

REPORT OF WORKING GROUP 21
CONTINUOUS CURRENT VELOCITY MEASUREMENTS
CURRENT METER INTERCOMPARISON IN MARCH - APRIL 1970

The following representatives of members of SCOR WG 21 embarked on the Soviet Research Vessel "AKADEMIK KURCHATOV" at Dover on 7 March 1970 joining Dr. K.A. Chekotillo of the working group who was already on board and in charge of mooring operations.

W.J. Gould	N.I.O. Wormley, Surrey, England
R. Heinmiller	W.H.O.I. Woods Hole, Massachusetts, U.S.A.
D.J. Lawrence	Bedford Institute, Dartmouth, N.S., Canada
C.K. Ross	Bedford Institute, Dartmouth, N.S., Canada
W. Zenk	Institut für Meereskunde, Kiel, Germany (FRG)

Also on board were two scientists, E. Franke and G. Pluschke from the Institut für Meereskunde, Rostock-Warnemünde, GDR, who had brought, at the invitation of the Soviet Academy of Sciences, several of their type LSK recording current meters to be included in the intercomparison experiment. Mr. G. Jaffe, director of the National Oceanographic Instrumentation Center, Washington, U.S.A. also took part in the cruise at the invitation of the Soviet Academy of Sciences.

Dr. F. Webster spent a short time on board prior to the ship's sailing and was able to discuss briefly the general arrangements for the cruise and the experiment.

The chief scientist for the cruise was Dr. Ivanov-Franskevitch, and the main cruise objectives were to make a detailed survey of the currents and water structure in an area of the Southern N. Atlantic near to 15°N 35°W. The moorings for the SCOR experiment were to be in addition to those of the array already laid by the sister ship of the KURCHATOV, the "DMITRI MENDELEEV".

At an early stage during the passage to the work area, time was spent in discussion of the layout of the experiment. It was inevitable that some departures would have to be made from the provisional plan drawn up in Dublin in September 1969, but an attempt was made to keep these to a minimum. The final arrangement differed from the Dublin plan in the following respects. The depths of 25 and 300 m were changed to 50 and 200 m in order that the meters should be on heavier wire at the 200 m level and that there would not be additional risk involved by spending time attaching current meters at the 25 m level when the mooring anchor was already on the sea bed. The LSK instruments were added as shown in Table 1 but their inclusion did not in any way change the original pairings. The sampling period for the LSK was 10 minutes and that for all the other instruments 15 minutes.

As was mentioned at the Dublin meeting of the working group it is the practice on the Soviet moorings to have a continuous wire with the current meters suspended from brackets clamped to the wire. This method of suspension was to be used for all of the instruments and, since the majority of these were not designed for use in this way, there were several difficulties to be overcome. Prior to the cruise, Dr. Chekotillo sent diagrams of the Alekseev brackets to the visiting scientists, but unfortunately there was insufficient time to complete brackets for all of the meters. The brackets for the Aanderaa meters were made from stainless steel at N.I.O. but there was no time to produce suitable clamps. Non-stainless clamps were available on board, and these were welded to the brackets. Spacer bars for the lower end of the Geodyne meters were also made at N.I.O., but on board these were found to be too short, and steel sleeves were inserted into the middle of the polypropylene bars. The brackets for the Geodyne meter were the standard Alekseev design. The Braincon meter used Alekseev brackets with an additional arm welded on to offset the suspension 110 cm from the wire. The Plessey meter was used with its own suspension frame, and the LSK instrument was clamped directly to the wire.

All shackles on the SCOR moorings were seized, and the instruments were attached to the

frames with Brummel Hooks; these are in general use with the Alekseev meters and save considerable time during launch and recovery. Fifteen-kilogram steel weights were suspended beneath the Braincon and Aanderaa meters. No non-magnetic weights were available, and so one-meter strops were inserted in order to minimize the influence on the compasses.

It was agreed to arrange the meters on the wire at each depth, so that there was a constant four-meter separation of speed sensors between adjacent meters. The complete suspension arrangement for each meter was photographed prior to the experiment.

