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Temperatures and Salinities on the Southeast Shoal of
the Grand Bank in July 1978

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ABSTRACT

A brief description of the hydrological conditions found in the Grand Banks of Newfoundland is presented here. Graphics showing bottom and surface temperatures and comments on their possible influence on capelin are also included.

INTRODUCTION

In order to determine capelin abundance and distribution, the R/V *Isla de la Juventud* conducted a research cruise from 3 to 14 July 1978, carrying out a hydrological study of the region.

Usually, capelin have spawned on the Southeast Shoal area during the months of June-July, but, when this failed to occur in 1978, it was first thought that this may be due to higher-than-normal bottom temperatures in these months.

Data collected during this cruise showed that water temperatures near the bottom of Southeast Shoal varied from 2°C to 4.5°C, which according to Dommasnes et. al. (1974), Sangolt and Ulltang (1976), Carscadden (1977) and other authors, are within the optimum range for the spawning of this species; however, very low catches were obtained this year.

Surface temperatures were very much higher than those of previous years.

MATERIALS AND METHODS

The studied area extended from 43°00.0' to 47°00.0' north latitude, and from 49°00.0' to 52°15.0' west longitude. Eight cross-sections at a distance of 30 nautical miles between each one of them were made, setting up 4 oceanographical stations in each of the sections for a total of 32. Castings were made with Nansen bottles and reversible thermometers to near bottom depths.

Salinities were determined with an inductive salinometer AUTO-LAB., MARK III.

Values for depths greater than 200 m depth were not taken into account when drawing isotherms.

RESULTS

Surface temperatures in the studied area increased from 9.6°C in the northern part to 18.2°C in the southern part (Fig. 1B). Near the bottom temperatures varied from -0.4°C in the northeastern part to 4.5°C at the latitude of the Southeast Shoal, decreasing again southward (Fig. 1A).

Both surface and bottom salinities were high on the southeastern part of the Grand Bank, the former ranging from 31.9 to 33.1‰ (average 32.6‰) and the latter from 32.8 to 33.3‰ (average 33.2‰).

DISCUSSION

In 1978, bottom temperatures on the Southeast Shoal (2 to 4.5°C) were within the range considered good for capelin spawning. In fact, they were similar to those reported for the preceding three years: 2.0 to 4.0°C in 1975 (Seliverstov and Kovalev, 1976), 4.1 to 5.0°C in 1976 (Carscadden, 1977), and 4.2 to 4.3°C in 1977 (Klochkov and Seliverstov, 1978). On the other hand, surface temperatures were very much higher than those of the above-mentioned years: 9 to 11°C in 1975 (Labarta, 1976), 6 to 11°C in 1976 (Sangoldt, 1977) and about 9°C in 1977 (Carscadden et. al., 1978), compared with 9 to 18°C in 1978.

It may be considered that capelin, being a pelagic species preferring cold water, might be affected by the high surface temperatures during its migratory route, but it is not likely that this was the case, as temperatures of 2 to 4°C existed in the whole 30-50 m layer, being even less in some areas near the bottom.

CONCLUSIONS

Water temperatures near the bottom were about the same as those of the three previous years and were considered good for capelin spawning.

Surface temperatures in 1978 were higher than in the three preceding years, but it is unlikely that these were responsible for the absence of capelin spawning on the Southeast Shoal in 1978. It is concluded that temperature was not the determining factor in declining abundance of capelin, as there has been a progressive decline in catches since 1975.

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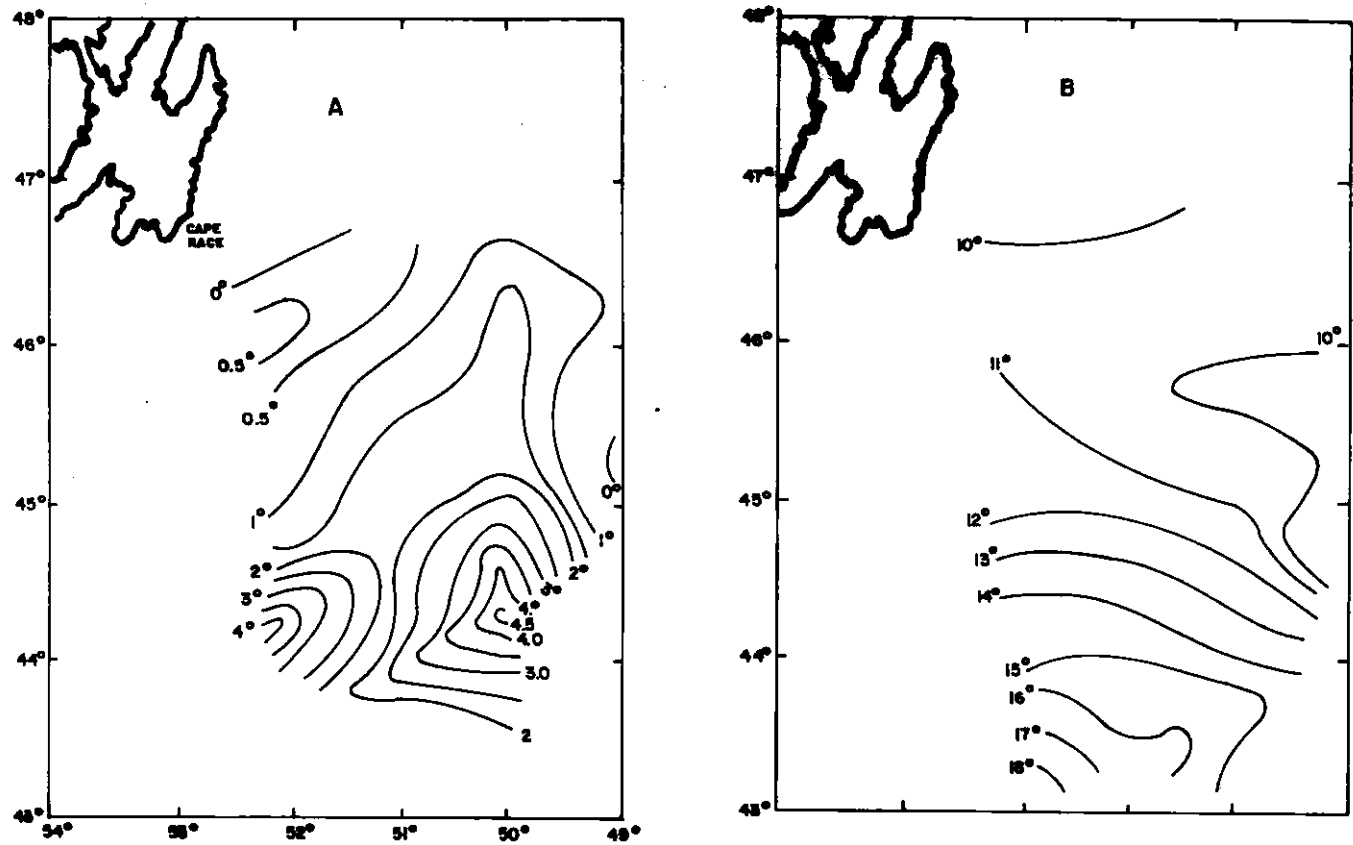


Fig. 1A. Near bottom water temperatures. B. Surface layer temperatures.

