

PROVISIONAL CRUISE REPORT

VESSEL: ML LABRAX (Southampton University, Department of Oceanography)

CRUISE LOCATION: Southampton Water. Rivers Test and Itchen.

CRUISE PERIOD: 19-20 December 1983

PERSONNEL: K R Dyer (Principal Scientist)
A L New
A J Marks

OBJECTIVES: In an echosounding survey on 2-3 September 1983 internal waves were observed being generated over topographic features in the estuary during the ebb tide. The internal waves propagate upstream when the current weakens, to eventually break and cause mixing. Repeat surveys were to be carried out at a higher tidal range, and with higher river discharge for comparison with the earlier results. Current measurements would be obtained in addition to salinity and temperature profiles.

PROCEDURE AND METHODS: Echo sounders with frequencies of 200 Khz (Raytheon) and 1 and 2 MHz (IOS developed) were available. Echo sounding profiles were obtained by repeated traverses from the Bury Swinging Ground in the Test River (Figure 1) on 19 December 1983. At the end of each traverse a vertical profile of salinity and temperature was taken with an MC5 TS Bridge. At the upper end the vessel was moored to piles and current profiles were also obtained with a Braystoke DCRM. Measurements were carried out from just after first high water to low water.

In the Itchen River similar measurements were taken in the reach between the Itchen Bridge and Princess Alexandra Dock. However, the wind prevented a consistent survey pattern and waves affected the results.

EQUIPMENT PERFORMANCE: On 19 December the Raytheon echo sounder did not have sufficient gain to give any backscattering from the water column. Two transistors were replaced that night and the instrument performed well on 20 December.

The IOS echosounder worked excellently at both 1 and 2 MHz. The addition of time and fiducial markers were of great benefit. Electronic noise from interference with the Raytheon was considerably less than in September, due to a redesign and using the transducers on opposite sides of the boat.

The hired generator though marked at 240V damaged an oscilloscope and a soldering iron. It was found to give 270-280V.

RESULTS: Test River: Wind southerly force 6-7. Similar to the previous surveys internal waves formed downstream of the topographic step at about maximum ebb tide. Calm and rough water patches were observed at the

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water surface over the troughs and crests of the internal waves. The waves broke without penetrating upstream, and appeared to create an intermediate mixed layer.

Itchen River: Wind SSW force 8. Because of the windy conditions a comparison was carried out between the 1 and 2 MHz systems. Traverses were carried out across the estuary above Kemps Boatyard, and several runs done along the estuary. Occasional backscattering within the water column was observed, but rolling of the boat caused frequent quenching of the transducers. Despite the high river discharge, the stratification near the Bridge was small.

ITINERARY: 18 December 1983: 1800 hours. Personnel travelled to Southampton
19 December 1983: Sailed 0930. Commenced echosounding in the Test
HW 1009 River at 1045. Completed surveying at 1610.
LW 1556 Returned to boatyard.
20 December 1983: Sailed 1030. Commenced echosounding 1030.
HW 1049 Completed surveying 1613. Returned to boatyard.
LW 1642 Unloaded. Returned to Taunton.

Prepared by: K R DYER

Approved by: K R DYER

Date: 9 January 1984