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A brief summary of the hydrographic conditions in the ICNAF area during 1976 is presented, based upon national reports and a few research documents.

The monthly anomalies of the sea surface temperatures in areas of the northern North Atlantic in 1974 (Smed) show an increase of temperature from the year before in all areas. The increase is about 0.2° in most areas; in the west and in a couple of areas in the east, however, the increase is about 0.5°.

On the basis of the observations at the synoptic hours monthly anomalies of sea surface temperature at the North Atlantic Ocean Weather Stations in 1975 and 1976 are presented (Smed), using mean values over the 10-years period 1961-1970 as standard.

The hydrographic conditions in Icelandic waters in May-June 1976 are described by Malmberg. The ice conditions were unusually favourable in North Icelandic waters. Temperatures were about normal south and southwest of Iceland, below normal north and east of the island. The salinity was low in the Atlantic water south and west of Iceland and also in the inflow, relatively weak in 1976, to North Icelandic waters. The polar water component of the East Icelandic current was stronger than observed since 1971 but not as strong as in the "polar current period" 1964-1971. General features of the hydrographic situation in Icelandic waters in spring 1976 were low salinities and a well developed shallow thermocline.

These findings also apply to the situation in summer, as described in the Report on the 0-Group Fish Survey in Icelandic and Greenland Waters, July-August 1976. Isothermal charts of the region covered are given for the levels 20, 50 and 100 m. Temperature in the surface layers of the shelf area west, north and east of Iceland were 1°-2° above normal but slightly below normal south of Iceland. In the Irminger Sea the temperature of the surface layer was 0.5°-1° higher than in August of the years 1970-1975. The Atlantic influx around Iceland, as indicated by the salinity, was below normal. Ice conditions in general were favourable.

The hydrographic conditions in the Norwegian Sea are reported on by Solonitsina. In January the temperature of the Norwegian current, observed on the 63°N section, was about 1° below normal in the 0-200 m layer. In February the Atlantic water in the Faroe-Shetland Channel area was about 0.5° below normal, as was the temperature of the East Icelandic Current. From dynamic calculations the inflow of Atlantic water through the Faroe-Shetland Channel in March was found to be 15 km^3/hour, i.e. twice as much as in March 1975. The temperature of the inflowing water was now about normal. However, the temperature of the Norwegian Current at 63°N and 65°45'N was still 0.5° below normal. The northern part, on the other hand, had normal temperatures both in March and April. In June the inflow of Atlantic water through the Faroe-Shetland Channel was about 13 km^3/hour, i.e. about normal, but twice as much as in 1975.

Compared to the cold year 1975 the inflowing Atlantic water in June 1976 was about 1.5° higher in 0-50 m, about 0.5° higher in the 0-200 m layer. Temperatures in the 0-50 m layer were above normal over nearly the whole Norwegian Sea, a consequence of the strong summer heating. In other layers temperature was normal or slightly below. The East Icelandic Current had normal temperatures and salinities on the section Iceland-Jan Mayen, whereas on the sections in the southwestern Norwegian Sea temperatures were about 0.5° below normal, salinities 0.1‰ or more below. The Atlantic water inflow through the Faroe-Shetland Channel in June 1976 had salinities lower than the year before. So on all sections and in all layers of the Norwegian Current salinity was below normal, the numerical value of the anomaly ranging from 0.04‰ to 0.13‰.

The hydrographic situation in the Norwegian Sea is also dealt with in the Report on Joint Soviet-Icelandic Investigations on the Distribution of Pelagic Fish and Oceanographic Conditions in the Norwegian Sea and Waters Adjacent to Iceland in May-June 1976. Isothermal charts showing the distribution of temperature at 20 m and 50 m over most of the Norwegian Sea are presented, and a table gives the average water temperature in different layers on a number of sections in the Norwegian Sea in June 1975 and 1976. The main points are already reported in the contribution by Solonitsina quoted above. The table shows that whereas temperatures generally were high in the upper 50 m, for the 0-200 m layer as a whole temperatures were lower in June 1976 than the year before, except in the Faroe-Shetland Channel and the eastern part of the section along 67°30'N. No overflow over the Iceland-Faroe Ridge of cold arctic deep water was observed in June 1976. On the other hand a relatively strong inflow of warm Atlantic water in the upper layers would seem to have taken place at about 10°W.

