| POLISH POLAR RESEARCH | 8 | 3 | 277—291 | 1987 |
|---|---|---|---|---|

Zbigniew PIETROŃ

Institute of Meteorology and Water Management
Regional Weather Office
Borowego 14
30-215 Kraków, POLAND

# Frequency and conditions of fog occurrence in Hornsund, Spitsbergen

ABSTRACT: An analysis of observation material concerning fog occurrence in Hornsund collected by seven whole-year expeditions of the Polish Academy of Sciences' to Spitsbergen in 1957—58, 1978—1980, 1981—1985 is presented. The frequencies of fog occurrence in Hornsund during a year and in particular months are compared with respective frequencies calculated for Norwegian stations in Svalbard. Data from the Poland territory are also quoted. The dependences of the fog frequency in Hornsund on air masses advection, circulation type, direction and speed of local winds, time of observation and temperature are shortly analyzed. The periods with long-lasting fogs (exampled by synoptic situations that favor them) are discussed more precisely. A short description of main meteorologie processes favoring the occurrence of fog in this part of Spitsbergen is presented.

Key words: Arctic, Spitsbergen, meteorology.

## Introduction

Fog is an atmospheric phenomenon that makes the man's activity in the Arctic difficult. Any enterprise on land, sea or in the air disregarding the possibility of fog occurrence is connected in polar regions directly with a risk of threat for human life. Among the Polish polar researchers the opinion predominates that Spitsbergen is an area of exceptionally high frequency of fogs, long persisting there.

The present paper constitutes a contribution to investigations on the Spitsbergen climate and is an attempt of objective glance at this problem on te basis of documented meteorological observations carried out in Hornsund at the Polish Polar Station ($\sigma = 77°00'N$, $\lambda = 15°34'E$, h = 11 m a.s.l.) by seven whole-year expeditions of the Polish Academy of Sciences to Spitsbergen in 1957—58, 1978—1980, 1981—1985 and basing on Norwegian publications on meteorological conditions predominating at other stations of Svalbard (Steffensen 1969, 1982).

## Observation material and methods

The first whole-year series of meteorological observations in Hornsund was carried out by the Polish expedition during the Third International Geophysical Year in 1957—58.

After a long break the observations were resumed in 1978. They have been carried on uniterruptedly since that time.

The most complete use of the observation material was possible after a review of original meteorological log-books, run by observers at the Hornsund Station during all the hitherto polar expeditions of the Polish

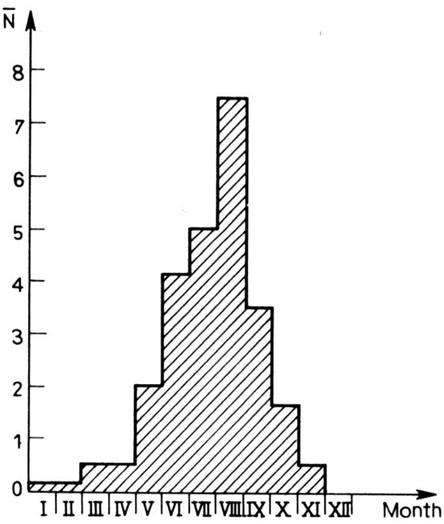


Fig. 1. Mean number of days with fog in the Hornsund area in particular months, calculated on the basis of data from the whole-year observation periods in 1957—58, 1978—79, 1980—81, 1982—1985

Academy of Sciences to Spitsbergen. For further elaboration the data from the following observation periods have been assumed: August 1, 1957 — July 31, 1958, July 1, 1978 — June 30, 1979, July 1, 1979 — June 30, 1980, July 1, 1980 — June 30, 1981, July 15, 1982 — July 31, 1983, August 1, 1983 — July 31, 1984 and August 1, 1984 — July 31, 1985. In those periods the observations of most meteorological elements at main observation times (00, 06, 12 and 18 hs GMT) were complete.

Requirements of a statistical analyses were necesary to supplement the lacking data for 14 days of August 1982 (0.5% of the whole material). It could be done after a detailed analysis of weather maps from that period and statistical distributions based on data from the whole available material. The introduced supplementations were found insignificant in the interpretation of results.

In the analysis only the fogs occurring at the station and reaching the level of over 2 m above a ground have been taken into consideration. Observations of near-ground and distant fogs were regarded as incomplete. In doubtful cases the weather course within $\pm 24$ hours since the observation time was analyzed, to decide about regarding (or disregarding) such fog in the elaboration. No data on any meteorological elements during some fog periods called for an interpolation from the approximate observation times.

