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Report on hydrographic data collected at Ocean Weather Station  
Alpha during the period January-July 1963 as a part of the  
NORWESTLANT Surveys

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In the period from 1. January to 20. July 1963 station Alpha has been occupied by Norwegian, French and English weather ships. The Norwegian O.W.S. "Polarfront" I and II served at the station from 1. January to 13. April. From these ships 55 hydrographic stations were worked, of which 23 were worked in January, 19 in February, 5 in March and 8 in April. From 27. February to 23. March no stations were worked because of damage to the hydrographic winch onboard the ship. Of these stations 10 are worked at the standard depths 0, 10, 25, 50 metres etc. down to 150 metres, while 6 are worked at all the standard depths to the bottom. 35 stations have samples from the depths 0, 50, 150, 300, 600 and 1000 metres. The remaining 4 stations have samples from other depths.

During the time from 14. April to 4. June O.W.S. "France" I and II served at station Alpha, and 2 hydrographic stations were worked with samples down to 2000 metres. The salinity values of these stations seems, however, to be too high.

The English O.W.S. "Weather Monitor" and O.W.S. "Weather Adviser" occupied station Alpha from 5. June to 20. July, and 8 hydrographic stations were worked at the standard depths 0, 10, 20, 30 metres etc. down to 2500 metres.

Ocean Weather Station Alpha has the position  $62^{\circ}00'N$ ,  $33^{\circ}00'W$ , and the depth to bottom is approximately 3000 metres. This position is situated in the boundary area between two different water bodies. To the east of station Alpha the Irminger Current runs northwards. In the area to the west of the station there is a cyclonic vortex of Subarctic Mixed Water. The station has thus warm and saline Irminger water to the east and colder and less saline Subarctic Mixed Water to the west. Relatively small east-west movements of the watermasses may therefore involve great variations of temperature and salinity in the upper 500 to 600 metres. Such variations are illustrated in figure 1, which shows vertical temperature and salinity curves of 2 stations. The unbroken curves illustrate the

station worked on 17. January, and the broken curves show a station worked on 18. January. On 17. January the salinity is above 35 ‰ at all depths down to 500 metres, while the station on the next day shows salinities around 34,95 ‰ at the same depths. The greatest difference amounts to 0,1 ‰ between the two stations. In temperature the corresponding difference is 0,9°C. The rapidity of the variations is indicated by the short intervall of time between the two stations.

Figure 2 and 3 show that such variations occur often. Figure 2 illustrates the time variations of temperature at the depths 0, 50, 150, 300, 600 and 1000 metres, while figure 3 illustrates the corresponding variations of the salinity.

Isopleth diagrams of temperature and salinity down to 1000 metre are shown in the figures 4 and 5.

Figure 6 shows mean vertical curves from the surface to 1000 metres depth of temperature and salinity in the following 4 periods: January, February, from 23. March to 13. April and from 5. June to 20. July.

The curves for February show the lowest values for both temperature and salinity so to speak at all depths from the surface to 1000 metres. Except in the upper 300 metres, the highest salinity values occur in January. Below 550 metres January exhibits also the highest temperature. In the period from 23. March to 13. April it is possible that the absorption of radiation from the sun is increasing. The mean surface temperature is more than 1°C higher than in January and February. The surface salinity is, however, very high in this period. It is therefore possible that the warm water has been transported to the area by the current.

In June-July the effect of solar radiation is more pronounced and the mean surface temperature has reached 8°C, even though this period has the lowest surface salinity.

The station worked on 17. January (unbroken curves in figure 1) is also typical for all the stations with samples from the surface to the bottom. A minimum of salinity at 1000 to 1200 metres seems to be a permanent feature. The mean values for temperature and salinity are here 3,7°C and 34,91 ‰. According to Sverdrup this is Arctic Intermediate Water which originates in the area around Greenland. Below this depth the temperature decreases very slowly and the salinity increases again to a maximum at a depth of 2000 to 2500 metres. The salinity lies here between 34,95 ‰ and 34,98 ‰ with a corresponding temperature of approximately 3,1 °C. Approaching the bottom both temperature and salinity decrease. Near the bottom the temperature is

F i g u r e s .

- Figure 1. : Vertical temperature and salinity curves for 2 stations worked 17. and 18. January 1963.  
Unbroken curves: 17. January.  
Broken curves : 18. January.
- Figure 2. : Variations of temperature January-July 1963.
- Figure 3. : Variations of salinity January-July 1963.
- Figure 4. : Isopleth diagram of temperature January-July 1963.
- Figure 5. : Isopleth diagram of salinity January-July 1963.
- Figure 6. : Mean vertical temperature and salinity curves for the periods January, February, 23.March-13.April and 5.June to 20.July.

