From Annales Biol. 26, (1970).

Variations of the hydrographic situation in the Southern Bight of the North Sea, February—March 1969

(Figures 107—114)

In February and March 1969 three cruises were made in the Southern Bight of the North Sea by the Netherlands Institute for Sea Research (NIOZ) and the oceanographic section of the Royal Netherlands Meteorological Institute (KNMI). These cruises were made with the F.R.V. "Willem Beukelsz" during the periods 17—28 February (by NIOZ), 10—14 March and 24—29 March (both by KNMI). During this time the weather situation was characterized by rather persistent easterly and northeasterly winds (Fig. 107). The observations resulting from this series of cruises show some interesting features that will be presented here.

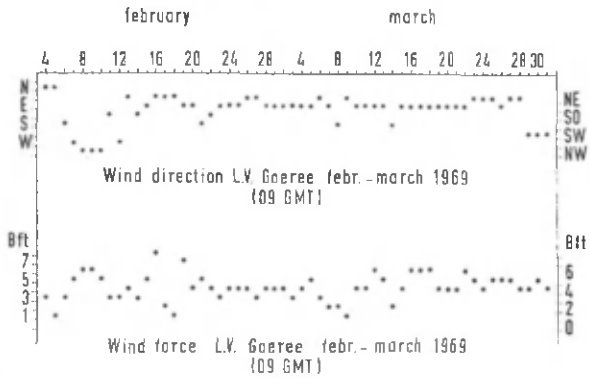

Figure 107. Wind conditions near L.V. Goeree, February and March 1969.

The salinity at the surface during the first cruise is shown in Fig. 115 in the contribution by Tijssen in this volume. In Figures 198 and 109 the salinity distribution during the other two cruises is shown, These figures show the occurrence of more or less isolated patches of low-salinity surface water during the first and the last period. The values for the fluorescence of the water in these patches suggest as their origin the Maas–Rhine estuary rather than the Scheldt estuary. During the second cruise no indication of such patches was found and the whole pattern found on this occasion corresponds to more normal conditions. Thus rapid variations occurred, apparently caused by rather drastic

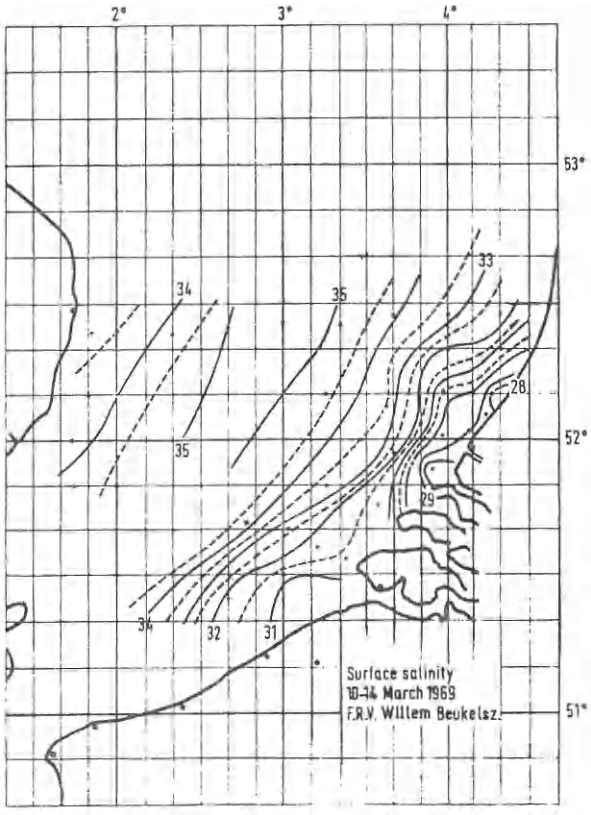

Figure 108. Surface salinity 10—14 March 1969, F.R.V. "Willem Beukelsz"

