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Results of the Hydrographical Observations  
in the Southern Baltic Performed by the Sea Fisheries  
Institute at Gdynia from May 1962 to May 1963

by

A. Glowńska



Temperature conditions

As there was no cruise in May 1962 we can only say that the surface temperatures rose from the values 5 - 10°C observed in the last decade of May to the highest of the year found on the 18th of July, when they amounted to about 17.5°C in the Bornholm Deep. The lowest value observed at that time was found in the western part of the Slupsk Furrow (15.7°).

According to the observations carried out by the State Hydrological and Meteorological Institute at Gdynia in the first days of August the surface temperatures did not exceed 17.2°, the lowest of them (12.3°) being observed at 56°01,8'N, 15°03'E. The mean computed from 28 observations then amounted to 15.6°.

The mean surface temperature in the last decade of October was 11.1°.

In the period from November 22 to December 6 surface waters showed temperatures from 8.3° to 7.3°, the last value being observed in the Bornholm Deep.

In the deeps of Bornholm and Gdańsk 8.0° was found on November 22 and 7.6° on December 5, respectively. At the same time the homogenized top water layer in the Arkona Basin reached to 30 m depth at least; in the Gdańsk Deep, however, to more than 50 metres.

In February 1963 during a cruise made by the staff of the State Hydrological and Meteorological Institute there were observed in some areas of the Baltic temperatures of below 0°C, for instance at one of the stations in the area of the Gulf of Gdańsk and at another one at the western end of the Slupsk Furrow; furthermore, in the Bornholm area, in the Bornholm Gate and in the Arkona Basin. So it might be seen that February was announcing yet an exceptionally rough winter to come and in fact the severe climatic conditions this winter resulted in surface temperatures down to -0.4°, observed as late as at the end of March (for instance on station B<sub>1</sub> of the Bornholm Deep at 40 m depth). Temperatures of below 0° were found in March down to more than 60 m depth in the Gdańsk Deep (Figure 3), and to somewhat more than 40 m in the Bornholm Deep (Figure 1). In spite of that the unusually warm spring brought a steep rise in temperature of the top waters, so the May temperatures amounted to almost the same values as they did in the preceding year (5 - 6°). The temperature conditions in the Deep of Bornholm and in the Slupsk Furrow as well as in the Gdańsk Deep are represented in Figures 1 to 3.

In the Bornholm Deep the winter water with temperatures of 2 - 3° persisted at least till August, but probably one or two months later, occupying the level about 50 m depth. At the end of November the minimum temperature there was 4.6° at 50 m depth. The bottom temperatures in that deep during the summer 1962 reached above 7° till October; afterwards there was a drop in temperature down to 6.1° found at the end of April this year; on May 18, however, some rise in temperature has been recorded again (6.5°).

If characterizing the July temperature at the surface in the Gdańsk Deep 1962 by means of the value 16.1° found at the neighbouring station K<sub>4</sub> (55°00'N, 18°35'E), the eastern part of the Baltic had colder surface waters than the western part. In the first days of August 16.05° was found. The further decrease of temperature at the surface is probably like that showed in Figure 3. In February values of somewhat

cold water like this occupied the top layer down to 70 m depth, where the isotherm 0° had to be drawn in Figure 3. The May temperatures at the surface were higher in the Gdańsk Deep (7.8°) than in the Bornholm Deep. The same was the case in the preceding year owing to the influence of the Vistula waters which at that time usually are much warmer than the surface waters of the Baltic elsewhere.

The bottom waters of the Gdańsk Deep showed in the period considered temperatures above 5° except in December 1962 and at the end of March 1963, when values lower than 5° were found.

As it can be seen during the whole period considered the bottom temperatures in the Gdańsk Deep were about 1°C lower than those in the Bornholm Deep.

### Salinity

Surface salinity in 1962 was rather high, particularly in the western part of the sea where in February it amounted to more than 8‰. The following table gives the surface salinity figures for some more important stations: A<sub>1</sub> (Arkona Basin), B<sub>1</sub> (Bornholm Deep), B<sub>2</sub> (western part of the Slupsk Furrow) and G<sub>2</sub> (southern part of the Gdańsk Deep).

Table 1.