Thus, the basic observation material used in this paper comprises seven full annual periods (in total 2558 days). Presentation of some problems was unfortunately impossible without a restriction to limited fragments of this material.

## Frequency of fog occurrence

Continuous observations of meteorological phenomena (including fogs) were carried out in Hornsund during all the mentioned periods, except the season 1979—80.

During six annual periods (in total 2192 days) 154 days with fog were recorded, *i.e.* the average $\bar{N} = 25.7$ days with fog a year. This number varied from 21 o 29 in particular observation periods.

Mean annual numbers of days with fog were calculated for some Polish cities (Table 1), representative for the whole country (Atlas of Climate of Poland 1973).

A comparison of the data for Poland (Table 1) and for Hornsund proved that the latter is decidedly less foggy than most regions of Poland. With a regard to the number of fogs in a year Hornsund resembles the Gdańsk area, being the least foggy city of Poland.

48.7% of days with fog in Hornsung fall for the two months of thermic summer (July, August) whereas during the six months of thermic winter (November — April) there are only 7.1% of such days (Fig. 1). The definitions "thermic summer" and "thermic winter" are used here according to the classification of Baranowski (1968). August is the month with the highest number of days with fog ($\bar{N} = 7.5$) and since most Polish researchers stay in the Hornsund region in this time, the common name "Fog Island" for Spitsbergen seems easily explainable.

In frequency calculations for Hornsund all the 7674 observation times from seven whole-year periods were taken into consideration. They comprised 152 fog occurrence events (Table 2). Data from the Norwegian stations (Table 2) were taken from comprehensive publications (Steffensen 1969, 1982).

The Hornsund station is found to note the highest frequency of fog occurrence among all the stations of Spitsbergen (*cf.* Table 2). The Isfjord Radio only, located also at the western coast of the island about 2° latitude northwards, approximates the Polish Polar Station in this respect. In Longyearbyen, located also at the fjord coast but deeper inside the island, fogs are very rare. Thus the definition of West Spitsbergen as the "Fog Island" is not conformable with the actual state.

On Hopen and Björnöya fogs are much more frequent but these islands occur at considerable distances far from Spitsbergen and are surrounded from all sides with wide sea areas. Due to their small dimensions the sea influence is there much more distinctly evident. All the above comparisons cannot be unfortunately regarded for strict ones due to the different lengths of observation periods at particular stations.

Table 1

Mean annual number of days with fog in some Polish cities in 1951—1960 (*after* Atlas of Climate of Poland 1973)

| City | Number of days |
|---|---|
| Gdańsk | 25.3 |
| Kielce | 37.8 |
| Kołobrzeg | 50.6 |
| Kraków | 56.3 |
| Łódź | 46.3 |
| Poznań | 49.5 |
| Rzeszów | 41.1 |
| Suwałki | 56.5 |
| Toruń | 45.8 |
| Warszawa | 43.0 |
| Wrocław | 50.6 |
| Zielona Góra | 66.6 |

The annual variation of fog occurrence is similar at all Svalbard stations (*cf.* Table 2). The maximum frequency is noted for summer, decreasing considerably in spring and autumn, and the minimum occurs in winter. It should be underlined that all the data on fog occurrence in Spitsbergen have been collected at the stations, situated at altitudes of 5—42 m a.s.l., *i.e.* relatively small if compared with the average ones of the island. A fog frequency in higher areas can be greater (*see* later) but this presumption cannot be verified due to a lack of respective observation material.

Table 2

Fog frequencies (in %) in the Hornsund area and at Norwegian meteorological stations in Svalbard (Steffensen 1982) based on observations at 06, 12 and 18 GMT

| Station | Observation period | Months | | | | | | | | | | | | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | |
| Hornsund | 7 years from the period 1957—1985 | 0.2 | — | 0.6 | 0.6 | 0.9 | 4.8 | 5.4 | 6.8 | 2.1 | 2.0 | 0.3 | — | 2.0 |
| Isfjord Radio | 1951—1975 | 0.5 | 1.1 | 1.3 | 0.3 | 1.4 | 3.9 | 5.1 | 3.8 | 2.3 | 0.9 | 0.3 | 0.2 | 1.8 |
| Ny -Ålesund | 1971—1980 | — | 0.1 | 0.6 | 0.3 | 0.9 | 3.0 | 1.6 | 2.5 | 0.4 | — | — | — | 0.8 |
| Longyearbyen | 1951—1976 | — | 0.1 | 0.6 | 0.3 | 1.2 | 1.7 | 1.1 | 0.9 | 0.5 | 0.4 | — | — | 0.6 |
| Björnöya | 1951—1980 | 1.5 | 1.3 | 1.9 | 2.3 | 6.2 | 11.9 | 21.5 | 17.1 | 10.3 | 4.9 | 1.9 | 1.2 | 6.8 |
| Hopen | 1951—1980 | 1.8 | 2.1 | 2.9 | 3.7 | 6.1 | 12.9 | 24.6 | 22.0 | 11.2 | 6.0 | 2.9 | 1.4 | 8.1 |

