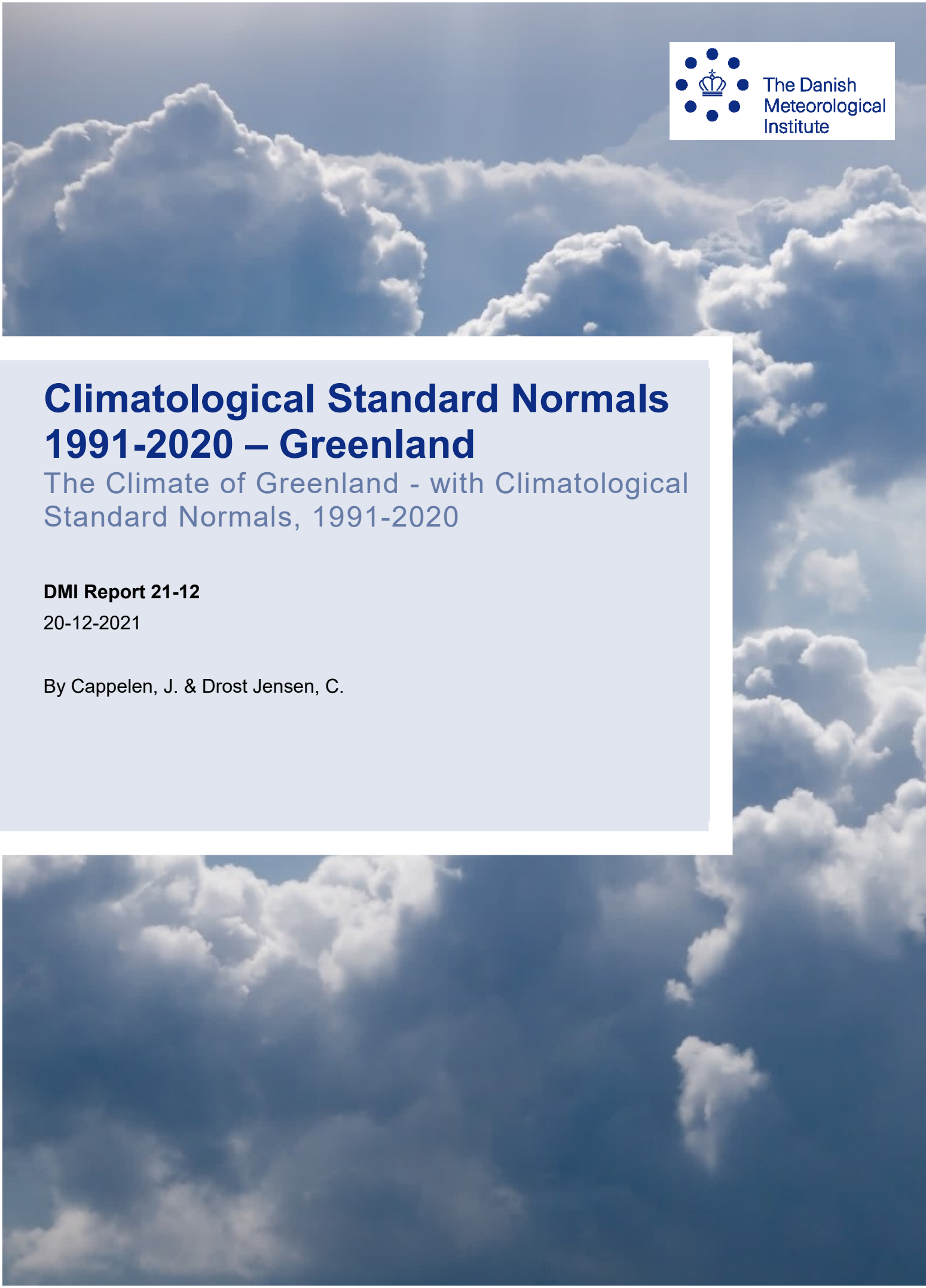

The Danish Meteorological Institute

Climatological Standard Normals 1991-2020 – Greenland

The Climate of Greenland - with Climatological Standard Normals, 1991-2020

DMI Report 21-12

20-12-2021

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The Danish Meteorological Institute

Colophon

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Content

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1 Abstract

This report presents 30 years of climatological standard normals 1991-2020 of various climate elements. It contains calculations of air temperature, relative humidity, wind, atmospheric air pressure at sea level, radiation, precipitation and cloud cover for stations in Greenland. This report is a contribution to the World Meteorological Organization (WMO) and their collection of climatological standard normals 1991-2020 from weather stations in Greenland.

2 Resume

Nærværende rapport præsenterer 30 års klimanormaler 1991-2020 for forskellige klimaelementer. Den indeholder beregninger af lufttemperatur, relativ luftfugtighed, vind, lufttryk ved havets overflade, stråling. nedbør og skydække fra grønlandske stationer. Denne rapport er et bidrag til World Meteorological Organization (WMO) og deres indsamling af klimanormaler 1991-2020 fra vejrstationer i Grønland.

3 Introduction

This report presents 30 years of climatological standard normals 1991-2020 or averages of short periods of time for 55 stations in Greenland based on quality-controlled data in the period 1991-2020. Monthly, annual and seasonal values are presented. The station climate elements include average air temperature, averages of minimum and maximum air temperature, lowest and highest air temperature, average relative humidity, lowest relative humidity, average vapor pressure, average mean sea-level atmospheric pressure, accumulated global radiation, accumulated precipitation, highest 24-hour precipitation, average cloud cover and various derived climate elements.