Temperature conditions in the Barents Sea in late summer are dealt with in the Report on the International 0-Group Fish Survey in the Barents Sea and Adjacent Waters in August-September 1976. Isothermal charts are given for the depth levels 0, 50, 100 and 200 m, and figures showing the distribution of temperature on the sections Bear Island-North Cape, Kola Meridian, Bear Island-West, and Cape Kanin Meridian are presented. Tables showing for each section the mean temperature of the water at this season for each of the years 1965 (or 1966)-1976 incl. are given. They show that temperature conditions in the Barents Sea in late summer 1976 were close to the long-term average, except that temperatures of the upper 50 m layer were somewhat above normal. In the West Spitsbergen Current temperatures were above normal.

On the basis of observations by research vessels and ocean weather ships Ellett studies the variation over the period 1948-1976 of the surface temperature and salinity in

the Rockall Channel. Anomalies from 1961-1970 are presented for the January-March season. The smoothed temperature curve shows an overall maximum in 1959, a secondary maximum in 1970. The salinity curve, on the other hand, reaches the overall maximum in 1968 and then falls steeply.

Temperature and salinity conditions in the Sea of the Hebrides in late May 1976 are discussed by Ellett. An interesting feature of the temperature and salinity distributions is a front at about 7°W, obviously the boundary between the Atlantic and Irish Sea/Firth of Clyde water masses.

On the basis of data from the temperature recorders contained in Continuous Plankton Recorders Aiken presents average temperatures at 10 m depth for areas of the English Channel, the Irish Sea and the North Sea.

Monthly anomalies of the sea surface temperature in an area off the eastern coast of Scotland in 1974 (Smed) show that temperatures in this area were slightly higher than the year before.

On the basis of temperature and salinity observations made from "Anton Dohrn" supplemented by data from the IGOSS scheme, Wegner shows that, as expected, the water in the North Sea was nearly homogeneous from surface to bottom in January 1976, so that surface data are representative for the whole water column. A comparison with long term (1902-1954) means shows that temperature in January 1976 was 0.5° to 1° above normal and that salinity was about normal, except at the northern stations where it was up to 0.15‰ below.

Anomalies of bottom temperature and bottom salinity in the North Sea in February, i.e. during the ICES Young Herring Survey, are shown on charts (Smed). In the main part of the North Sea temperature was below normal; only in minor regions, however, it was more than 0.5° below. Bottom salinity was above normal in most of the North Sea, the anomaly generally not exceeding 0.2‰.

The hydrographic situation in the coastal waters of the eastern Southern Bight is illustrated by monthly mean values of temperatures and salinities of the surface water at LV "Noord Hinder" and LV "Texel", presented by Wiggers. Compared to the means for the period 1961-70 positive anomalies, from 0.5° to 2°, occurred at "Noord Hinder" in January and July-November, at "Texel" in January and June-December; negative anomalies of about 0.5° occurred at "Noord Hinder" in February and May, at "Texel" in May. At "Noord Hinder" salinities were about 0.4‰ below normal in January, February and May, about 0.3‰ above in April and October-December and about normal in the other months. At "Texel" salinity was above normal, the anomaly ranging from 0.4‰ to 1.1‰, in all months except February when it was normal.

Observations at light vessels in the German Bight showed (Prahm) that temperature of the estuarine and coastal waters of the Bight was normal or above for nearly all months. Anomalies of more than 1° were found in the surface layer in January-February, July-August and November, in the bottom water in January. The only significant negative anomaly

(-0.8°) was found in the surface water at LV "Borkumriff" in May. Obviously the temperature conditions in the coastal waters of the German Bight throughout the year were much like those of the Southern Bight coastal waters.