## Conditions for fog occurrence

Directions of advection and circulation types for 109 days with fog in Hornsund (*cf.* Fig. 2) were determined from surface weather maps (Europäischer Wetterbericht, Offenbach) and cited after Niedźwiedź and Ustrnul (1986 *unpubl.*). The type 0 comprises all synoptic situations without

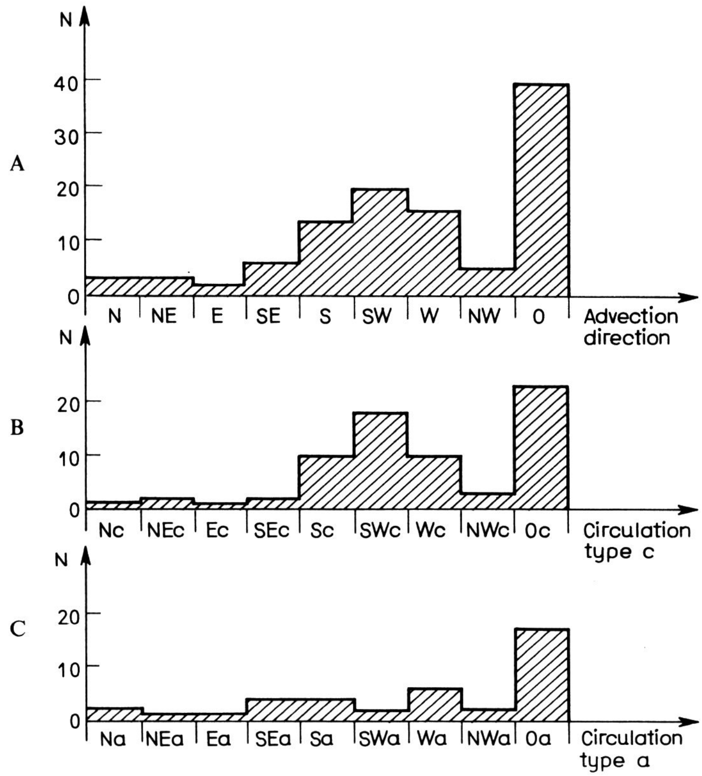


Fig. 2. Number of days with fog in the Hornsund dependent on the direction of advection (A) and circulation type: B — cyclonic situations (c), C — anticyclonic situations (a), based on data from observation periods 1978—79, 1980—81, 1982—83 and 1983—84.

a distinct inflow of air masses over the Hornsund region. 35.8% of all days with fog occurred in anticyclonic situations, whereas 64.2% in cyclonic ones. This corresponds in general to the percentage frequencies of such situations in Spitsbergen (Niedźwiedź and Ustrnul 1986 *unpubl.*).

Most days with fog were recorded during advection of air masses from south, southwest and west (in total 45.9%) and without a distinct advection (36.7%) while only 7.3% of such days occurred during inflows of air masses from north, northeast and east 53.2% of the total number of days with fog occurred at the circulation types Oc, Oa and SWo. (Fig. 2).

Since the occurrence frequencies of particular circulation types in Spitsbergen are not equal to one another (*cf.* Niedźwiedź and Ustrnul 1986 *unpubl.*), conditional frequencies of days with fog in Hornsund at different circulation types are specified (Table 3). They have been calculated from the formula:

$$F_t = \frac{N_t}{f_t \cdot N} \cdot 100\%$$

where: $F_t$ — frequency of days with fog at the circulation type t (in %); $f_t$ — frequency of days with the circulation type t in Spitsbergen in 1978—1984 (*cf.* Niedźwiedź and Ustrnul 1986 *unpubl.*); $N_t$ — number of days with fog at the circulation type t recorded in 1978/79, 1980/81, 1982/83 and 1983/84; N — number of all days ( = 1461) in the four presented annual periods.