Figure 6,

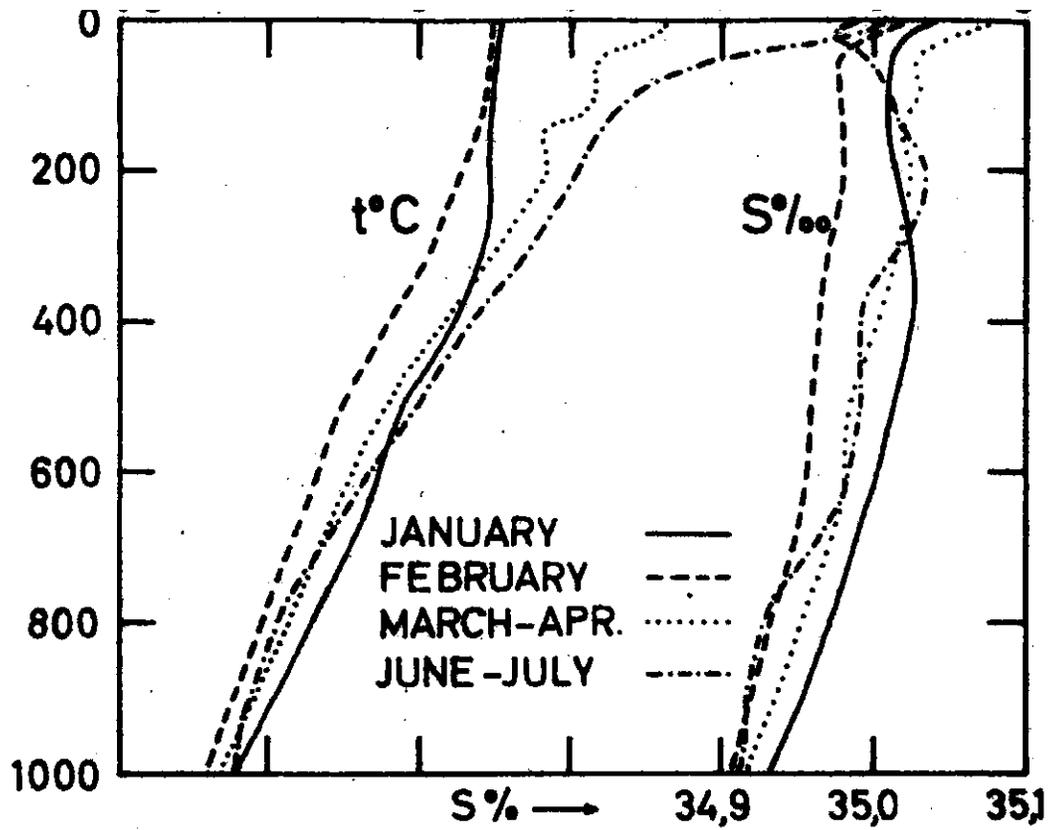


Figure 1.

