

Northwest Atlantic  Fisheries Organization

Serial No. N333

NAFO SCR Doc. 81/VI/51

SCIENTIFIC COUNCIL MEETING - JUNE 1981

Temperature anomalies along the Seal Island Section (Div. 2J)

between 1969 and 1980

by

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Introduction

Between November 8 and 10, 1980 RV 'ANTON DOHRN' completed standard hydrographic work along the Seal Island Section (Subarea 2). The measurements performed at the Standard Stations S3 to S8, were done with a CTD as described by STEIN (1980). The temperature and salinity profiles were used to calculate mean values as well as temperature anomalies for the surface layer 0 - 50m.

Mean values of temperature and salinity along the
Seal Island Section

Tables 1 and 2 contain the mean values of temperature (\bar{t}) and salinity (\bar{s}) for the Standard Stations S3 to S8. For the surface layer (0 - 50m) and the deeper layer (50 - 200m) the standard deviation of t and s is given. The figures show that the surface layer was warmer than usual, up to 0.5 °K, whereas the salinity ranged 0.26 ppt below normal. In the deeper layer the situation is different. Here the warming dominates the Irminger parts of the section: salinity increased the mean value up to 0.34 ppt in this layer.

Table 1 Mean temperature (\bar{t} = average 1969 - 1980, excl. 70, 78), standard deviation (σ_{n-1}) of the mean value and mean temperature differences in °K as compared to 1980 ($\bar{t}-t$) in distinct water layers on the Seal Island Section

		S3	S4	S5	S6	S7	S8
0 - 50m	\bar{t}	0.55	0.37	0.35	0.86	1.11	2.46
	σ_{n-1}	0.36	0.33	0.46	0.67	0.60	0.56
	$\bar{t}-t$	-0.43	-0.49	-0.32	0.13	-0.50	-0.31
50 - 200m	\bar{t}	0.83	0.42	1.06	1.76	1.96	3.14
	σ_{n-1}	0.76	-	0.59	1.01	0.71	0.37
	$\bar{t}-t$	0.43	-	0.27	0.44	-0.33	-0.27
0 - 200m	\bar{t}	0.79	0.53	0.92	1.56	1.76	2.98
	$\bar{t}-t$	0.25	-	0.16	0.39	-0.36	-0.11

Table 2 Mean salinity (\bar{S} = average 1969 - 1980, excl. 70, 78), standard deviation (σ_{n-1}) of the mean value and mean salinity differences in ppt as compared to 1980 ($\bar{S}-s$) in distinct water layers on the Seal Island Section

		S3	S4	S5	S6	S7	S8
0 - 50m	\bar{S}	32.82	32.78	32.92	33.23	33.48	34.05
	σ_{n-1}	0.25	0.19	0.26	0.40	0.41	0.24
	$\bar{S}-s$	0.12	0.10	-0.07	0.26	-0.22	0.24
50 - 200m	\bar{S}	33.36	33.46	33.56	33.82	33.96	34.44
	σ_{n-1}	0.30	-	0.37	0.38	0.36	0.12
	$\bar{S}-s$	-0.11	-	-0.15	0.01	-0.34	-0.14
0 - 200m	\bar{S}	33.23	33.27	33.43	33.70	33.85	34.35
	$\bar{S}-s$	-0.05	-	-0.09	0.10	-0.30	-0.03

Temperature anomalies

A comparison of the mean values for the two layers 0 - 50m and 50 - 200m indicates that the surface layer is representative for changes in the water column down to 200m depth. Thus, the temperature anomalies, given in fig. 1, were calculated for the surface layer 0 - 50m. They represent the changes of temperature for the polar component of the Labrador Current (S3 - S5) and the Irminger component (S6 - S8) during the past ten years.

The general increase of temperature as observed for both components from 1974 onwards was observed until 1977. Unfortunately, there are no data available for autumn 1978. Thus, it cannot be ascertained here whether the general decline of the temperature started in 1977 or 1978, respectively. From 1979 to 1980 an increase of the anomalies was found for the polar component (S3 - S5), whereas the Irminger component of the Labrador Current (S6 - S8) decreased, indicating a cooling of the warm component during the end of the decade of observation.

References

- STEIN, M., 1980: Hydrographic conditions on Hamilton Inlet Bank (Div. 2J) in early December 1979.
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