Frequencies of particular circulation types in four analyzed annual periods were assumed to be the same as in the whole period 1978—1984. This assumption, similarly as low frequencies of some circulation types (particularly SWa, Wa and NWa), diminishes somewhat the value of presented results (Table 3). Nevertheless, the circulation types Wa, SWc and Wc are

Table 3

Conditional frequencies of days with fog in the Hornsund at particular circulation type (a — anticyclonic, c — cyclonic)

| Circulation type | $F_t$(%) | Circulation type | $F_t$(%) |
|---|---|---|---|
| Na | 3.5 | Nc | 1.1 |
| NEa | 1.2 | NEc | 1.4 |
| Ea | 0.9 | Ec | 0.5 |
| SEa | 7.2 | SEc | 2.3 |
| Sa | 11.9 | Sc | 14.3 |
| SWa | 10.5 | SWc | 26.6 |
| Wa | 34.2 | Wc | 20.7 |
| NWa | 12.4 | NWc | 7.9 |
| Oa | 9.8 | Oc | 15.3 |

in general the most favorable ones for a fog formation in Hornsund, whereas Ec, Ea, Nc, NEa and NEc types are the most unfavorable ones Great number of days with fog when no distinct advection occurs (particularly Oa), reflect mainly the fairly often occurrence of such situations in Spitsbergen and only slightly their positive influence on a fog development in Hornsund.

In earlier papers concerning meteorological conditions in Hornsund (Baranowski 1968, Pereyma 1983) the local orographic conditions have been underlined to modify considerably the influence of general circulation on the weather. The rekationship between a fog occurrence in the Hornsund area

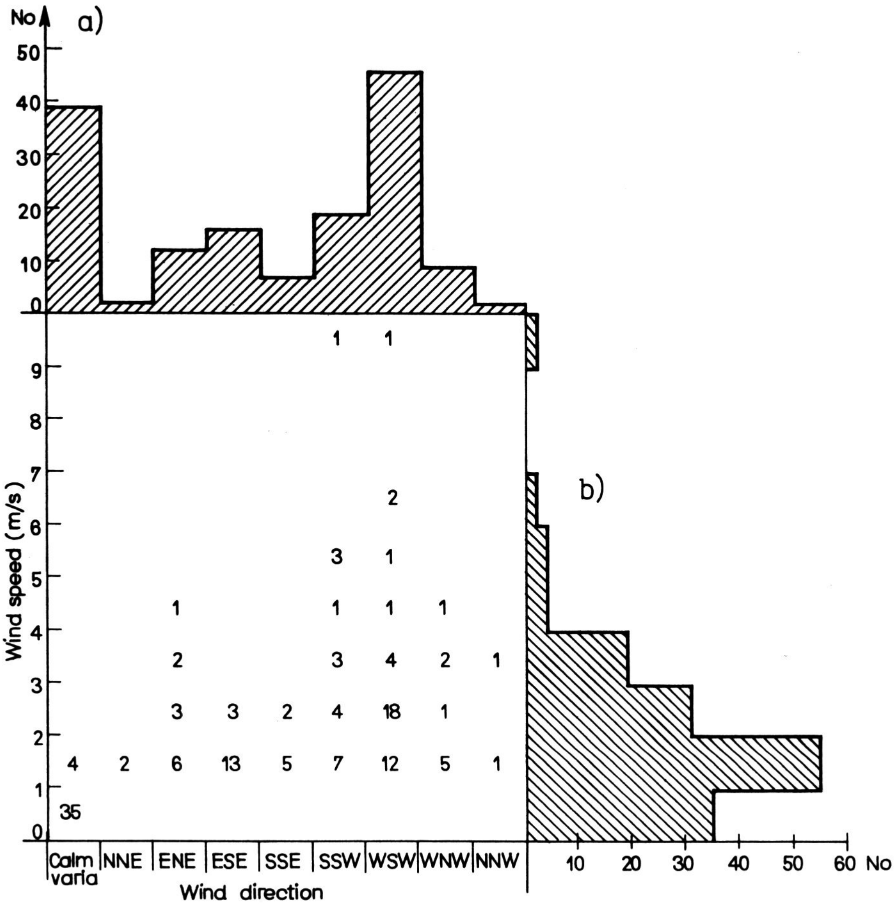


Fig. 3. Dependence of the number of fogs on speed and direction of wind in the Hornsund area

and a wind velocity recorded at the observation site (*i.e.* reflecting local horizontal air movements in the area under study) is based on all 152 events of fog occurrence recorded at 06, 12 and 18 hs GMT during the seven annual periods (Fig. 3). In the central rectangle the numbers of fogs observed at different wind speeds and directions are noted. Wind directions are quoted within 45° intervals while middles of these intervals (NNE, ENE, etc.) are marked on the horizontal axis. A and B histograms present distributions of fog occurrence events dependent on direction and speed of local winds respectively.

Most fog occurrence events were obviously recorded at directions of local winds within interval of 180—270° (42.8%) as well as at calm and variable winds with velocities below 1 m/s (25.7%). During winds blowing from the sector 180—270° the fogs were observed even at the velocities over 5 m/s.

