunton. J. Blower, J. Whellock, N. Dillon joined as day visitors. Two sets stake measurements, move Eproms and re-measured.

12/9/80 0800-2000 Contacted D.N.L. to report progress. Very rough day, West Force 9, two sets of measurements, sheltered in Hallsands between slack waters.

13/9/80 0430-2030 Three sets measurements, moved Eproms. Returned to Dartmouth am to replemish petrol supply for outboard compressors and generator.

14/9/80 0800-2045 Attempted repairs to inflatable. Two sets of measurements. Answered a Coastguard distress call to rescue man in small dinghy drifting offshore in strong winds. Completed rescue off Slapton and regained site in time for second set measurements.

15/9/80 0800-2015 D.N.L. and P.H. arrived from Taunton 1030 having replaced trisponder batteries. Equipment set up for box survey. Stake measurements 1230. Trisponder unserviceable on both channels. Changed High and Low Voltage circuit boards and completed one survey line before failing again. Second set measurements 1830. R. Reed (Bath University) joined 2100.

16/9/80 0730-2030 Two sets of measurements. Too rough to attempt survey. Answered a Coastguard call to search for apparently empty dinghy off Slapton but nothing found. Recovered Eproms 1915. Trawler fishing in vicinity.

17/9/80 0630-1900 B.N. ashore 0630 to return to Taunton. Stake measurements 0815. Trisponder unserviceable so took Devonian to Brixham for spares from Decca. Second set measurements 1400 plus set sediment samples. 1500 landed D.N.L., A.M., P.H. at Start Point to check remote. Batteries found unserviceable. D.N.L. and R.R. left 2000.

18/9/80 0730-1800 25 h.p outboard motor failed, changed to 10 h.p. Weather bad, forecast Southerly 8, so removed both current meters, measured stakes, removed spare site marker and trisponder calibration buoy. Divers reported turbulence on sandwave. Returned to harbour for shelter. P.H. returned borrowed trisponder spares to Brixham and recovered trisponder remotes. Sailed again 1400 but returned after look at area. Sea too rough to work, very heavy seas in River Entrance. Unloaded all equipment except basic diving gear. J.H. and P.H. return to Taunton in hired van.

19/9/80 0830-1700 D.N.L. phoned to request extension of charter to obtain post gale data. One set measurements taken, very rough conditions. South 6-7, divers observed gale effects and reported turbulence movement on crest.

20/9/80

0830-1900 One set of measurements, removed stakes, anchor and mooring, removed both current meter frames and sinkers. Unloaded remainder of equipment, E.J.M., A.M. and B.N. returned to Taunton.

OBJECTIVES:

(a) To continue the study of sandwave movement and sediment transport in relation to hydrodynamic conditions.

(b) To test an improved system of self-recording Eprom stakes.

(c) To carry out a box survey of the area surveyed on previous occasions.

(d) To provide assistance and ship time for G. Crisp's trials with spar buoy.

PROCEDURE AND METHODS:

The experiment was almost an exact repeat of that carried out in 1979 and marred by failure of the remote recording stakes. A line of 34 seabed reference stakes was set up crossing the sandwave crest at right angles (see Fig 1). These stakes were measured by divers at slack water to measure the movement of the sandwave over a Neap/Spring/Neap tidal period. Tidal flow was measured using 2 self-recording current meters placed 1 m above the seabed on the sandwave crest.

A line of 10 self-recording stakes was set up parallel to the reference stakes and 2 m North. These were observed and measured daily by divers and individual stakes moved to best advantage to record the changing shape of the sandwave.

G. Crisp's spar buoy was tested in calm water in the lee of Hallsands. Flotation tests were carried out and the inflatable was used to keep station on the buoy while remaining tethered. G. Crisp report attached.

EQUIPMENT PERFORMANCE:

Trisponder:

9/9/80 Low voltage card in Master Unit failed. Replaced with spare.

15/9/80 Low voltage card in Master Unit failed again, a fault on the high voltage card could have caused overloading of the low voltage card: High voltage card replaced from spares; Low voltage card borrowed from remote No 76.

15/9/80 Channel 2 on the D.M.U. only updating in Rapid Mode no update in Normal Mode: Control card replaced from spares.

17/9/80 Remote station failure due to catastrophic cell degeneration in two of the 95 A.H. batteries, survey abandoned. Apart from the above faults the system operated satisfactorily.