The monthly, annual and seasonal values from every year (1991-2020) that form the basis of the calculation of the climatological standard normals or averages are included in the associated dataset with this report.

A description of the general weather and climate in Greenland is also included.

This report is a contribution to the collection of the WMO climatological standard normals 1991-2020 from weather stations in Greenland. The contribution is based on the published quality-controlled observational data collection in Cappelen (ed.) (2021) (DMI Report 21-08) along with the monthly data collection in Cappelen (2021) (DMI Report 21-04).

The report (pdf-format) and the associated dataset (see Appendix 13.3 for a description of the data file formats) can be downloaded from this link on DMI's website https://www.dmi.dk/publikationer/

4 Weather and Climate in and around Greenland

The world's largest island (2.2 million square kilometers) stretches almost over 24 degrees of latitude from top to bottom. The northern tip is located only 700 km from the North Pole, while Cape Farewell is located 2,600 km further south - at almost the same latitude as Oslo (see Figure 1). To the south, the altitude of the sun, and consequently the length of nights and days, is almost the same as in Denmark. To the north, there is midnight sun in almost one-third of the year and winter darkness in another third.

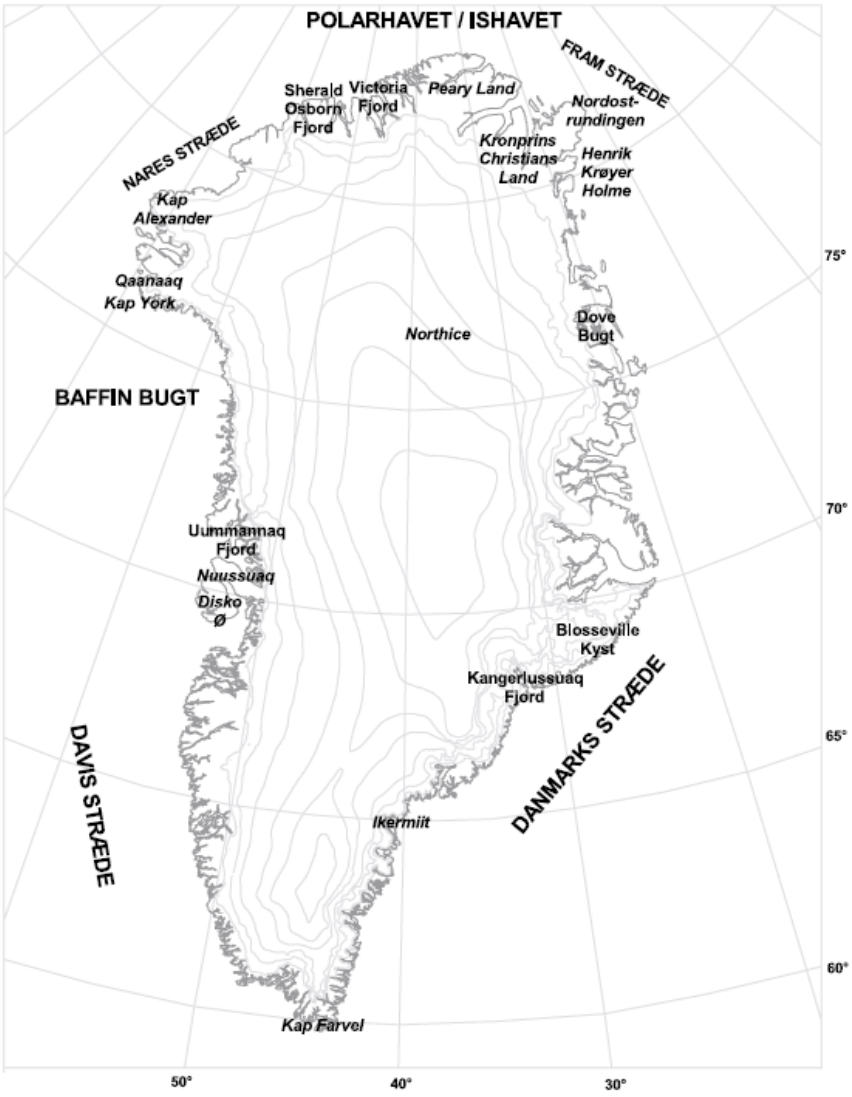

Figure 1: Map of Greenland with locations mentioned in the text.

An uninterrupted slightly domed ice cap, the Greenland Ice Sheet, covers 80% of the land. In some areas, the ice cap is more than 3 km high. Ice cores drilled through the central part of the ice cap have shown that the bedrock is located at a depth of 3,030 meters.

The remaining 20% of the island is the habitat of the country's flora and fauna, and this area is also where the human population lives - at the edge of the ice age, as it were - mainly along coasts that give access to open water. The northerly location of the country, and the cold and more or less ice-filled sea that surrounds it, are the most important factors determining the cold climate in the country.

4.1 Sea Currents and Sea Ice

The exchange in the sea of warm and cold-water flows, between southern and northern latitudes, follows patterns illustrated in Figure 2 below. The rotation of the Earth (the Coriolis force) makes any movement, including sea currents, turn to the right. This means that an eastern arm of the warm North Atlantic Sea Current (a branch of the Gulf Stream) runs northward along the Norwegian west coast, while a compensatory outflow of cold polar water runs southward along the eastern coast of Greenland.

