

VESSEL R.V. EDWARD FORBES Cruise No. 15/78

CRUISE PERIOD 14 - 28 September 1978

PERSONNEL	D.N. Langhorne	SSO (Senior Scientist)
	A.J. Marks	SSO (Electronics and Diving Team)
	E.J. Moore	HGCD (Diving Team Leader)
	J.D. Humphery	HSD (Diving Team) 23-25.9.78
	P.M. Hooper	SO
	N. Dillon	ASO
	I. Hayes	ASO (Diving Team)
	L. Dominy	(AUWE) 20.9.78 only.
	P. Bird	Contract Diver 16-19.9.78
	K. McClean	Contract Diver 20-22.9.78

ITINERARY

R.V. Edward Forbes operated on a daily basis from Dartmouth.

13 Sept. A.J. Marks and P.M. Hooper joined R.V. Edward Forbes at Barry. Installed equipment.

14 Sept. Sailed from Barry. Abandoned attempts to investigate Furrows to the N of Ilfracombe owing to adverse sea conditions.

15 Sept. D.N. Langhorne and N. Dillon calibrated and set up Trisponder remote stations. R.V. Edward Forbes investigated the existence of Furrows to S of Prawle Point. Berthed at Dartmouth 2000.

16 Sept. 0930 Diving Team joined ship. Sailed for sandwave research area in Start Bay.

a. Laid 2, 1½ ton anchors with moorings on either side of the sandwave crest (to be used to hold the vessel steady for boundary layer flow measurements and underwater T.V.)

b. Divers obtained sea bed profiles across the sandwave crest using reference stakes.

c. Laid Plessey current meter on crest of sandwave (position controlled by divers).

d. Recovered existing Plessey current meter system.

e. 2200 changed wave recorder tapes at Start Point Lighthouse.

17 Sept. a. 0730 - 1930 Carried out boundary layer flow measurements using HRS bottom rig for the period of an ebb tide.

b. Routine sea bed profile measurements by divers.

c. Adjusted the position of the mooring anchors.

18 Sept. a. 0800 - 2200 Continued boundary layer flow measurements.

b. Carried out trials with prototype photocell stake.

c. Routine diver measurements.

19 Sept. a. 0800 - 2000 Continued boundary layer flow measurements.

b. Routine diver measurements.

- 20 Sept. L. Dominy (AUWE) joined ship.
  - a. 0800 - 2200 Sediment transport studies using boundary layer rig and underwater T.V. system.
  - b. Routine diver measurements.
- 21 Sept. a. 0800 - 2000 Boundary layer flow measurements made in conjunction with prototype photocell stakes and underwater T.V.
  - b. Routine diver measurements.
- 22 Sept. a. 0800 - 2130 Ripple evolution studies using underwater T.V. and photocell stake.
  - b. Carried out measurements with reference to AUWE contract.
- 23 Sept. a. 0830 - 2130 Recoverd AUWE equipment.
  - b. Fluorescent tracer studies of sand dispersion from sandwave crest.
  - c. Routine diver measurements.
- 24 Sept. 0830 - 2130 Continued fluorescent tracer studies and routine diver measurements.
- 25 Sept. a. 0830 - 1830 Echo-sounding and sidescan sonar survey of the sandwave area.
  - b. Relaid AUWE equipment and continued measurements.
  - c. Routine diver measurements.
- 26 Sept. a. 0830 - 1730 Recovered 1½ ton anchors and self recording current meter.
  - b. Routine diver measurements.
- 27 Sept. R.V. Edward Forbes sailed for Barry. IOS staff returned to Taunton.

#### OBJECTIVES

1. To investigate the existence and nature of Furrows (for Dr. R. Flood, Woods Hole Oceanographic Institute, USA. Project No. S13) off Ilfracombe and to the S of Prawle Point.
2. To continue the study of the mobility of sandwaves and sediment transport in relation to hydrodynamic conditions.
3. To continue measurements associated with the AUWE contract.

#### PROCEDURE

1. Furrows: Sidescan sonar was used to investigate the presence of Furrows in those areas requested by Dr. Flood.
2. Sandwave mobility and sediment transport:
  - a. The systematic movement of the crest of a sandwave was measured between Spring and Neap tides. Measurements were made by divers, before and after ebb tides, using a transverse line of sea bed reference stakes.
  - b. Boundary layer flow measurements were made at the crest of the sandwave using a vertical array of four flow sensors (on loan from HRS).
  - c. A self recording current meter was also laid at the crest of the sandwave.
  - d. Ripple mobility and bed roughness was studied using underwater T.V. and reference markers.
  - e. Sediment dispersion from the crest of the sandwave was measured using fluorescent sand. Divers emplaced plugs

of dyed sand up to 30 cms deep into the crest of the sandwave and measured the dispersion at night using an underwater Ultra-violet light.