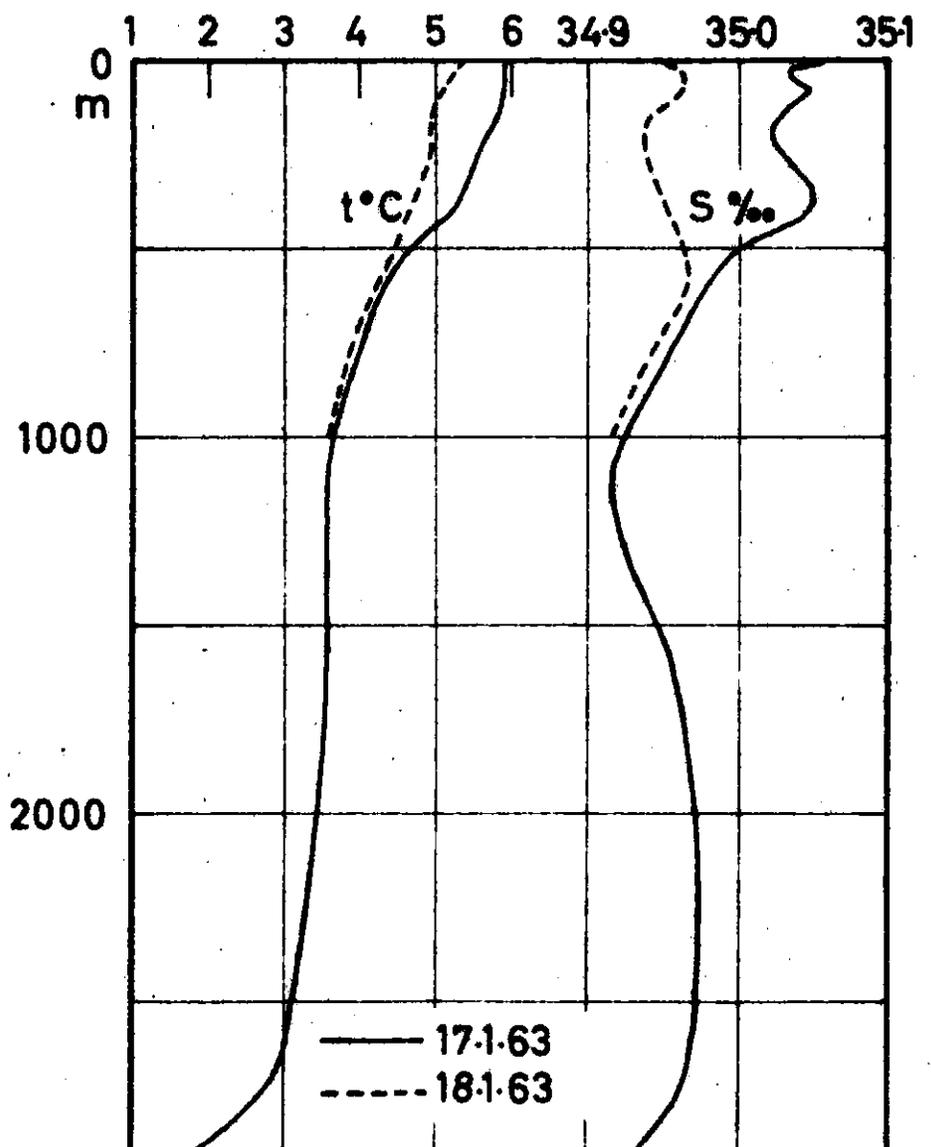
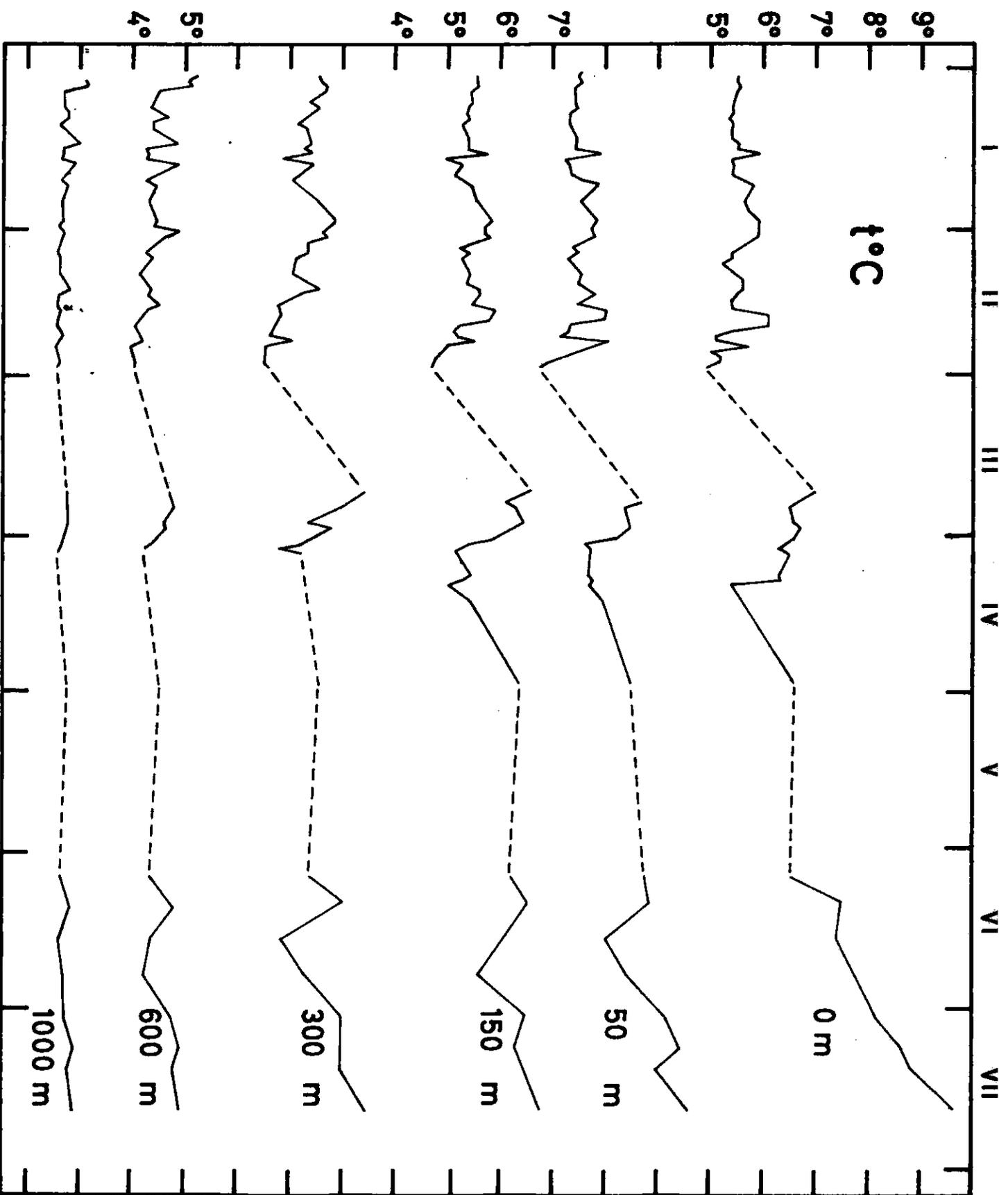