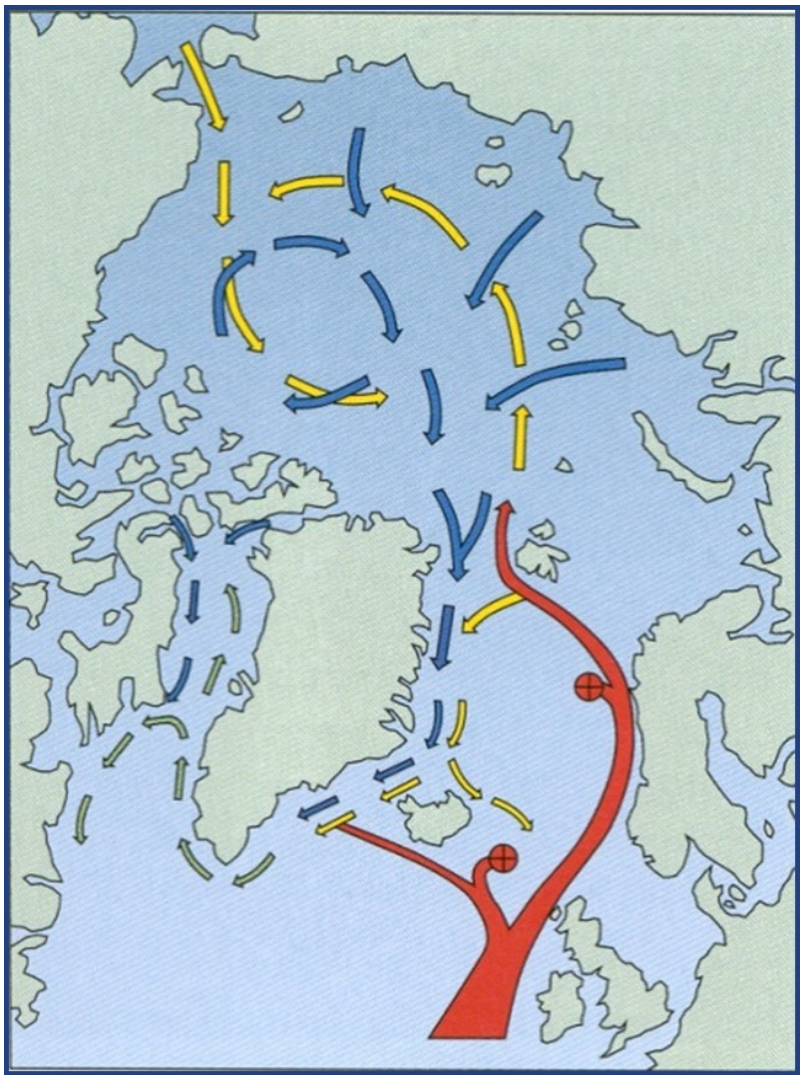

Figure 2: Sea currents in the Arctic Ocean and the North Atlantic Ocean. The warm North Atlantic Sea Current goes north and passes Norway. Along the way, branches go in the direction of Greenland, and parts of it sink to the deep seawater (marked with the sign ⊗). The rest flows into the Arctic Ocean because the higher salt content makes it sink a few hundred meters before it continues (arrows pointing upwards to the north of Svalbard) under the cold polar water. The polar water flows like a cold, icy current southward along the east coast of Greenland, more or less sharply delimited on the outside by branches of the North Atlantic Current. The two water masses gradually become mixed, and the East Greenland Current continues as a flow of mixed water around Cape Farewell and a bit up along the west coast where the "Storis", it has brought along, quickly melts.

A similar pattern of sea currents, though on a smaller scale, is seen between Greenland and Canada. In the winter period, ice is formed within the cold-water area, but throughout the year the cold sea currents in addition

transport icebergs that come from the glaciers in the area. The East Greenland Sea Current in particular also transports a great deal of “surplus” sea ice from the Arctic Ocean, which is mainly drained through the Fram Strait.

Ice in or from the Arctic Ocean is called polar ice (old ice from the Arctic Ocean). Ice in the East Greenland Sea Current is called “Storis” (general term for the polar ice and thick first-year ice from the Arctic Ocean and the Greenland east coast), while ice in the northern and western parts of West Greenland waters is called west ice (first-year ice).

Figure 3 and Figure 4 below show the median ice concentration in each month of the year based on data from 2000-2020. Especially the months February to May have a high median ice concentration that reaches down to the southern part of Greenland. From June until September, the median ice concentration decreases and the ice retreats back to Northern Greenland. From October the median ice concentration starts to increase again.