Date / Station	A <sub>1</sub>	B <sub>1</sub>	B <sub>2</sub>	G <sub>2</sub>
8-22.II.1962	8.66	8.10	7.77	7.41
28.III. - 4.IV.	8.12	7.85	7.57	7.48
22-28.V.	7.97	7.79	7.79	7.14 <sup>x)</sup>
18.VII.	7.92	7.65	7.59	-
25.IX. - 4.X.	7.76	7.79	7.76	7.48
22.XI. - 4.XII.	8.22	7.72	7.57	7.48
24-29.IV.1963	7.70	7.43	7.39	7.43
16-20.V.	7.25	7.25	7.43	7.43

x) Temporary dilution by the Vistula water.

The high salinity values at the surface in the Arkona Basin and in the Bornholm Deep at the beginning of the preceding year as well as the values of about 7.5‰ in the eastern areas with few exceptions were due to the winter influx of Kattegat waters into the Baltic, which according to Danish observations, had taken place in the Belt Sea. It must be said, however, that this influx resulted in a rise in salinity of the top water layer only.

In the Arkona Basin the unusually high salinity of 8.66‰ found there in February of the preceding year dropped steeply to values of about 8‰ in the period from May to August, then further to the minimum of 7.76‰ observed in the first decade of October. In November there was stated a maximum of 8.22‰, which was followed by a gradually lowering in salinity till May when its value reached 7.25‰ only, probably in connection with the spring melting of the ice sheet that covered extensive areas of the Baltic during the last severe winter.

Analogous conditions had been observed in the Bornholm Deep. In February the surface salinity exceeded 8‰, but in March and May the salinity there was yet slightly below 8‰. Afterwards it dropped to the minimum of the whole year found on the 18th of July, when it amounted to 7.65‰. In the first decade of August, however, two values of 7.92‰ and 7.78‰ were found. From August to the end of November the salinity dropped slowly to 7.72‰ and afterwards there was a rather steep further decrease in this hydrographical factor so that in February 1963 7.26‰ was observed. At the end of March, according to the data from the State Hydrological and Meteorological Institute at Gdynia, there was a rise in surface salinity to a

value of about 7.5 ‰, but afterwards, in April and May the staff of the Sea Fisheries Institute found there 7.43 and 7.25 ‰ only.

The surface waters of the western part of the Slupsk Furrow were characterized by constantly oscillating salinity values during the whole period reported. The values ranged from 7.8 to 7.4 ‰. In 1962 the salinity was rather high, staying above 7.5 ‰; in the last months, however, like at the other places, it dropped below that value except at the end of March when, just as in the Deeps of Bornholm and Gdańsk, the salinity curve showed an unexpected maximum, here amounting to about 7.8 ‰. Later on there were stated two values of about 7.4 ‰, in April and May this year.

In the Gdańsk Deep the salinity of the surface waters was generally somewhat below 7.5 ‰, except for March 1962 (probably owing to the process of ice development and the resulting stronger salt concentration). The minimum of the period reported on was observed in May 1962. The warm spring without rainfall did not give the usual dilution of sea water in that Deep in May 1963, and the salinity amounted to 7.43 ‰.

The bottom salinity in the Bornholm Deep, being till November 1962 higher than 16 ‰, decreased with time to the value of 15.46 ‰ in May 1963.

In the western part of the Slupsk Furrow the bottom salinity oscillated during the period from more than 13 ‰ to about 11 ‰, found in May this year. In the Gdańsk Deep the general lowering of the bottom salinity was observed. At the beginning of 1962 the bottom water showed values of above 12 ‰, but afterwards the salinity decreased constantly. From February this year the isohaline of 11 ‰ did not appear any more.

The oxygen contents at the bottom in the Deeps of Bornholm and Gdańsk was, generally taken, very low, reaching values below 1 cm<sup>3</sup>/l. The low oxygen contents at the bottom of both Deeps indicate an essential stagnation of the bottom waters in the deeps. This supposition seems to be confirmed by a simultaneous gradual rising in phosphate content. The unusually high phosphate values are given in the following table together with the values of the oxygen contents.

Table 2

Station Date	A <sub>1</sub>		B <sub>1</sub>		B <sub>2</sub>		G <sub>2</sub>	
	O <sub>2</sub> cm <sup>3</sup> /l	P <sub>2</sub> O <sub>5</sub> <sup>-</sup> -mg/m <sup>3</sup>	O <sub>2</sub> cm <sup>3</sup> /l	P <sub>2</sub> O <sub>5</sub> <sup>-</sup> -mg/m <sup>3</sup>	O <sub>2</sub> cm <sup>3</sup> /l	P <sub>2</sub> O <sub>5</sub> <sup>-</sup> -mg/m <sup>3</sup>	O <sub>2</sub> cm <sup>3</sup> /l	P <sub>2</sub> O <sub>5</sub> <sup>-</sup> -mg/m <sup>3</sup>
28.III.-IV.62	6.0	15	2.0	55	3.5	50	1.8	70
18.VII	4.5	15	0.4	140	3.2	55	-	-
25.IX.-4.X.	4.6	15	0.1	360	2.4	280	0.4	160
22.XI.-4.XII.	3.6	70	0.6	400	3.0	70	2.3	70
25-29.IV.63	7.3	25	0.5	120	5.0	55	1.0	65
16-20.V.	6.4	20	0.2	400	5.8	25	1.1	55

