

International Commission for the Northwest Atlantic Fisheries

Subcommittee on Environmental Research

A note on the preparation of surface temperature charts of
the North Atlantic Ocean

by

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At the planning sessions of the Ad Hoc Subcommittee on Environmental Research held at Montreal in 1959 it was recommended that thermographs and surface sampling equipment should be used from non-research vessels in order to provide more adequate cover of hydrographic conditions in the ICNAF area than can be obtained even with the most carefully co-ordinated research vessel programme. Hearing this, it occurred to me that there existed an enormous amount of temperature material for the North Atlantic in the form of surface temperature observations made by the merchant ships etc. which make weather observations for the various meteorological offices of the world, and that this material probably exceeded in volume that which any sampling programme sponsored by ICNAF could hope to collect. Later, conversations at the New York Oceanographic Congress with Mr. V. E. Brock of U.S. Fish and Wildlife Service's Biological Laboratory at Honolulu showed that surface temperature charts of the North Pacific were, in fact, being produced already from this type of material for 10-day periods based on the middle of each month. I therefore decided to approach the Meteorological Office, London to see how much material was available for the North Atlantic and found that it was considerable and of easy access. It was sufficient to allow 5-day charts of surface temperature to be constructed and a series of such charts for the period 13-17 of each month during the years 1953-4 is now in the course of preparation for the Atlantic north of latitude 30°N. The chart for January 1954 is presented here. The help given by the Meteorological Office in making the data available to us is gratefully acknowledged.

The period 1953-4 was chosen for two reasons. First, it was known that the Atlantic Fishery Oceanographic Research Laboratory, Washington was producing similar charts for the area from the Straits of Florida to the Grand Banks for these two years. Second, there is some evidence which indicates that these years

had contrasting hydrographic regimes as far as the Barents Sea and Icelandic waters are concerned, 1953 being a cold year and 1954 a warm one; whilst further south in the Atlantic the situation was reversed, 1953 being warmer than 1954. It is considered that a study of all the available oceanographical data together with certain meteorological data might throw light on the mechanism responsible for this see-saw and so help in the future forecasting of hydrographic conditions on certain Arctic fishing grounds.

The period of 5 days was selected in order to make the charts as truly synoptic as possible. Charts for 10-day periods have been produced and compared with the 5-day charts but they yield no significant increase in information. If even longer periods, such as a month, were used then the data would have to be reduced to a central date and the work involved in preparing the charts would be considerably increased.

It can be seen that there are sufficient data for a 5-day period to allow a reasonably detailed chart to be drawn, but there are some striking gaps in the chart, the area south of Greenland being particularly lacking in observations. It is possible that in some months data collected by research vessels or by merchant ships operating on routes sampled under the ICES Routine Sampling Programme could be used and they might help to fill up these gaps. (No attempt has been made to include such data in the chart for January 1954). It is unlikely that such data will all fall in the 5-day period selected, however, and they will have to be reduced to the 15th day of the month by using the temperature trends at the Ocean Weather Stations for the month in question. If temperature observations could be made by the ships operating Continuous Plankton Recorders between Reykjavik and New York, they could be treated in a similar fashion and would help to fill a major gap.

It is not intended to make any scientific deductions from the chart presented here, but it is worth pointing out that, as the chart is for the winter season, the isotherms can be regarded as more or less stream lines and the chart is therefore a current chart as well. (The warmer water lies on the right-hand of an observer looking in the direction to which the current is flowing). The meanders in the Gulf Stream to as far as the tail of the Grand Banks are a striking

feature of the chart, as are the flow of warm water from a position east of the Grand Banks towards the Davis Strait, the closing-up of the isotherms over the Mid Atlantic Ridge, and the branching of the North Atlantic Drift as it approaches Europe.

Postscript: Since writing this note I have become aware that since July 1959 the U.S. Navy Hydrographic Office have been issuing charts similar to the one described here. They are for the period 11-20th of each month and cover the area between 20° and 57° N and between the American coast and the 25° W meridian.

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NORTH ATLANTIC OCEAN
SURFACE TEMPERATURE (°F)
13-17 JANUARY 1954

- Selected ship observation
- Ocean Weather Station