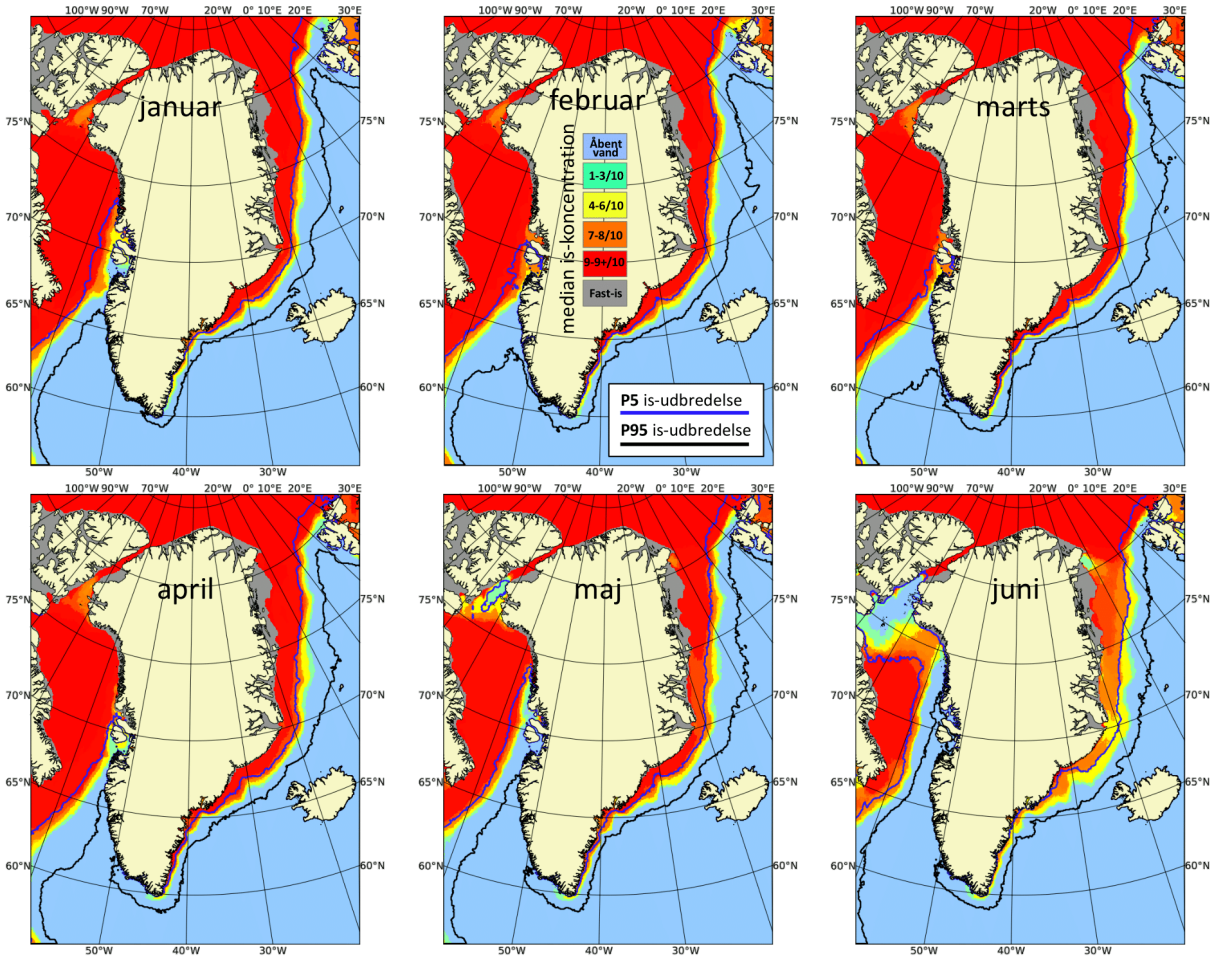

Figure 3: Median sea-ice concentration (in tenths) from 2000-2020 in January (januar), February (februar), March (marts), April (april), May (maj) and June (juni) in Greenland. ‘Åbent vand’ (blue) means open water and ‘Fast-is’ means permanent ice. The blue solid line (P5 is-udbredelse) indicates the 5% percentile, which means that less than 5% of the observations (ice maps) has a lower ice-concentration. The black solid line (P95 is-udbredelse) is the 95% percentile, which means that less than 5% of the observations (ice maps) has a higher ice-concentration (in Danish).