Local maximum of the number of fogs (histogram A in Fig. 3) within the sector of 045°—135°, reflects a rather frequent occurrence of eastern and northeastern local winds in Hornsund at the Oc and Oa types, within weak pressure gradients. Previously (Baranowski 1968, Pereyma 1983) winds from E and NE directions were in general found to be the most common

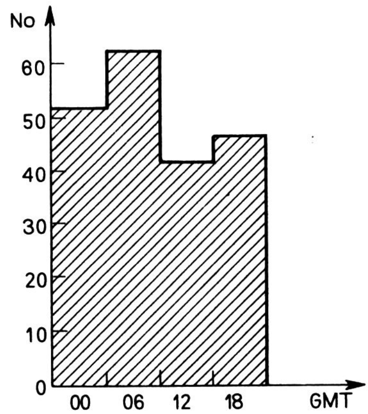


Fig. 4. Number of fogs observed in the Hornsund area at 00, 06, 12 and 18 GMT,

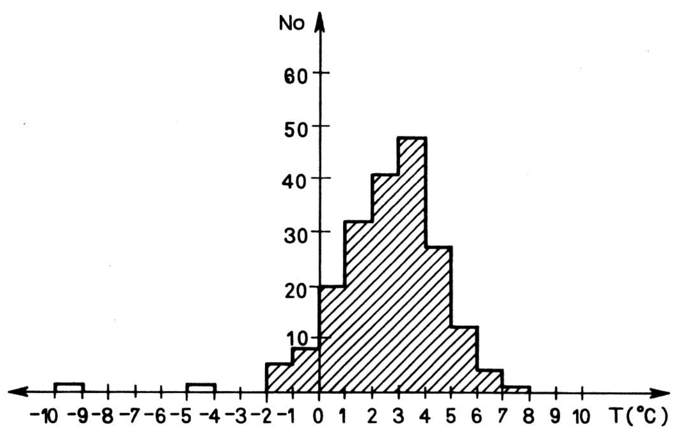


Fig. 5. Temperature recorded during fogs in the Hornsund area

in the Hornsund area what significatly diminishes a significance of the described secondary maximum. Thus, most favorable conditions for fog formation in Hornsund can be assumed to occur at local air inflows from over the open sea, particularly when there are winds from the sector 225—270° and with velocities of 1—3 m/s and at a calm.

The distribution of 204 fog occurrence events recorded at 00, 06, 12 and 18 hs GMT within seven annual periods is also presented (Fig. 4). Most fogs (30.9%) were observed at 06 GMT, least ones (20.6%) at 12 GMT. The morning cooling of the ground and near-ground air layer in the periods when a distinct daily variation of insolation influence is noted, seems to affect the fog formation as well, although it is not a decisive factor in most cases. A more detailed analysis would require, however, more observations.

More rare fogs about noon can be explained by a thermal convection in the near-ground air layer. The latter is, however, rather seldom due to a generally great cloudiness predominating in this region (Rodzik and Stepko 1985.

For 200 events of fog recorded in Hornsund at 00, 06, 12 and 18 GMT within seven annual periods the air temperature was measured. As many as 92.5% of were observed at temperatures $1 > 0°C$ while only two observations (1.0%) concerned the fogs at temperatures $T < -2°C$ (Fig. 5). No fogs were recorded at temperatures below $-10°C$.

## Long-persisting fogs

Many members of the Polish expeditions to Spitsbergen usually connect the adjectives "frequent" and "long-persisting" if speaking about the fogs. Due to the observation results the former adjective should be rejected but the doubt arises with the latter. The definition of "a long-persisting fog" is little precise as even during long foggy periods the horizontal visibility does not maintain continuously below the boundary value of 1000 m. The matter could be therefore analyzed if all days, during which the fog occurred at least for the arbitrarily fixed limit of 8 hours, were selected from the observation material. During the six annual periods (without 1979/80) there were 44 such days among 154 days with a fog. The absolute majority of fogs in the Hornsund area (71.4%) can be therefore found to be the short-lasting ones. On the average there are only 7.3 days with fog lasting for at least 8 hours in this region every year. The number of long-persisting fogs in different whole-year observation periods varied within wide limits, from 2 to 14. June, July and August comprise usually most days with long-persisting fogs. The respective mean monthly values are equal 1.8, 2.0 and 1.7 days. In the period November-February no long-persisting fogs were observed.