The moorings were laid on 20 and 21 March 1970 at the corners of a 5-mile square centered on 16°33'N, 32°50'W. The only incidents during the laying of these moorings were the loss of a pin from the hinge block of the Plessey meter on Mooring I and the breaking of the rotor on the Aanderaa meter on Mooring III. Spares were available for the replacement of both these items.

All the moorings carried a flashing light and radar reflector but an inspection of the moorings on 21 March showed that the mast on Mooring I had broken.

Throughout the duration of the moorings the KURCHATOV was working some distance from the mooring site, and so regular observations of the buoys were not possible. On the evening of 1 April the "ANDREI VILKITSKY" (another ship engaged in the survey) reported that all the SCOR buoys were in position. The weather during the 13 day period had been good with winds generally in the range force 3 to 5, from directions in the north-easterly quadrant.

Three moorings were recovered on 2 April (I, II and III). Mooring I which had lost its radar mast was recovered first. There was slight marine growth (goose barnacles) on the meters at the 50 m level, both on the body and fins of the instruments and also to some slight extent on the rotors. The LSK instrument at 200 m had one propellor blade missing, apparently due to corrosion, and at 1000 m there was some damage to the Plessey fin due to its having fouled the suspension frame. (It would be worthwhile to tow the meter with the damaged fin in a tank to observe its deflection from the normal position at the speeds that it would have measured during the experiment.)

On Mooring II the only damage to the instruments was that a stud had sheared on the Plessey frame, but this would in no way have influenced the data. Again there was marine growth at the 50 m level as on all the other moorings. The goose barnacles did not adhere to the speed sensors which had been treated with anti-fouling paints (Plessey, Braincon and Geodyne).

Mooring III was recovered during the early evening. This mooring and Mooring IV used a different design of surface float from Moorings I and II. These floats were a new design with the body having two diameters. When the float on Mooring III was lifted from the water it was seen that it was on the point of breaking, with the bottom layers of foam only held in place by a short piece of steel tube within the buoy. The mooring was, however, recovered without further incident.

Later in the evening a radar and searchlight search was made for Mooring IV but the mooring was not found. The search was resumed at 0900 on 3 April and after some time the buoy was sighted in its expected position. It was immediately obvious that the buoy had broken in a similar manner to III and was floating with the mast downwards, and the mooring held only on the bypass line used in lifting the moorings. Several attempts were made to grapple the buoy from the ship, but these met with no success. Finally a boat was launched, and a diver put a wire lasso around the base of the mast. The mooring was recovered by means of this lasso with no damage to any of the meters.

A preliminary investigation showed that all current meters appeared to have worked satisfactorily, except that 4 of the 12 Alekseev meters have incomplete records, and one of the 3 Braincon meters had not recorded.

TABLE 1.

<u>DEPTH</u>	<u>SCOR MOORING No.</u>			
	1	2	3	4
50 m	Aa	P	D	A
	A	A	B	G
200 m	D	B	A	D
	G			A
	A	A	Aa	P
1000 m	P	D	A	A
		Aa		
	A	A	G	B

Key Aa = Aanderaa
 A = Alekseev
 B = Braincon
 D = Warnemünde LSK
 G = Geodyne
 P = Plessey

ANNEX VI

REPORT OF SCOR WORKING GROUP 31
 SYMPOSIUM ON GEOLOGY OF THE EAST ATLANTIC CONTINENTAL MARGIN
 CAMBRIDGE, 23 - 26 March 1970

The Symposium was held at Churchill College, Cambridge, U.K. About 240 colleagues from several countries, representing universities, governmental and industrial organizations etc. were able to participate.

The principal aims of the Symposium were:

- 1) To review present knowledge and plans for investigation of the East Atlantic Continental Margin (EACM);
- 2) To identify gaps in knowledge that could be filled by coordinated national or international marine research programs.

Ten invited general lectures outlined continental margin problems. These were given by specialists in geology, geophysics, oceanography and biology, as well as economic aspects. Nineteen invited regional lectures gave reviews on topography, sediments, rocks and structures of the entire EACM. Dr. G. Giermann - UNESCO/IOC - summarized planned national and international programs. Twenty shorter regional contributions of general interest were included. 80 m² of maps and other illustrations were displayed near the lecture hall.