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S.M.B.A., Dunstaffnage Marine Research Laboratory.

Preliminary Cruise Report: RRS CHALLENGER, Cruise 11C

(A full report of JASIN cruises 11A to 11D will be issued subsequently).

Duration: 0825 h 17 August - 1613 h 30 August 1978.

All times GMT.

Locality: Rockall Channel.

Staff: D.J. Ellett

A. Edwards

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D. Rae (Student)

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Prof. C.S. Ling (Catholic University of America)

Dr T.W. Kao (Catholic University of America)

Dr C. Fairall (USN Postgraduate School)

Aims: 1) To make an STD survey around the JASIN experimental area in co-operation with HNMS TYDEMAN.

2) To make water droplet flux and aerosol measurements during the STD survey with Professor Ling and Dr Fairall's apparatus.

Narrative: CHALLENGER sailed from Yorkhill Quay, Glasgow at 825 h 17 August, and upon reaching the Sea of the Hebrides, set course

for the JASIN Fixed Intensive Array (FIA), in order to be able to stand by the concentration of moorings in this area during the absence of METEOR for an intercalibration ^{with} ~~of~~ other meteorological ships. 10-minute logging of surface temperature and soundings began at 0910 h 18 August, and the ship hove-to close to METEOR at 0517 h 19 August in southerly winds of force 6-7, using the opportunity to make droplet and aerosol measurements in moderate sea conditions. Because the weather had delayed some of the ships participating in the intercalibration, METEOR did not quit her station until evening, and the early arrival of PLANET to take over her station allowed CHALLENGER to leave the FIA at 2336 h to begin the STD grid.

Because of the shorter time available and the likelihood of rougher weather than that of Cruise 11B, it was decided to omit triangle D5 of the STD grid and begin work at D4, where the first station began at 0610 h 20 August. Four of the six lowerings at this position had been made by 1500 h when winds increasing to force 8 led to abandonment of STD work. Droplet flux measurements and aerosol observations for high sea states were made, but at 1830 h the bow A-frame suffered minor damage from a cross-sea. During the evening 50 kt gusts were registered by at least two of the ship's five anemometers and the ship continued hove-to on southerly and south-westerly courses overnight.

By 0720 h on the following morning, 21 August, the wind had dropped to force 6 and the ship steamed for triangle D3, where work began at 1116 h. Stations continued throughout the day, and

at C2N at 1426 h 22 August an intercalibration STD lowering was made with TYDEMAN. Winds became fresh again on the evening of 23 August and maintained a moderate swell until the evening of 24 August, when conditions began to improve. Stations were uninterrupted with the exception of a break from 1304 to 1650 h 24 August to rectify STD faults.

After completing triangle B4 at 1355 h 25 August the ship steamed to meet SHACKLETON at a nearby position where an STD calibration station with AKADEMIK VERNADSKY had been arranged, in order to collect engine room spares delivered late to Glasgow. At Mr Creasé's suggestion, it was agreed to join the intercalibration and simultaneous lowerings were made by CHALLENGER & VERNADSKY at 1600 to 1710 h. Results in the form of plotted profiles and t-s diagrams were prepared and taken to VERNADSKY by Mr Edelsten, who enjoyed a tour of the ship and brief hospitality before returning to CHALLENGER at 2000 h. Professor Ling's A-frame was dismantled and re-rigged with a replacement droplet detector in the interim.

Triangle B3 was worked from 2150 h 25 August, and in light westerly winds and decreasing swell, stations continued to the south-west corner of the grid, triangle A4, without interruption apart from occasional speed reduction for fog patches. Only one circuit was made of triangle A1 in order to ensure the completion of stations to the west before a forecast change in the weather. However, this did not materialise, and the final lowering at A4 was completed at 1509 h 29 August, after which course was set for the Butt of Lewis. Surface temperature and soundings were logged