In spite of a small number of events the cyclonic situations are expected to be more favorable for long-persisting fogs in the Hornsund area than the anticyclonic ones with the SWc circulation type being particularly privileged (Fig. 6). A conditional frequency of days with long-persisting fogs

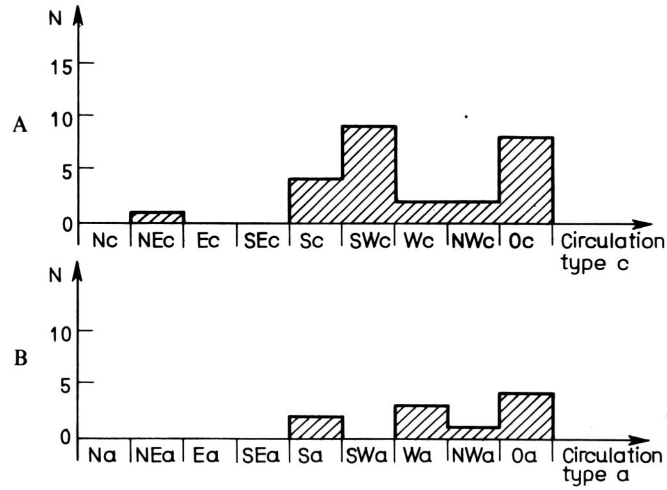


Fig. 6. Number of days with fog lasting 8 hours or more in the Hornsund area dependent on the circulation (A — cyclonic situations, B — anticyclonic situations), based on data from 1978—79, 1980—81, 1982—83 and 1983—84

is 13.4% for this type of circulation. It means (*cf.* Table 3) that as many as a half of all days with fogs at this circulation type are the ones with long-persisting fogs.

When the dates of all the 36 long-persisting fog events are put together, then more than a half of them (19) appears to be grouped into 2—3-day series. The total duration of a fog in particular series is varied within wide limits from about 18 to about 66 hours, amounting most often 30—50 hours. Such foggy periods are rare and occur twice a year on the average (mainly in summer). They are usually connected with warm fronts or warm occlusions shifting over Spitsbergen from the south or southwest towards the northeast, followed by warm and humid polar-maritime air masses as exampled by synoptic situations (Fig. 7).

A detailed synoptic analysis of all situations of this kind would go beyond the framework of the present paper. But it should be noted that in the Hornsund area no really long-persisting fogs, maintaining over the maritime stations usually throughout many weeks (Steffensen 1969), have been observed.

## Remarks

An occurrence of fogs over a definite area is caused by interaction of many factors which are traditionally divided in the synoptic meteorology into advection, radiation and local factors. One of them usually predominates, being only supplemented with the others.