- f. Echo-sounding and sidescan sonar surveys were conducted to study the stability of the larger sandwave area.
- g. Observations and measurements were made with reference to the AUWE contract.
- h. Trials were carried out with a prototype self recording reference stake (using a vertical array of photocells connected to an onboard recorder).

## RESULTS

1. Furrows: The survey to the N of Ilfracombe had to be abandoned on account of adverse sea conditions. The ships progress on passage was delayed owing to engine trouble and hence only a short time was spent on the investigation to the S of Prawle Point. During this time little evidence of Furrows was found in the designated area.
2. Sandwave mobility and sediment transport:
  - a. Routine measurements (using a line of 31 sea bed reference stakes) were made on a daily basis between 16 and 25 September. On most of these days measurements were made at slack water preceding and following an ebb tide.
  - b. Boundary layer flow measurements were obtained for the periods of ebb tide on three successive days. Experience showed that monitoring of the flow sensors for weed fouling using underwater T.V., provided information which considerably enhanced the quality of the data.
  - c. The self recording current meter failed. No data was obtained (Tape transport failure).
  - d. Techniques for emplacing fluorescent dyed sand and its subsequent tracking by night, using an underwater Ultra-violet light proved to be successful.
  - e. Pressure on time prevented significant progress with echo-sounding and sidescan sonar surveys.
  - f. Good progress was made on the AUWE contract.
  - g. The prototype self recording stake proved to be successful. The main difficulties encountered were associated with cable connections to the shipborne recorder.

PREPARED BY :



(D N LANGHORNE)

APPROVED BY :



(K R DYER)

DATE

: 5-MARCH 1980

5 March 1980

VESSEL R.V. SARZIA

CRUISE PERIOD 2 April - 12 April 1979

PERSONNEL

B.J. Lees	HSO	Senior Scientist
M.W.L. Blackley	HSO	
J.E. Blower	ASO	
R. Bryant	EO	
A.P. Carr	PSO	
N. Dillon	ASO	
P.M. Hooper	SO	
R. Kirby	SSO	
E.J. Moore	HGCD	
B. Wainwright	ASO	

ITINERARY A copy of the relevant part of Admiralty Chart No. 1543 is attached.

Monday	2 April	Loaded equipment at Plymouth. Sailed 2030 hrs, on passage to Lowestoft.
Tuesday	3 April	On passage.
Wednesday	4 April	Berthed Lowestoft 0800 hrs. Set up equipment. Sailed 1130 hrs. Obtained 13 vibrocores. See attached chart
to		
Friday	6 April	for details.
Saturday	7 April	Offloaded vibrocorer. Loaded current meter, box corer and grapnel. Sailed 1130 hrs. Searched unsuccessfully for longterm mooring. Deployed new longterm current meter rig.
Sunday	8 April	Fluorescent tracer search to delineate cloud resulting from injection in August 1978.
Monday	9 April	Search completed. Echosounding runs made over sandwave area to SE of Dunwich Bank along lines normal to crests.
Tuesday	10 April	8 box cores obtained. See attached chart for stations.
Wednesday	11 April)	Loaded vibrocorer. Sailed for Plymouth.
Thursday	12 April)	On passage to Plymouth.

OBJECTIVES

1) To complete the vibrocoring programme begun in March 1978, the cores being required to supplement the geophysical, grab and boxcoring programmes. 2) To complete the bedload transport measurements begun in August 1978 by making final measurements of the fluorescent tracer cloud concentrations, and boxcoring in order to be able to measure the depth of mixing of the tracer. 3) of the vibrocores also to be used for this purpose, should the box cores not prove deep enough. 3) To drag for the longterm mooring which had lost its toroidal buoy, and replace it with a new rig.

PROCEDURE AND  
METHODS

The vibrocorer was used to obtain cores 8 cm wide and up to 4.2 m long at the stations shown on the attached chart. Grab sampling, using a Shipek, was carried out as before. (See Cruise Report R.V. Edward Forbes 16 - 30 August 1978).

EQUIPMENT  
PERFORMANCE

No insoluble problems were encountered with the IOS equipment. It was felt that the Gifford grapnel used to drag for the current meter mooring was not of an ideal design.

RESULTS

Vibrocore results incorporated in Sizewell-Dunwich Banks Field Study Topic Report : 1, Introduction and geological background. IOS Report No. 88. Bedload transport measurement results incorporated in paper read at IAS Conference on Holocene Sedimentation in the North Sea, at Texel, Netherlands in September 1979. Published in Abstracts, No. 37.

PREPARED BY : *Barbara J. Lees.* (B J LEES)  
APPROVED BY : *Allan* (A P CARR)  
DATE : *22.2.80.* 22 February 1980