As we see the oxygen contents in the bottom waters of the Slupsk Furrow, however, were much higher and the phosphate contents there were lower than in the Deeps of Bornholm and Gdańsk. So we are allowed to suppose that through the Slupsk Furrow there was a constant flux of waters from west to east but without involving the very bottom waters depleted of oxygen and rich in phosphate.

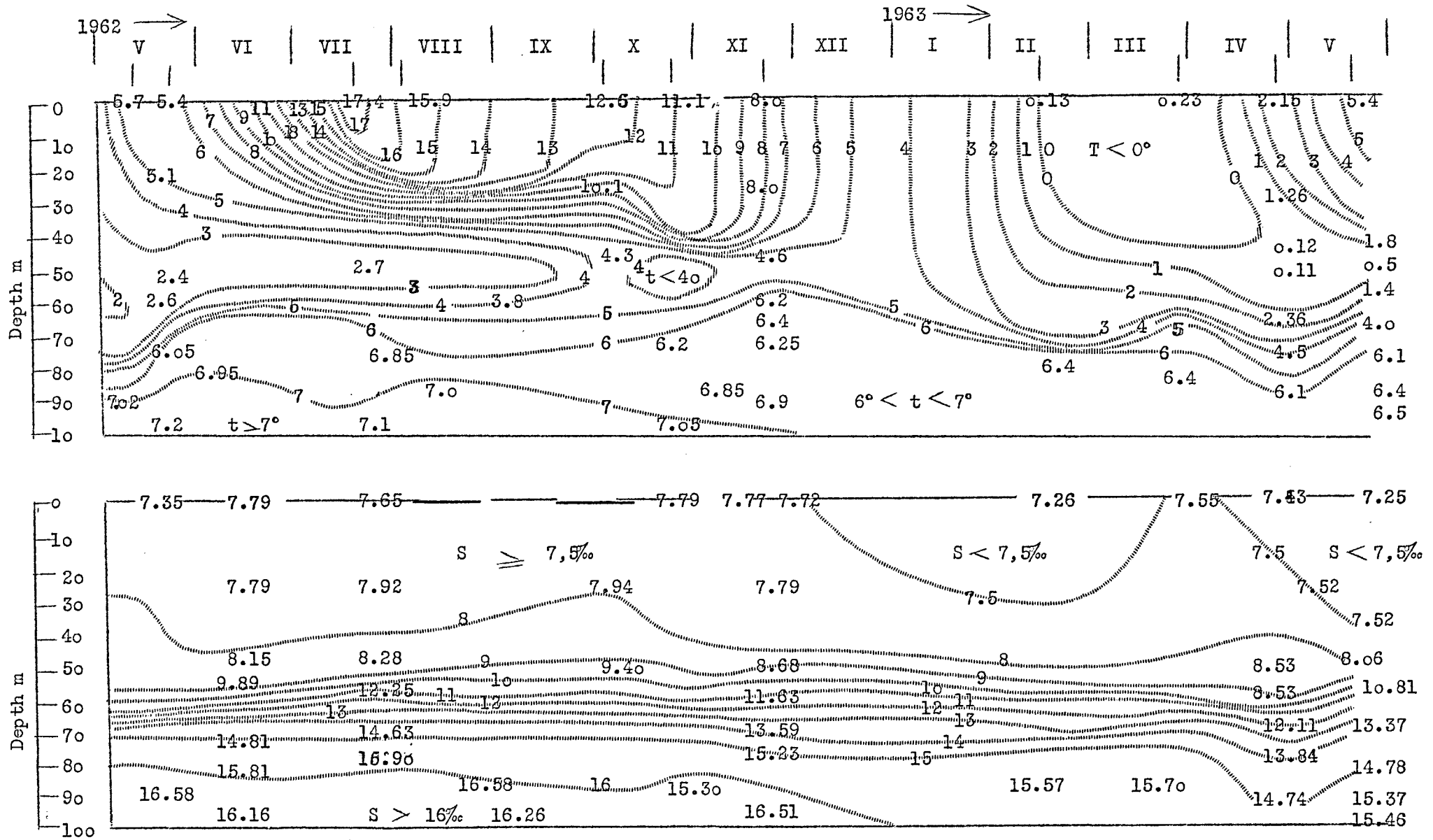


Figure 1. Bornholm Deep. 55°20'N - 15°45'E. - V.1962-V.1963. Temperature and Salinity.