Figure 2.



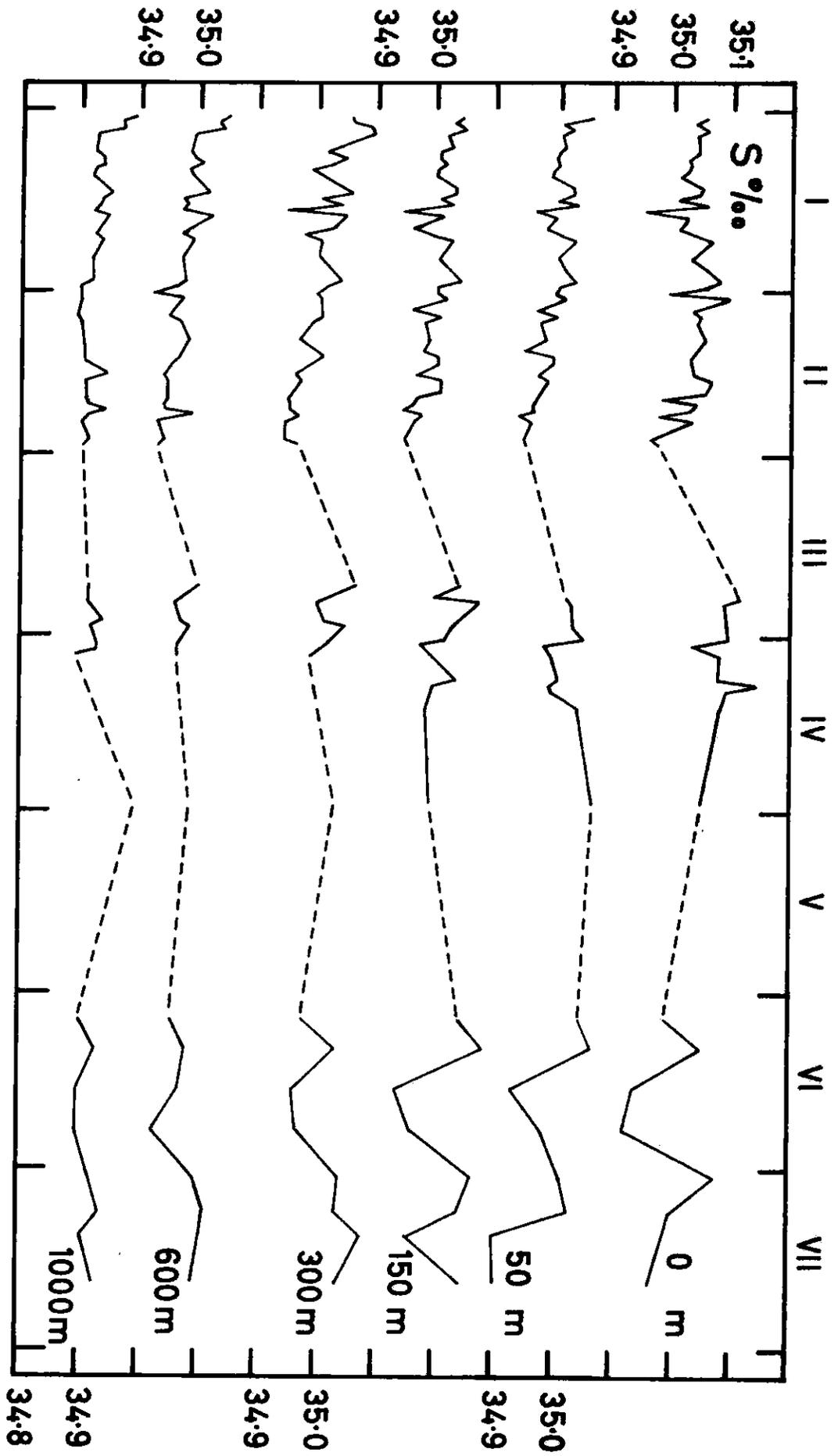