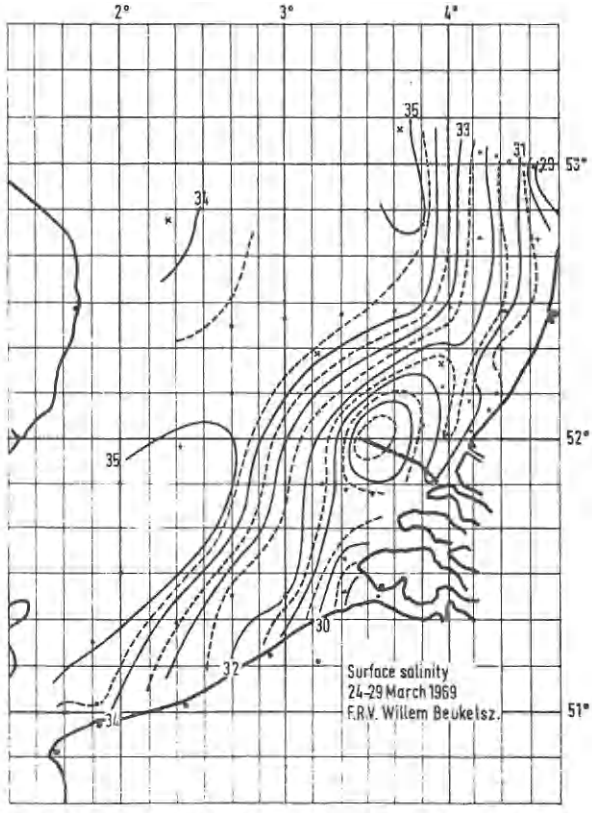

Figure 109. Surface salinity 24—29 March 1969, F.R.V. "Willem Beukelsz"

changes in the circulation pattern along the Netherlands coast. The temperature distribution is shown in Figure 116 of Tijssen's contribution and in Figures 110 and 111 of this paper. As temperature is much more subject to atmospheric influence than salinity is, the changes of the temperature pattern are not parallel with those of the salinity pattern. In the central area of the Southern Bight there was a decrease in temperature between the first and the second cruise, which trend was reversed in the southern part of this area between the second and the third cruise. However, along the Netherlands coast the temperature increased during the first half of March, but decreased again during the second half.

The vertical structure of the water in the regions where the low-salinity patches occurred is demonstrated in Figure 112, where the salinity and temperature distribution is shown in a section transverse to the coast. The location of this section is indicated in Figure 109. When the patches were observed during the first and third cruise, the water was highly stratified. It is seen that the bottom water is moved coastward with respect to the second cruise when the low-salinity water adhered to the coast.

The variation with time of the surface salinity near the lightvessel Goeree (situated in the region where the patches occurred), from samples taken each day at 09 GMT is shown in Figure 113. Twice during the period of investigation the salinity dropped to values close to $27^0/_{00}$. The first time (26 February) was two days after the patch was observed some 5 miles east of the lightvessel. The second time (26 March) was just one day before the second patch was observed some 8 miles northwest of the lightvessel. We may infer from these observations a west- or northwestward displacement of the patches of 2.5—8 miles per day (about 5—17 cm/sec).

It is interesting in this connection to consider the residual current near the lightvessel Goeree during this period (calculated as 25 hour means of hourly observations with the Carruthers vertical-log current meter at 6 m depth), see Figure 114. There is a marked increase of the offshore component compared with the mean current. The current velocities are comparable with those deduced from the move-

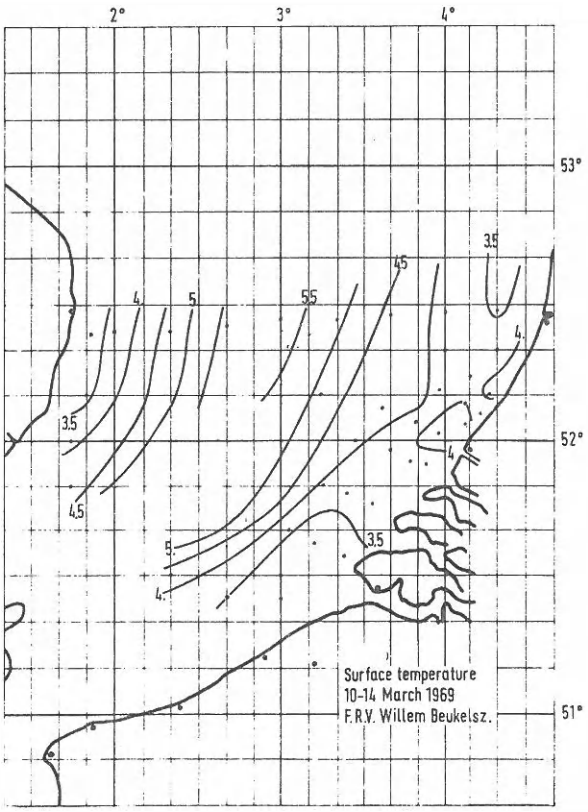

Figure 110. Surface temperature 10—14 March 1969, F.R.V. "Willem Beukelsz"