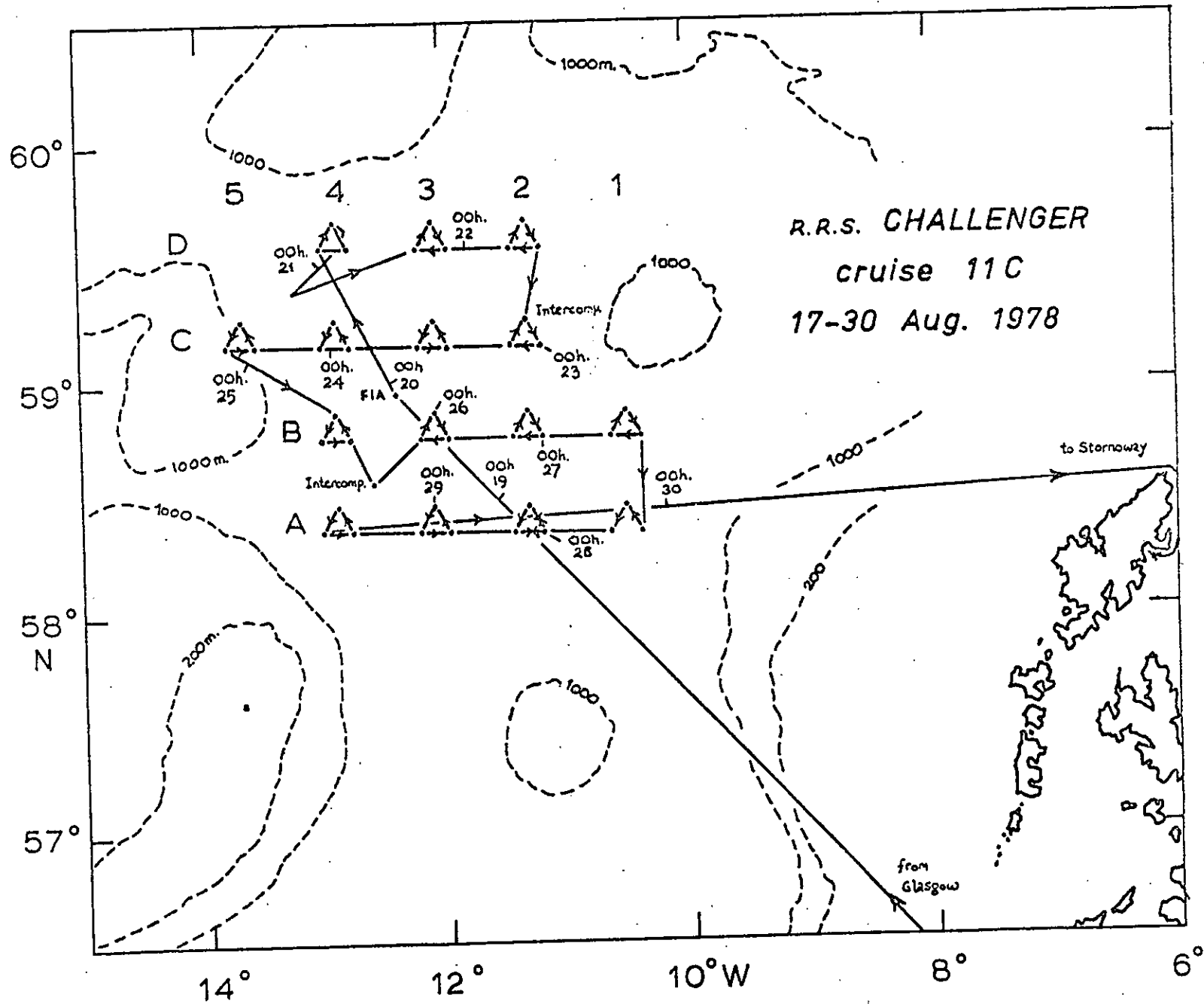
until the latter point was reached at 1230 h 30 August, and CHALLENGER berthed at Esplanade Quay, Stornoway at 1613 h after a very favourable passage.

Results: Aim 1) All but one of the sixteen triangles of the STD grid were covered during 20-29 August, thirteen by two circuits of the triangle at approximately $6\frac{1}{4}$ hr spacing and two by single circuits. Results from the Plymouth 9006 STD were mostly of a very satisfactory standard, and because calibrations were available from the previous cruise it was possible to produce corrected temperature and salinity profiles and t-s plots on board during the cruise. Satisfactory intercalibrations were carried out with both TYDEMAN and AKADEMIK VERNADSKY.

Aim 2) Aerosol observations and associated meteorological parameters were logged on tape from the Monterey mast-head site for much of the cruise, but especially during the periods when the ship was hove-to head to wind on STD stations. Spray droplet observations from the bow A-frame were also made at stations, but suffered interruption from 20-25 August after the frame was slightly damaged by a cross-sea. However, wind and humidity profile data were taken at three levels during most of the cruise from Professor Ling's sites.

D.J. Ellett.

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