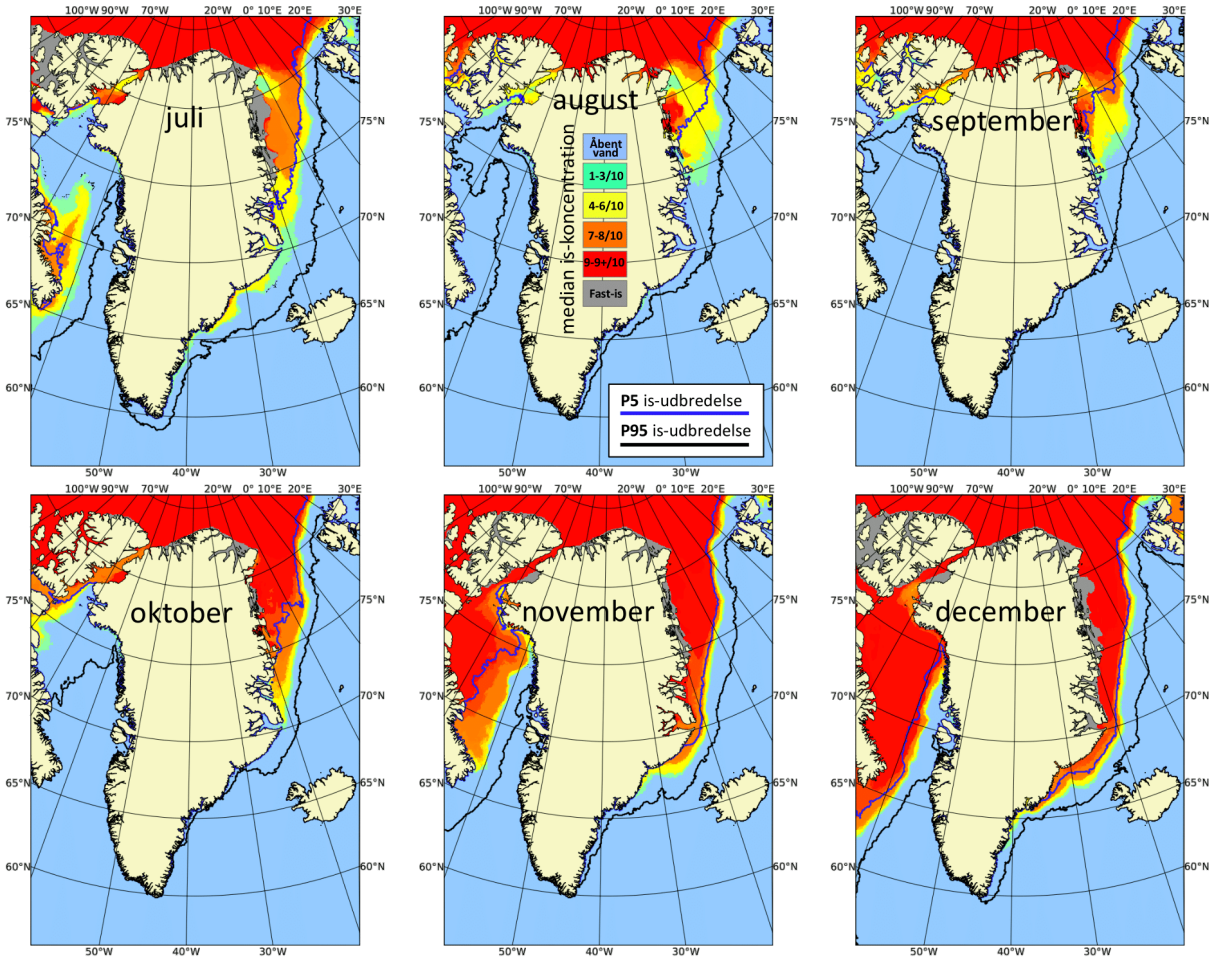

Figure 4: Median sea-ice concentration (in tenths) from 2000-2020 in July (juli), August (august), September (september), October (oktober), November (november) and December (december). 'Åbent vand' in blue means open water and 'Fast-is' means permanent ice. The blue solid line (P5 is-udbredelse) indicates the 5% percentile, which means that less than 5% of the observations (ice maps) has a lower ice-concentration. The black solid line (P95 is-udbredelse) is the 95% percentile, which means that less than 5% of the observations (ice maps) has a higher ice-concentration (in Danish).

4.2 Arctic Sea-Ice

The Arctic sea ice has experienced a decline in extend and thickness during the last 30 years. The ice is typically up to 7 years old.

In wintertime, most of the Arctic Ocean is covered by sea ice, which often appears as an uninterrupted surface covering an area of several hundred kilometers. At closer investigation, the Arctic sea ice is far from smooth and even. Ridges of sea ice crisscross the area, which indicate that the sea ice has been compressed. These ridges can be rounded, weather ridden, which indicate that they are formed a long time ago, now making the ice thick and unbreakable. Protected by these ridges is the snow, blown together and modelled into hard, parallel snow drifts by the wind. Openings and cracks in the sea ice may occur for a few hours, after which they close again or freeze over. The thickest sea ice has in general decreased its thickness from approximately 5 meters to 4 meters. Even the largest ice-breaking vessels have to give up when faced with such powerful ice formations. In summertime, the ice cover decreases from an almost full Arctic coverage to a coverage north of the Canadian and Greenlandic coast.

4.3 The East Greenland Sea Current and the "Storis"

Almost all water leaving the Arctic Ocean drains through the Fram Strait between Greenland and Svalbard, from where it continues as the sea current called the East Greenland Sea Current all the way down along the east coast of Greenland, around Cape Farewell and a bit up along the west coast. To the east, the current is bordered by warmer, saltier (and consequently heavier) Atlantic water floating in a southerly direction after having left the North Atlantic Sea Current. A part of this water flows below the cold polar surface water.

The East Greenland Sea Current brings along huge quantities of polar ice in a band that may be up to several hundred kilometers wide. A few hundred kilometers to the south of the Fram Strait, the sea current accelerates, which causes a certain spreading of the ice. In the winter months, new ice is quickly formed between the floes of polar ice. This mixture of polar ice and first-year ice is called "Storis". Its floes of polar ice may be as big as the Danish island of Zealand. Drifting down along the coast, however, they are broken into smaller pieces by the wind, the swell of the sea, and collision with other floes. To the south of Ittoqqortoormiit (formerly Scoresbysund), their size has been reduced as well. However, even though the smaller dimensions make it easier for (specially designed) vessels to maneuver in or sail around the ice, the ice is extremely dangerous to navigation. This is particularly true when the wind brings the ice to areas where ice is not normally expected.

The sea ice to the east of Greenland is generally thick ice exported from the Arctic. It follows a narrow current along the Greenlandic coast. During most of the year, the coast is blocked by "Storis" or thick multi-year ice. In the peak wintertime, it extends down to Cape Farewell and in some cases, it spreads a few hundred kilometers along the west coast via Cape Farewell. The minimum extend is found in summertime (August – September), where the maximum extend for the last 20 years is down to 70° North and on average the summer sea ice extends to ~75° North.

In addition to currents, the wind has a major impact on the drift of the ice, especially if the ice is not very compact. Winds from the east (on-shore wind) will close the edge of the ice and make it impenetrable for most vessels. If the wind comes from the west, there may be bars and belts of ice up to several hundred kilometers from the ice field, while there may be open water areas close to the coast. Such areas may occur more or less permanently in an otherwise uninterrupted ice cover, depending on local winds or sea currents. A permanent open water area within closed sea ice is called a polynya. The polynya at the mouth of Scoresbysund is well-known and the wildlife there ensures the survival of the local population.