Raytheon Echo Sounder: Satisfactory operation. New parts have improved the appearance of the trace.

Radios: No problems except that some batteries may need replacing, and the Westminster requires a new aerial.

Bedform Monitors: Electrolysis problems caused corrosion products to obscure some cells. There were two cell failures due to a dry joint and a poor plug connection, one cell failed mechanically, and one monitor failed after about 5 days because of a component failure. For further information see separate report.

Aanderaa Current Meters: Their operation appeared to be correct although the tapes have not yet been read.

Generator and Diving Compressor: Operation was satisfactory. A pressure gauge on the compressor was damaged due to ship motion.

General Diving Gear: A few minor faults were rectified on site or on return adequate spares were carried.

Inflatable: The towing bridle parted due to rotted and worn fittings. As the fittings are built into the hull a new bridle will have to be rigged such that the strain is taken by the transom. An old repair to the floor opened up causing a leak. Some trouble was experienced with the 25 H.P. outboard; which may have been partially due to spark plugs being damaged by salt water.

One outboard fuel tank developed a leak rendering it unusable.

RESULTS: The cross sectional profile of the sandwave was obtained over a period of 18 days, covering a Neap/Spring/Neap tidal period. The current meters were in operation for 16 days and were inspected for fouling twice each day. The height of each current meter and its distance from the sandwave crest were measured daily. Corrosion on the Eprom stakes was noticed on the second day and was thereafter cleaned on every dive.

Because of the trisponder problem the box survey was not carried out.

Prepared by: E J MOORE

Approved by: K R DYER

Date: 23 Oct 1980

Preliminary Trials of Spar Buoy

Preliminary trials of a small, spar-buoy-mounted, capacitance wire wave staff were conducted in the lee of Start Point as the weather conditions precluded trials over the Skerries.

The instrument, originally designed as a wavetank model, was deployed on a buoyed tether and carried a small echo sounder hydrophone attached to the bottom of the spar. The trial was intended to demonstrate the feasibility of tracking the buoy using an inflatable boat, whilst recording both surface waves with frequencies in excess of 0.05 Hz and a bottom profile.

In practice it was found that the mooring arrangement is not well designed for field use and results in a low frequency instability of the whole buoy. Only a very small change in tension of the mooring causes the buoy to change its altitude in the water which in turn makes the hull of the buoy develop lift as it is towed through the water. As a result the capacitance gauge is eventually lifted clear of the surface on a time scale of the order of 1 minute. It was just possible using a longer mooring (35 m in length) to keep the mooring slack for a few minutes at a time using the inflatable boats outboard motor. The manoeuvers which were necessary to do this necessitated running over the slack mooring line and it is doubtful if this procedure would be adequate during the S.A.R. 580 experiment (especially as these trials need to be conducted in relatively calm water and in a location which was partially sheltered from the wind).

The attached chart shows a section of wave record which was taken during these tests and shows clearly the large excursions of the buoy caused by tension in the mooring. No difficulty was experienced using the wave staff and echo sounder simultaneously.

Diving Officer's Report

Start Bay Cruise M.F.V. Devonian 2/9/80 to 20/9/80

Personnel: Divers: J D Humphery, A J Marks, B Norman

Diving Officer: E J Moore

The Start Bay sandwave survey was geared almost entirely to diving work and slack water measurements of the sandwave profile were to be carried out at a High water slack and a Low water slack every day.