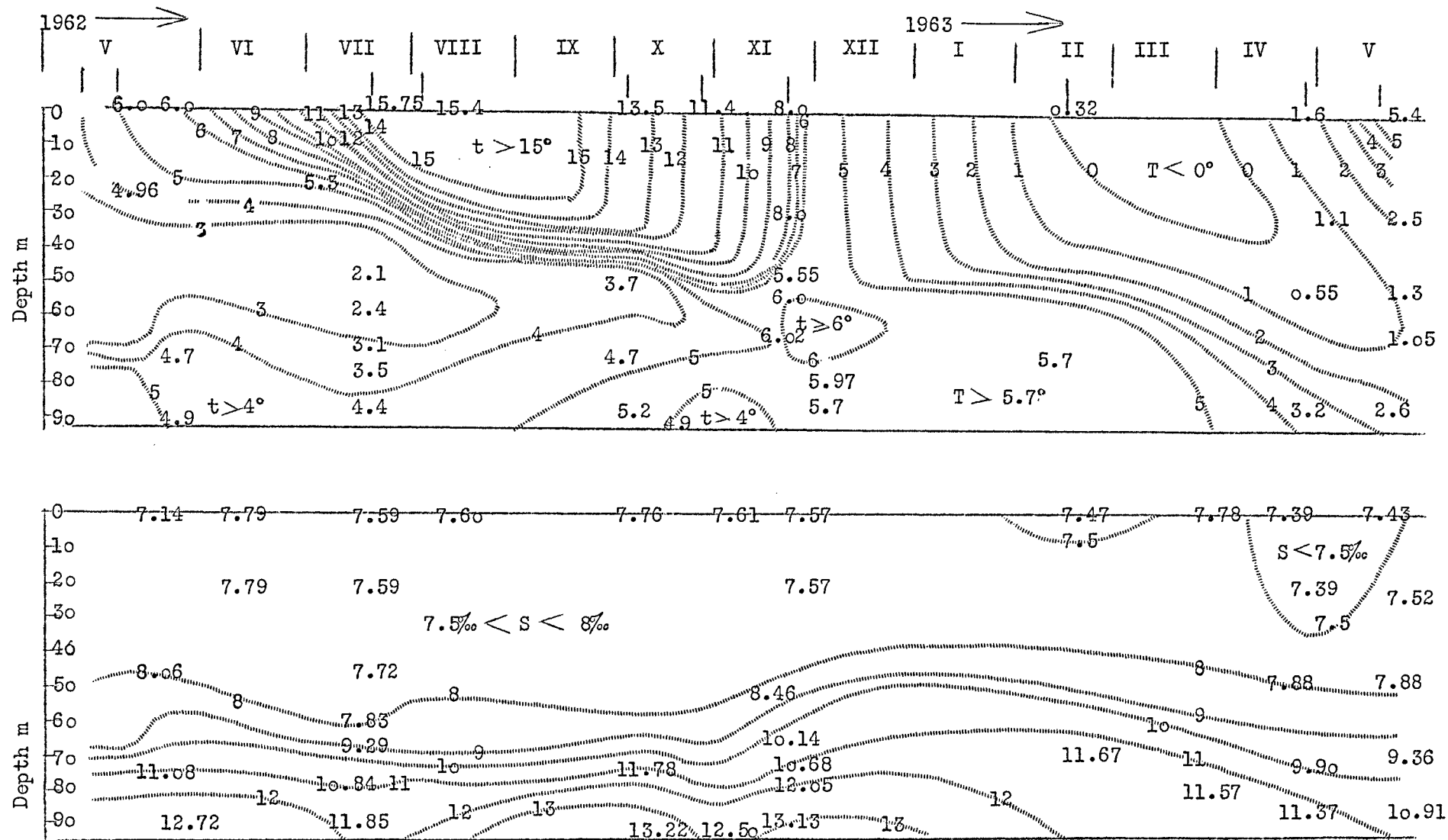


Figure 2. Slupsk Furrow. 55°13'N - 17°07'E. V.1962 - V.1963. Temperature and Salinity.