4.4 West Greenland and the West Ice

Conditions along the west coast of Greenland differ a great deal from conditions along the east coast. No real polar ice is seen along the west coast – except "Storis" that travels around Cape Farewell. Polar ice, which occasionally drifts towards the south through the Nares Strait between Greenland and Ellesmere Island in north-eastern Canada, stays close to the Canadian coast when it drifts further south. The vast majority of the ice to the west of Greenland is thus formed in the sea area where it is seen, and it is uncommon to see more than a couple of sea ice types at the same time, for example, broken floes of winter ice in a sea covered in dark new, thin ice.

The sea ice in Baffin Bay is dominated by first year ice, which can reach a maximum thickness of approximately 1.5 meters. In addition to this, thick sea ice is exported from the Arctic when ice bridges are not present in the Nares Strait.

The maximum sea ice extend is found in the winter season and it covers most of Baffin Bay and closes off Greenland's west coast from Qaanaaq (Thule) in the north, and almost all the way down to Sisimiut (Holsteinsborg) in the south. It is called "west ice" in Greenland. Varying quantities of west ice are brought with the Labrador Sea Current down along the Canadian east coast. Navigation further south is rarely affected to any great extent. Only a small part of the west ice survives the summer.

West ice can generally be broken by ships with sufficient engine power, though it will usually be both unprofitable and hazardous. Consequently, it is only possible to sail to and from Qaanaaq (Thule) from July to September, while it is usually possible to sail to and from Aasiaat (Egedesminde) and Ilulissat (Jakobshavn) from mid-May to mid-December. There is normally no sea ice between the west ice and the "Storis" further south. Therefore, 90% of the population lives in the four "open sea towns" of Paamiut (Frederikshåb), Nuuk (Godthåb), Maniitsoq (Sukkertoppen), and Sisimiut (Holsteinsborg), where most business enterprises in Greenland are also located.

4.5 Icebergs

Glacial outlets from the Greenland ice sheet form icebergs. As opposed to sea ice, icebergs are not made of frozen seawater but of ice that is many thousand years old. This ice was once snow that fell on the ice cap. Icebergs may be extremely dangerous for ships, the reason being that icebergs do not follow winds and surface sea currents but go so deep down into the sea (sometimes up to 300 meters below the surface of the sea) that their drifting is primarily determined by deep-sea currents. A ship sailing in the sea ice may easily end up on a collision course with an iceberg if there are major differences between surface currents and currents deeper down in the sea. Furthermore, icebergs melt slowly and may therefore drift far away from sea ice areas.

Icebergs are seen along almost all coasts in Greenland, but there are particularly many of them in the Qeqertarsuaq (Disko) area where some of the world's most productive glaciers are located. Many of these icebergs drift to the west, whereupon they are taken south by the Labrador Sea Current. Some icebergs are moved as far south as the transatlantic shipping routes (as was the case in 1912 when the Titanic hit an iceberg).

4.6 Climate and Weather

The climate in Greenland is an Arctic climate, which means that no forest can grow in the area. An exception to this is are the protected small locations in the southernmost parts of the country. The northern part of the country is very close to the North American continent, from which it is separated only by a relatively narrow and more or less ice-filled sea. Southern Greenland, on the other hand, is something between the continent to the west and the ocean to the east.

4.7 Atmospheric Flow Patterns and Cyclone Tracks

Because of its height and size, Greenland has a great impact on the movement of air in the lower, dense part of the troposphere, causing the wind to blow mainly along the coast. Greenland thus contributes to the exchange of air masses between north and south. In the summer, northerly and southerly winds are almost evenly distributed, while northerly winds are very predominant in the winter in accordance with the fact that the highest air pressure occurs in the coldest areas to the west or north-west.

The picture changes in the upper troposphere. Within a cold and dense air mass, pressure necessarily drops faster with altitude than in a warm air mass. Consequently, there is generally a low pressure at an altitude of, for example, 5 kilometers (the 500hPa level) where the atmosphere is coldest (to the north), and a high pressure where it is warmest (to the south). This pattern is less regular in winter when the pole area is not the coldest, the coldest areas being the eastern parts of the continents (where the impact from the oceans is lowest). Figure 5 below shows the average pattern in January. The low-pressure area over the Baffin Island is often named "the Canadian cold vortex".

