MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1976 RESEARCH VESSEL PROGRAMME

REPORT: RV CLIONE: CRUISE 5.

STAFF

J W Ramster (NIC)
G C Baxter
B McCartney)
P G Collar) Institute of Oceanographic Sciences
N Millard (part-time)) (IOS), Wormley.
C Clayson)
K Birch (part-time))

DURATION

Left Lowestoft 1700h, 26 March) All times are Greenwich Mean Time
Docked Lowestoft 1100h, 2 April)

LOCALITY

Southwold-Lowestoft

AIMS

1. To compare the performance of the acoustic current meter mounted on Data Buoy I (DBI) with an IOS electromagnetic (EM) current meter temporarily fixed onto DBI.

2. To compare current velocities recorded by the acoustic current meter, the EM current meter and rotor current meters laid in the region of DBI with the drift of acoustic transponding floats designed for the Mid-Ocean Dynamics Experiment (MODE).

3. To compare the heave, pitch and roll as measured by equipment on DBI with that measured by an IOS pitch-and-roll (PR) buoy:
   a. in the immediate vicinity of the data buoy; and
   b. when the PR gyro sensor is temporarily clamped to the deck of DBI.

4. To compare the wave following performance of the Lowestoft Nimbus 6 spar-buoy and the PR buoy.

5. To collect meteorological data to 'selected ship' standard for comparison with the data collected on DBI itself.

6. To measure tidal stream profiles in the vicinity of the Data Buoy by means of a direct-reading current meter. (DRCM).

NARRATIVE

The ship cast off at 1700h 26 March and was "on station" after a little over half-an-hour's steam. A recording current meter station was launched some 400 metres SSE of the Data Buoy by 2000h and then, after rigging the IOS towed fish, "ranging trials" began and carried on until 0515h the next day. These trials consisted of steaming away from or towards the Data Buoy on various courses and monitoring the strength of the return signal from the "master" acoustic beacon hung below the Data Buoy by the IOS (Wormley) team in the week prior to the cruise.

From the results the positions of the three anchored "reference" beacons to be laid specifically for this cruise were deduced. Before this operation got underway, however, the ship's Zodiac took Mr Millard to the Data Buoy where he retrieved the electronic's package from the acoustic beacon for examination on board RV CLIONE.

By 1530h 27 March the three reference beacons had been laid and the Data Buoy beacon was back in full working order. A Mid-Ocean Dynamics Experiment (MODE) float was prepared and released in the vicinity of the Data Bucy as the south-west-going tidal stream (Flood Tide) began to make. The position of this float was tracked all night; the operation being combined with the work of surveying-in the triangle of reference beacons via acoustic ranges from the ship and the Data Buoy. This work continued until 0700h 28 March when the float was retrieved north of the Data Buoy.

This pattern of float-tracking - release as the flood tide began and retrieval of floats early on the ebbing (north-east-going) tidal stream - was to be typical of the whole cruise and stemmed from the need to prevent the floats getting into the sandbank regions off Lowestoft. During the peak of the north-east-going tide of the morning of 28 March, the ship moved to the vicinity of the Data Buoy and the P-R Buoy was rigged and deployed for about an hour.

With the turn of the tide three MODE floats were released and their positions fixed acoustically from the drifting ship at roughly 30 minute intervals from 1100h until 1600h. After they had been retrieved the ship anchored 2 cables or so from both the Data Buoy and the moored current meter rig so that 10 hours of DRCM profiles could be obtained. A full tidal cycle could not be sampled because Mr Millard had to be put ashore by 0600h, 29 March and Mr Birch picked up to replace him.

Once this change of staff had taken place three MODE floats were released and, apart from the period 0900-0940h 29 March when the PR buoy was being used, the ship tracked them, and up to another three floats, for virtually the rest of the next two days. One or two floats were temporarily retrieved as they threatened to move too far to the north, but for the most part the array moved to and fro passed the Data Buoy without much trouble. Sextant fixes were taken during daylight hours as a check against the acoustic fixes and Decca positions of the ship and consequent float ranges calculated at 20-40 minute intervals.

The period 0830-1331h 31 March was spent recovering the floats and then the P-R buoy was deployed near the Data Buoy whilst the Nimbus-6 buoy was being made ready. The latter buoy was put out at 1600h and allowed to drift freely in the wind and tide. The P-R buoy was re-deployed at 1730h in the vicinity of the Nimbus buoy for the better part of an hour.

Another set of MODE floats were released around 2100h and tracked until 0830h the next day. Four of the five in the water at 0830h 1 April were successfully recovered off Southwold during the rest of that morning but the fifth could not be found nor could any acoustic signal be picked up. Consequently the ship turned and moved towards the Data Buoy and at a range of 3-4 miles the first signals from the missing float were received. Inspection showed that the stray-line of the system had caught on the EM spar that overhung the side of the Data Buoy. After the buoy had been recovered a final tracking "pass" of the Data buoy position was made during the afternoon using 3 floats.

Between 1630h and 1825h, 1 April the ship recovered the three "reference" beacons after they had been freed from their anchors via the IOS acoustic release system. The ship then moved back to its anchor position between the Data Buoy and the moored current meter rig and another set of DRCM measurements were taken between 1900h 1 April and 1000h 2 April. Once the anchor had been hove in on completion of this operation the moored current meter rig was recovered and the ship steamed to Lowestoft, docking at 1155h.

RESULTS

All the aims of the cruise except for 3(b) were achieved. Given the sophistication of the equipment and of the initial plan this was in some ways an unexpected development : harsh reality suggesting that a 50% success rate would be very respectable. The three main reasons for the almost totally successful outcome were the persistence of the off-shore wind during the cruise, the expertise and adaptability of the crew and the all-round excellence of the IOS, Wormley, preparations. The preliminary work on the Data Buoy and on the chart-table, the movement and setting-up of a large amount of sophisticated equipment and, perhaps above-all, the intrinsic reliability at sea of that equipment were three very obvious potential disaster areas that were successfully negotiated by the IOS team. (The fact that the Data Buoy transmissions per se are being treated here as a routine item is perhaps sufficient testimony to the success of the back-up operation of the SEATEK consortium.)

It is intended that at least a first assessment of the results of this cruise will be given at the proposed Data Buoy symposium at Wormley later this year. For the moment therefore it is sufficient to note that:

(a) When "standard" MODE floats were deployed together they did not diverge significantly over periodsof 3-12 hours. If, however, a group was put out that included a "modified" (ie 2 m instead of 4 m in length) float then the modified float tended to move away from the others.

(b) At first sight at least, the velocities of the floats agree with those measured by the acoustic and EM current meters mounted on the Data Buoy.

(c) There is marked vertical shear at times in the tidal stream velocities found in the vicinity of the Data Buoy. A corollary of this is that the tidal streams measured by the remote mid-depth Plessey current meters linked to the Buoy may well be rather different at peak speeds to those measured at 2 metres depth by the Harwell acoustic current meter.

J Ramster
14 April 1976

SEEN IN DRAFT: J R French - Master
G F Lee - Skipper

INITIALLED: AJL

DISTRIBUTION:

Basic List
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