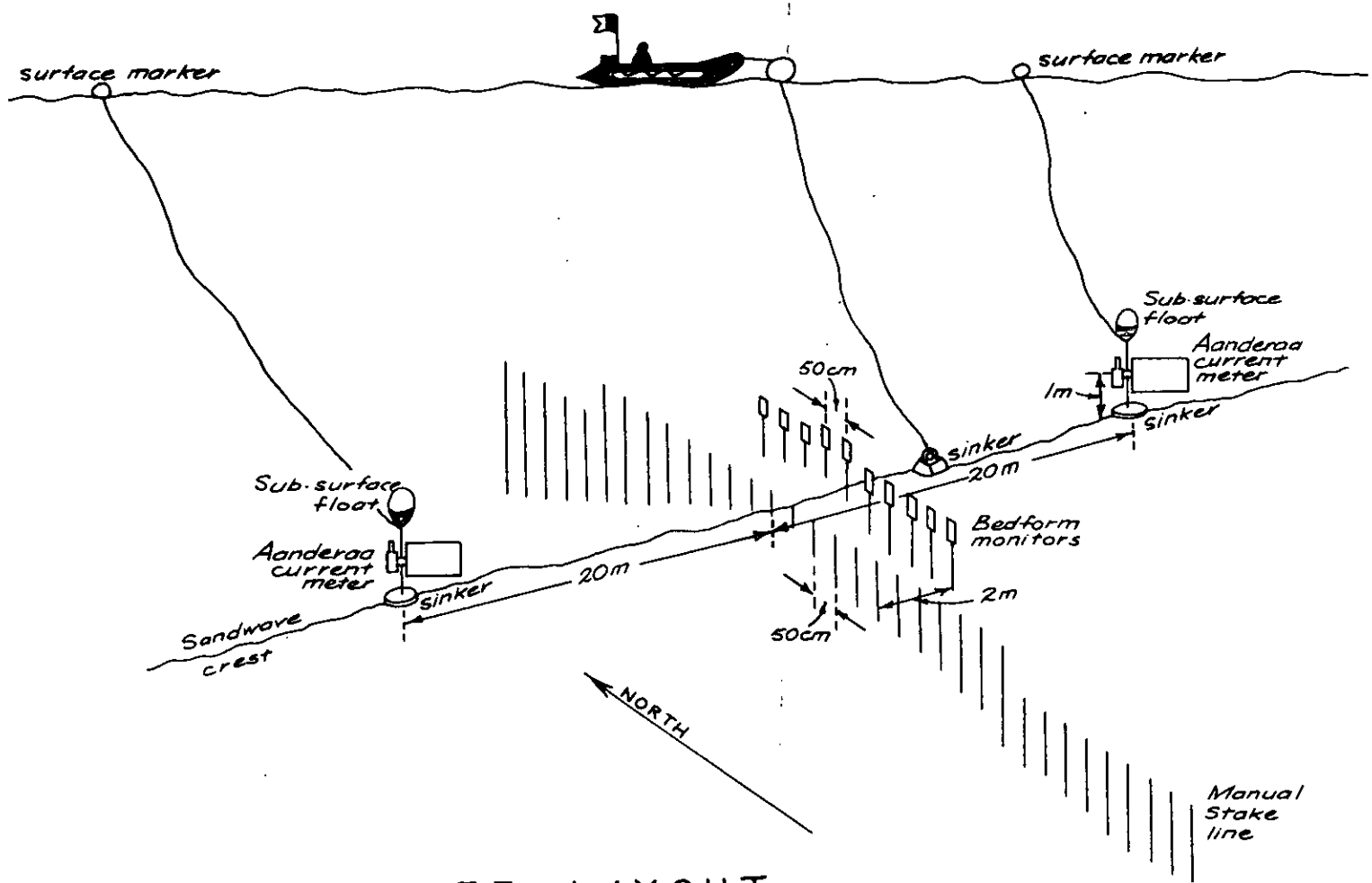
On the first day, 3 September, the divers examined the sandwave selected from echo sounder traces, installed two Aanderaa current meters on the sandwave crest, installed the set of Eprom stakes and a line of 34 stakes to be measured manually.

From that day until the 18 September, two and sometimes three slack water measurements were taken daily, sediment samples were obtained across the profile and the current meters checked for weed. The Eprom cells were cleaned daily and notes made of the number of cells exposed. A daily profile was drawn recording changes to the sandwave and enabling forward planning to Eprom movements.

The survey was extended by three days in order to examine the effect of Southerly gales on the sandwave and this was carried out successfully, only one slack water being missed through the gale.

No diving problems were encountered, the team worked perfectly together and everything went very smoothly. This team work, coupled with total confidence in the back up provided by John McGuire and Devonian enabled measurements to be continued through subsequent bad weather conditions, without the loss of any data.

All equipment and stakes sinkers etc were recovered and the site left completely clear.


surface marker
surface marker
Sub-surface float
Aanderaa current meter
50cm
1m
sinker
sinker
20m
Sub-surface float
Aanderaa current meter
Bedform monitors
sinker
20m
2m
50cm
Sandwave crest
NORTH
Manual Stake line

SITE LAYOUT