The variation of the sea surface temperature at Helgoland Reede (German Bight) throughout the year, as presented by Weigel, was in fairly good accordance with the variation at the light vessels of the Bight, but the anomalies were somewhat lower at Helgoland Reede, probably because the reference period is another (1965-1975). Anomalies are positive in January and November (about 0.5°) and in July (more than 1°), negative in February-April (about -0.4°) and September (-1°), about normal in the other months. Surface salinities were about 1‰ below normal in January-February, were normal in March, and 0.5‰ to 1‰ above in April-December.

The hydrographic conditions in Kattegat and Skagerrak are dealt with by Svansson. Isopleths show the deviations (reference period 1931-60) of temperature and salinity in the water column at Bornö Station throughout the year. Conspicuous temperature features of the deeper layers are negative anomalies of up to 2° in February, positive anomalies of up to 2° in May-June. Salinities were especially low in February and October, high in January, August and December. At Station M 6 in the Skagerrak Deep a marked increase of salinity and oxygen from February to June was observed in the deep layer, indicating a certain renewal of the water there. Oxygen saturation at a station (Fladen) in northern Kattegat throughout the year shows a rather early minimum, viz. in August; however, values were also low in December. On the basis of daily measurements at "Læsø Trindel" monthly mean values of the content of total phosphorus at standard levels are given.

Temperature conditions in the western Baltic are discussed by Prahm from measurements at LV "Fehmarnbelt". In January and July surface temperature was appreciably higher than normal, in the other months it was about normal. Bottom temperatures were above normal during summer, in August and September more than 2° above. During February-March, May and November-December bottom temperatures were slightly below normal.

An inflow of high salinity water to the western parts of the Baltic occurred during the autumn months, as reported by Francke, Nehring and Rechlin. Continuous current measurements showed that the inflow consisted of a number of minor intrusions. In accordance with this repeated observations at a station in the Arkona Basin indicate that the increase of the salinity was limited to a thin bottom layer. However, investigations carried out during February 1977 have shown that the inflow during the autumn substantially improved the oxygen situation in the Bornholm and Gotland Basins. It is interesting to note that the hydrographic observations were corroborated by the fish landings from these regions, in as much as these landings during the autumn inflow contained species usually living in areas of higher salinity than the Baltic.

Also the Swedish observations (Engström and Fonselius) showed in December unusually high salinities, and high oxygen content, of the bottom water in the Arkona Basin. The contribution gives tables showing the variation throughout the year of temperature, salinity, oxygen and hydrogen sulphide content, pH, alkalinity and contents of nutrients in Arkona, Bornholm, Gotland and Landsort Deeps. The tables indicate that the bottom water flowing into the Baltic by the end of 1975, had reached Gotland Deep in spring 1976 and Landsort Deep during the summer, renewing the bottom water in these deeps. Already in August, however, hydrogen sulphide again occurred close to the bottom in the Gotland Deep. Charts showing the distribution of oxygen and hydrogen sulphide in the deep areas of the Baltic in each quarter of 1976 are presented.

A survey of the hydrographic conditions in the Baltic during 1975 and 1976 is given by Kaleis and Yula. They show, i.a., that the salinity of the surface layer in 1976 was the highest for the last 17 years. During the period 1967-1976 the salinity of the upper 40 m layer in the Bornholm Deep area increased by 0.7‰, in the Gotland Deep area by 0.5‰. Observations of temperature, salinity and oxygen content at a number of standard levels in the Bornholm Deep and the Gotland Deep are presented for almost every month in 1975 and 1976, together with sections Bornholm Deep-North Deep showing for each quarter of a year the distribution of oxygen and hydrogen sulphide. On the basis of the oxygen deficit it is shown that in 1975 the stagnation in the Bornholm and Gdansk Deeps was worse than ever before in the last 17 years. The inflow of Kattegat water in late 1975 and early 1976 meant some amelioration. As the density of the inflowing water was lower than at previous strong inflows the effect was of fairly short duration only, as already reported above. In August-October an inflow of very warm Kattegat waters of relatively low oxygen content into the layer at 55-75 m of the Bornholm Deep was observed. By the end of the year these waters reached the Gotland Deep where they brought about an increase of temperature and oxygen content of the bottom layer.

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