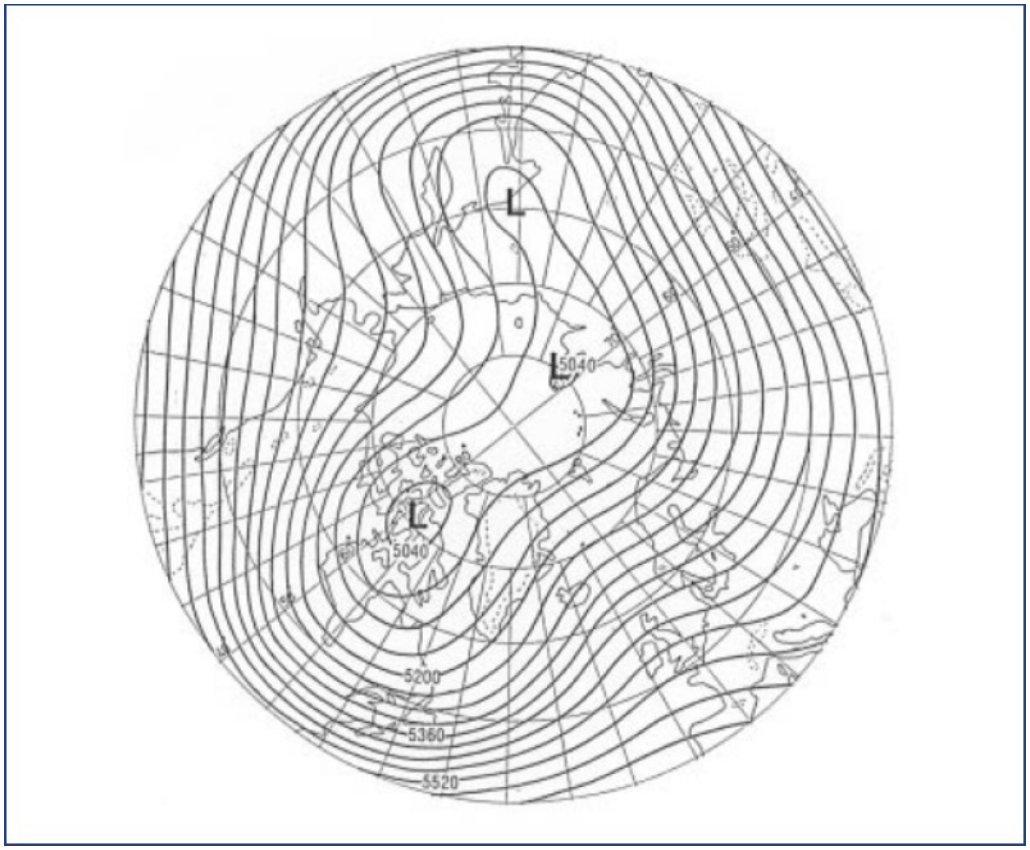

Figure 5: Mean January contour map for the 500hPa level (altitude stated in meters). The air flows in parallel with the contour lines and counterclockwise related to the center of the low. The circulation over the Baffin Island is often called the "Canadian cold vortex". The impact of the warm oceans and the cold continents on the general westerly flow is evident. Source: Leif Rasmussen.

The flow at the 500hPa level is interesting because, to a great extent, it governs the migrating weather systems (highs and lows) and the weather associated with them. Lows in particular are associated with "bad weather" - strong winds and precipitation. As shown, Greenland is mainly "supplied" from the southwest (where winters are cold) in the winter and mainly from the west in the summer.

Most lows develop as "waves" at the polar front (the border between cold air to the north and warmer, more humid air to the south). The waves propagate along the front, the cold being on their left-hand side. This means that the preferred cyclone tracks in the winter are from the east coast of the United States at the edge of the Gulf Stream towards the northeast, passing south of Greenland and continuing to Iceland and the Norwegian Sea. In a scenario like that, the southern and eastern parts of Greenland will be particularly affected. However, very different patterns occur. Sometimes cyclones move northwards through the Davis Strait and the Baffin Bay, and sometimes a cyclone will move directly towards Cape Farewell, subsequently splitting into two centers, one of which follows the west coast, while the other follows the east coast. When this happens, most of Greenland may be affected during the passage, depending on local conditions.

In the summer, lows are less intense, but their tracks tend to be displaced northward, often straight towards West Greenland. Therefore, the weather can be rather unsettled there.

Other types of lows – of more local nature and on a smaller scale - occur. Here, only the polar lows are mentioned. They develop over ice-free sea areas when the atmosphere is very cold, typically between Labrador and West Greenland, but sometimes even near the south-eastern coast of Greenland. The occurrence is always relatively far to the north of the polar front. The diameter of a polar low is generally 200-

300km, and the system may be quite intense. Its life cycle is normally one or two days. At some point in the cycle, the system may feature a cloud structure similar to that of a tropical hurricane. This is no coincidence. Just like tropical hurricanes, these lows get their energy from the heat and humidity brought to the air from the surface of the sea, being essentially warmer than the air.

4.8 Wind

As mentioned above, strong winds will typically be connected with passing cyclones. Between such events, there will be short or long periods of calm weather throughout the year, in which the wind regimes are determined by local conditions.

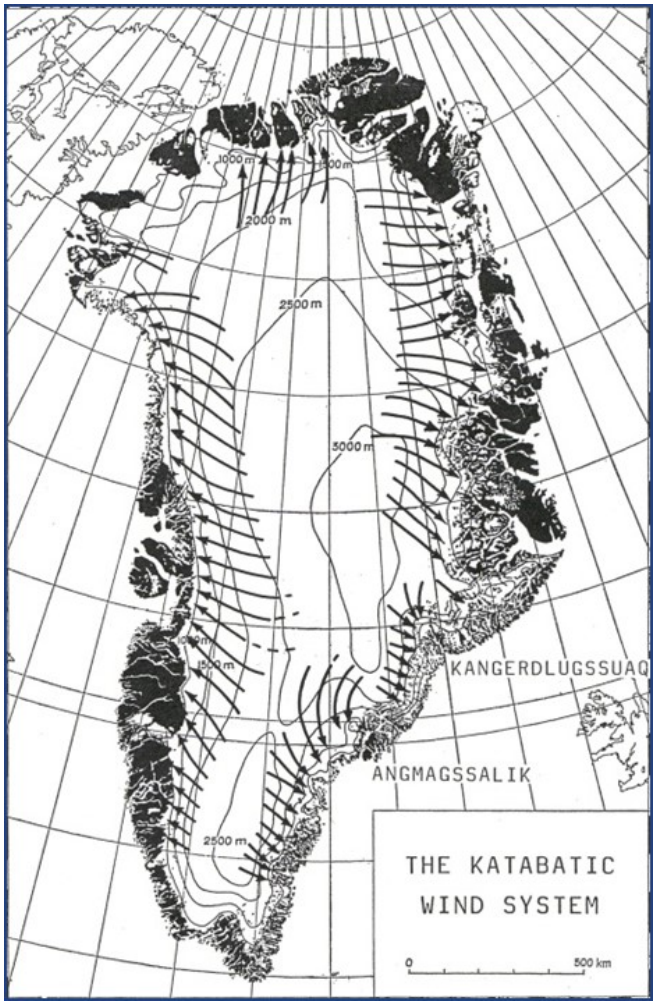

Figure 6: The katabatic wind pattern over the ice cap. The deviation from the natural fall line is due to the Earth's rotation. The pattern has been determined based on physical and thermal structures on the surface of the ice as they are seen on infrared satellite images. In the central area winds are often light. Source: Leif Rasmussen.