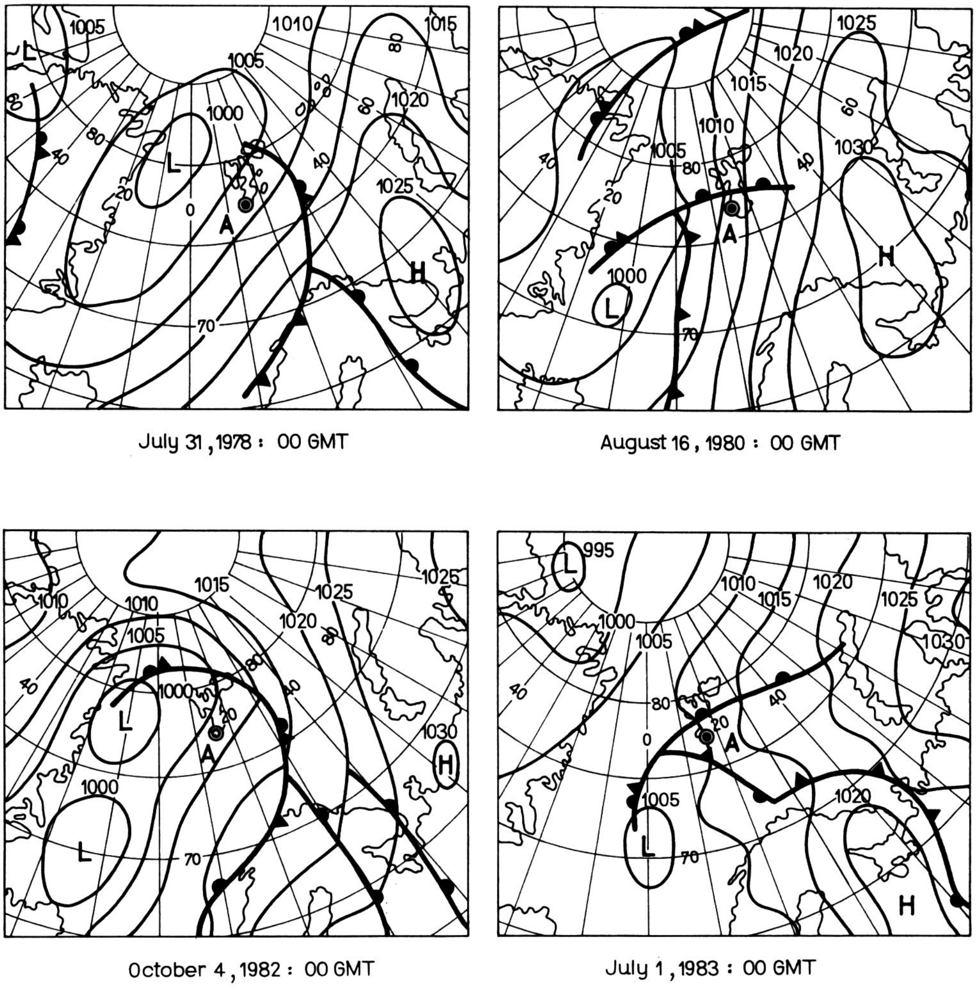


Fig. 7. Examples of synoptic situations that favor a formation of long-persisting fogs in the Hornsund area. A — Polish Polar Station in Hornsund, L — low-pressure centre, H — high pressure centre; isobars are in hPa

In Spitsbergen the advection of humid and warm air masses from over maritime areas (being within the reach of warm North Atlantic, Norwegian and West Spitsbergen currents) is usually responsible for the occurrence of fog. The advection of air masses from these regions (southern, southwestern and western directions) causes a shifting of fog zones over Spitsbergen that form and usually stay over the open sea. Also the thermic-orographic border running along the coast is very favorable for the fog-forming processes. In accordance with the above simplified scheme, a frequency of fogs over Spitsbergen should be the highest at coastal stations in the southwestern part of the island (Hornsund) and the least in regions isolated by orographic barriers from direct influence of the relatively warm sea (Longyearbyen). This suggestion was confirmed by observations (*see* Table 2). The advection frequency of air masses from S, SW and W over Spitsbergen is the highest in summer. It reaches the second distinct maximum in the mid of winter in the cases of Sc, SWc and Wc circulation types (Niedźwiedź and Ustrnul 1986 *unpubl.*). In summer the prevailing conditions such as relatively weak winds, high air humidity, absence of snow cover, considerable water inflow to the ground from rainfalls (Steffensen 1982, Rodzik and Stepko 1985 or a moisture accumulation by spongy tundra vegetation, however favor a formation of fogs. On the other hand strong winds, low air humidity and permanent snow cover in winter do not favor at all a formation of fogs, likewise a small thermic contrast between the ice-covered sea and the snow-covered land.

Thus, the summer maximum of fog frequency at all the meteorological stations of Svalbard is quite distinct whereas in winter fogs occur very seldom there (*see* Table 2). The orographic barriers on the way of a warm and humid air shifting from the sea over the land reduce considerably a number of advection fogs. Firstly, they control a flow of maritime air masses and secondly, they generate foehn effects that lead, among other things, to drying of air on their lee-sides. Many a time the transporting warm and humid air mass from over the North Atlantic or the Norwegian Sea shifts over the Svalbard region in such a way that there are temporary inflows of humid air from E and NE over Spitsbergen. In the Hornsund area fogs occur then very seldom as the air reaching the Polish Polar Station is considerably dried by mountain barriers. A humid air from SE meets on its way the barrier of the Sörkappland mountains, that control its movement and thus prevent from a formation of advection fogs in the Hornsund (*see* Table 3 and Figs. 2—3).

Atmospheric fronts are also significant in formation of fogs in Spitsbergen. Shifts of warm fronts (or of warm occlusion fronts) from south and southwest towards northeast were already described to be particularly favorable for a formation of long-persisting fogs in the Hornsund area. Beside a distinct advection of warm and humid polar maritime air masses, a considerable lowering of the base of low stratiform clouds (sometimes to the sea level), is noted. Low stratiform clouds connected with front zones can more frequently result in a formation of fogs or their long-persistence in higher areas (and thus inside the island) than at coastal stations. A radiation of warmth from the ground and the near-ground air layer is, on the whole, an important factor that affects a formation of fogs. Its role in the Hornsund region is, however, reduced by a great cloudiness predominating there (Rodzik and Stepko 1985) and by a considerable amount of low clouds.

Typical radiation fogs occur occasionally as the radiation usually supplements only the advection factors. In Longyearbyen where a cloudiness is smaller (Steffensen 1982) the radiation fogs should occur more frequently.