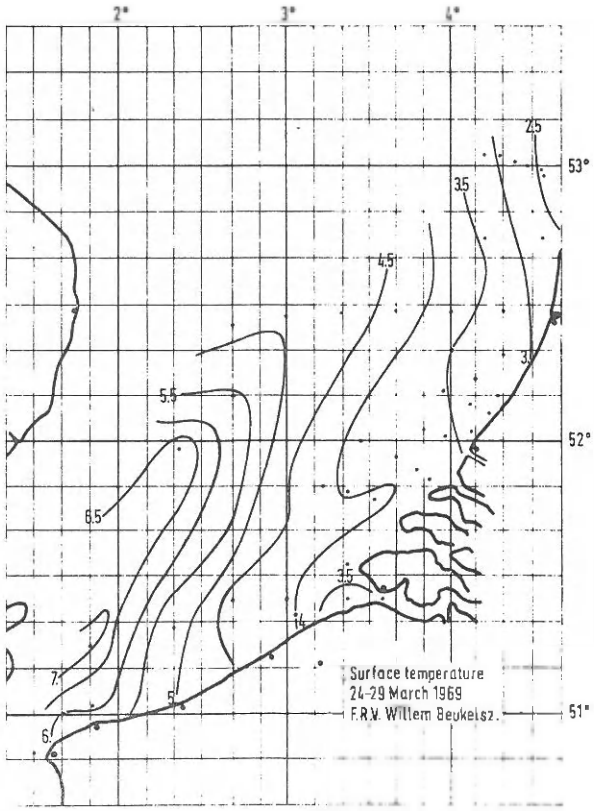

Figure 111. Surface temperature 24—29 March 1969, F.R.V. "Willem Beukelsz"

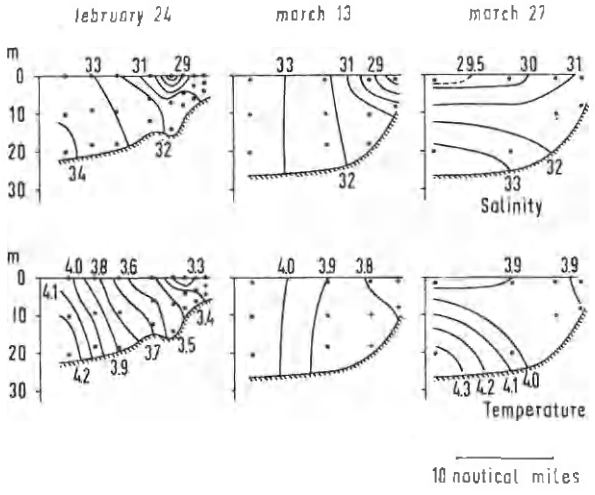

Figure 112. Sections of salinity and temperature perpendicular to the Netherlands Coast

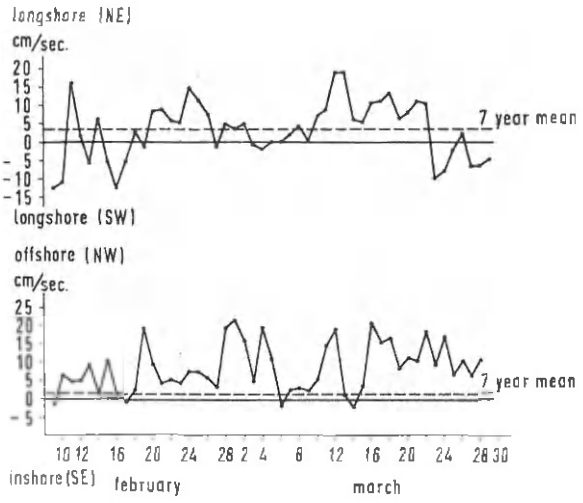

Figure 113. Surface salinity near L.V. Goeree, February and March 1969.

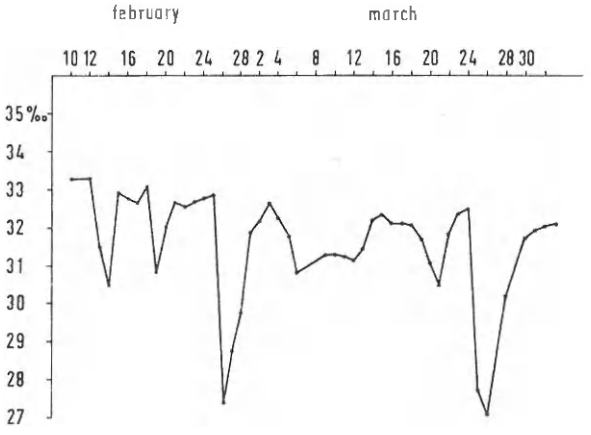

Figure 114. Residual current near L.V. Goeree, February and March 1969.

ment of the low-salinity patches. As to the mechanism of the formation of the patches no definite conclusion can be reached. We may note, however, that on both occasions when they were observed the longshore component of the residual current had been reversed some days earlier, with rather high current speeds (about 10 cm/sec).

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Erratum: the drawings of fig. 113 and 114 have to be interchanged.