Figure 3.

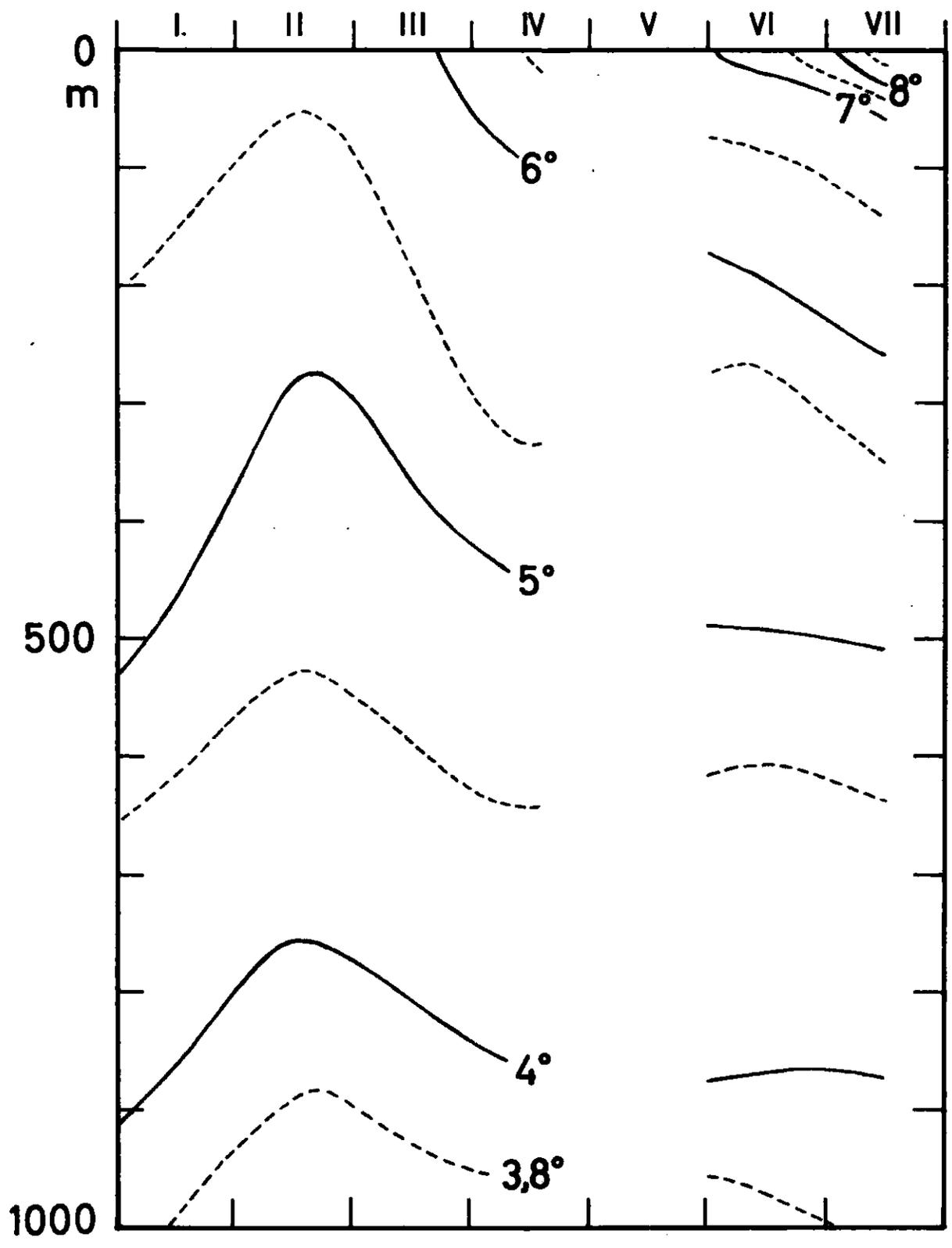


Figure 4.