The much more rare occurrence of fogs in Longyearbyen than in Hornsund (while conditions for radiation fogs are there much more favorable) confirms once more the assumption that most Hornsund fogs are of avdvection or coastal origin. Typical polar (frosty) fogs formed at very low temperatures due to a direct sublimation of water vapour, do not occur in Hornsund at all in view of too high temperatures (rarely below $-30°C$) and a small air pollution (*i.e.* no condensation nuclei).

Finally, all above remarks should be considered for general ones only and being shortly formulated. Actually the fog formation processes are much more complicated and cannot be presented in simple schemes. A more detailed recognition of the fog phenomenon over Spitsbergen would be possible by widening the observation base into the areas inside the island and at its eastern coast or by application of modern satellite technique.

## References

Atlas of Climate of Poland. 1973. State Publishers of Cartographic Works, Warsaw, p. 29.

BARANOWSKI S. 1968. Thermics of the periglacial tundra of SW Spitsbergen. — Acta Univ. Wrastislav., 68: 74 pp.

PEREYMA J. 1983. Climatologic problems of the Hornsund area, Spitsbergen. — Acta Univ. Wratislav., 714: 134 pp.

RODZIK J. and STEPKO W. 1985. Climatic conditions in Hornsund, 1978—1983. — Pol. Polar Res., 4: 561—576.

STEFFENSEN E. L. 1969. The climate and its recent variations at the Norwegian arctic stations. — Meteorol. Ann. 5: 215—349.

STEFFENSEN E. L. 1982. The climate at Norwegian arctic stations. — Klima, 5: 44 pp.

Received March 1, 1986
Revised and accepted November 29, 1986

## Streszczenie

W artykule przeanalizowano częstość i warunki występowania mgły w Hornsundzie na podstawie materiału obserwacyjnego zebranego przez siedem całorocznych ekspedycji Polskiej Akademii Nauk na Spitsbergen w latach: 1957—58, 1978—1980 i 1981—1985. Obliczono średnią roczną liczbę dni z mgłą w Hornsundzie, która wynosi 25,7 i jest zdecydowanie mniejsza niż analogiczna wartość obliczona dla większości stacji meteorologicznych w Polsce (tab. 1). Rozkład częstości występowania mgieł w ciągu roku wykazuje wyraźne maksimum w miesiącach letnich, zimą mgły występują bardzo rzadko (fig. 1).

Hornsund jest stacją o największej częstości występowania mgieł spośród wszystkich stacji meteorologicznych Spitsbergenu. Średnia częstość mgieł obserwowanych w terminach 06, 12 i 18 GMT wynosi 2.0% (tab. 2). Najwięcej dni z mgłą notuje się tam podczas adwekcji mas powietrza z kierunków S, SW i W — łącznie 45,9%, najmniej podczas spływu z kierunków N, NE i E — łącznie 7,3% (fig. 2). Typami cyrkulacji najbardziej sprzyjającymi występowaniu mgły w Hornsundzie są typy Wa, SWc i Wc, natomiast wybitnie niesprzyjającymi — typy Ec, Ea, Nc, NEa i NEc (tab. 3). Najkorzystniejsze warunki do wystąpienia mgły w Hornsundzie powstają przy wyraźnym lokalnym napływie powietrza znad otwartego morza (tj. przy wiatrach wiejących z kierunków 225°—270° o prędkościach 1—3 m/s) oraz przy ciszy. Podczas wiatrów lokalnych z kierunków 180°—270° mgły obserwowano nawet przy prędkościach 5 m/s i większych (fig. 3). Rozkład ilości mgieł w zależności od pory doby wykazuje niewielkie maksimum w terminie obserwacyjnym 06 GMT, a minimum o godzinie 12 GMT (fig. 4). Temperatura notowana podczas mgieł w Hornsundzie aż w 92,5% przypadków była większa lub równa 0°C, natomiast tylko w 1,0% przypadków — niższa niż −2°C (fig. 5). Mgły długotrwałe występują w Hornsundzie raczej rzadko. Typem cyrkulacji najbardziej sprzyjającym występowaniu mgieł trwających 8 lub więcej godzin w ciągu doby jest typ SWc (fig. 6). Okresy mgliste trwające 2—3 dni notuje się średnio dwa razy do roku. Związane są one najczęściej z frontami ciepłymi lub frontami okluzji przemieszczającymi się przez Spitsbergen z południa i południowego zachodu na północny wschód (fig. 7).

Interpretacja wyników wskazuje, że mgły na Spitsbergenie mają głównie charakter adwekcyjny i powstają przy napływie mas powietrza znad obszarów morskich pozostających pod wpływem ciepłych prądów. Mgły typowo radiacyjne występują rzadko, ze względu na duże zachmurzenie.