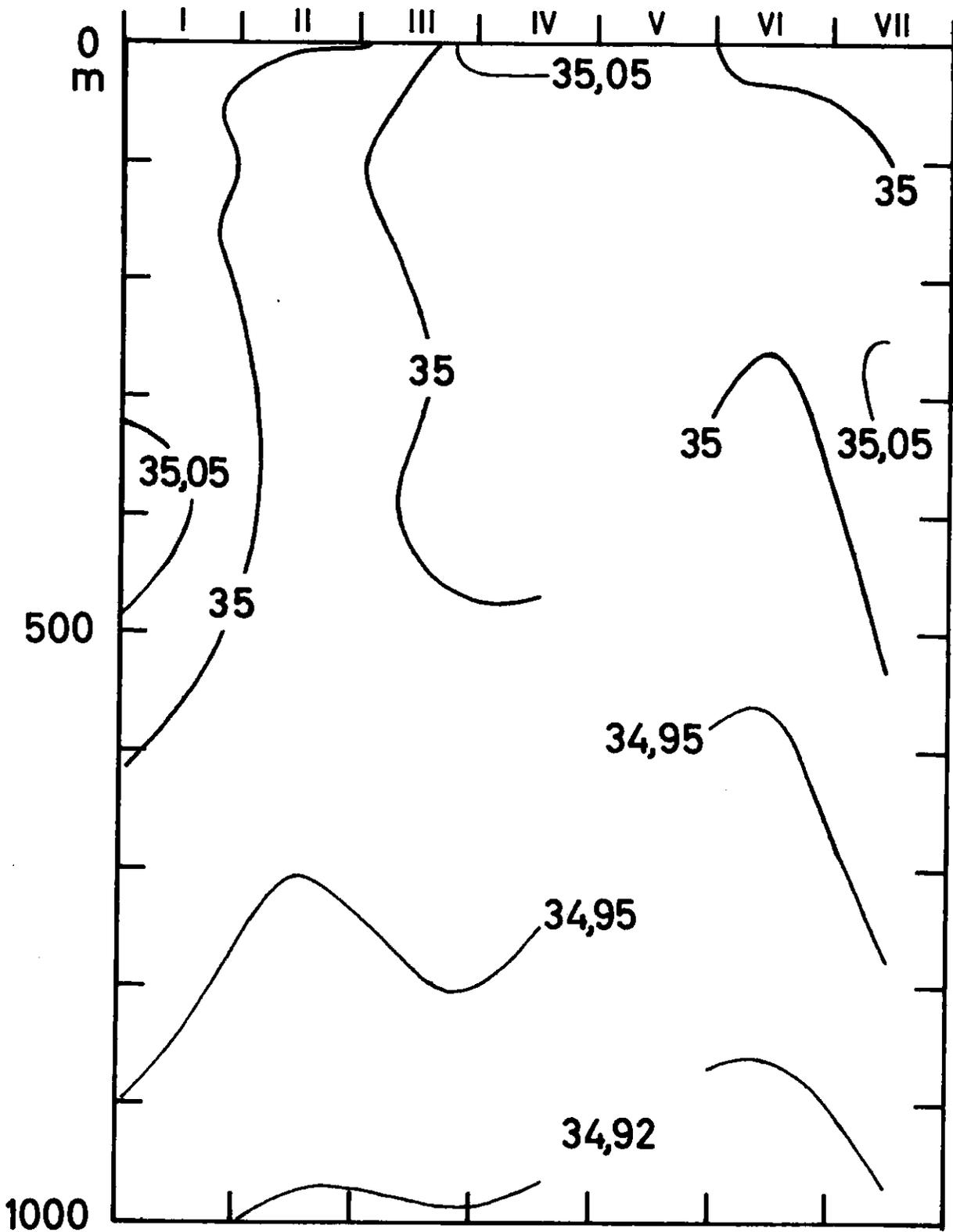


Figure 5.