One example of this is the katabatic wind system of the ice cap (see Figure 6). Katabatic means downward going, and the winds move from the central and highest part of the ice cap towards the edge of the ice. They are governed by the difference in density between the cooled, heavy air closest to the surface of the ice and the warmer, lighter air in the free atmosphere at the same level. The outflow accelerates as and when the slope of the surface increases, and the topography may cause canalization with extremely high wind velocities at the edge of the ice. Because of the change in altitude, the outgoing air is compressed and thereby heated (this is called an adiabatic process if it takes place without being affected by external factors (i.e. heating or cooling, addition or release of humidity)). The heating (which is named a Foehn effect) will then be 1°C for each 100 meter the altitude changes. Whether or not the fast-moving wind will reach the fjords in the coastal area, will depend on its temperature on arrival. If it is warmer (lighter) than the fjord air, it will only be able to replace the fjord air locally, mainly at the head of the fjords, where it will be felt like a warm Foehn wind. If it is colder (heavier) it will, as an icy fall wind, easily go all the way through the fjord eventually reaching the open sea.

The best-known example of this is the 60 km long, unpopulated, and very windy Kangerlussuaq fjord on the east coast. From a position in a protected side fjord, it would be possible both to hear and see the gales because of their noise and the snowdrift or foam they generate. Its continued, more subdued passage

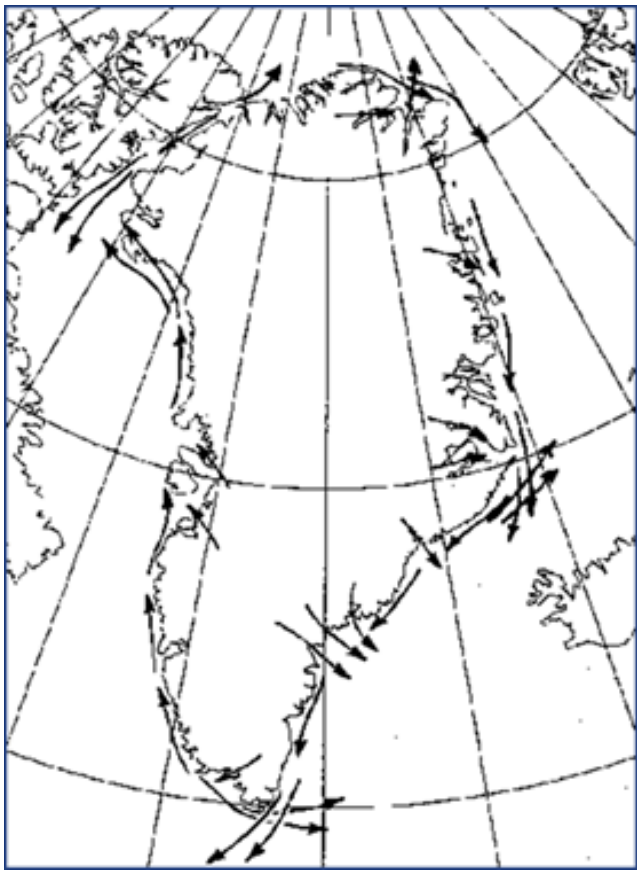

Figure 7: Predominant wind directions in situations with strong winds in the coastal area. The winds coming from the land may be warm Foehn winds or cold fall winds. Winds blowing along the costs are mainly "barrier winds" blowing clockwise along the land. However, at "the corners of the land" there are two wind regimes. Thus, at Cape Farewell, which is often affected by very strong winds, both north-easterly and westerly gales occur. The latter is part of a "lee whirl" typically formed on the east coast with a prevailing westerly flow in the area. Source: Leif Rasmussen.

over the Denmark Strait can be seen on satellite pictures, in which it will appear that the flow may continue more than 200km out over the sea.

However, "undisturbed weather" in the fjords is often calm, though characterized by sea breezes in summer and land breezes in winter, governed by local temperature differences in an ordinary manner. This pattern is so predominant that it can be compared to a monsoon system (i.e. seasonally determined winds caused by differences in the heating of sea and land) in several places.

Local wind regimes may be affected and eventually destroyed under the influence of passing cyclones. The strong winds connected with such cyclones have their own patterns, which are very dependent on the topography and the wind direction in relation to the coast. If they blow towards the coast they will partly be lifted and cause precipitation and partly be deflected along the coast in the direction of lower pressure (a westerly wind will thus be deflected towards the north, while an easterly wind will be deflected towards the south). In this process, the wind will accelerate - we have a so-called barrier wind which may become very strong. If the wind blows away from the coast it will be either a warm Foehn wind (especially in West Greenland) or a cold fall wind (especially in East Greenland). Both types of winds may result in very high wind speeds.

A special feature in Greenland is that the change from calm to gale force may take place very suddenly. A Greenlandic word for this phenomenon is "piteraq", which is mainly used about strong north-westerly fall winds on the east coast. These winds will typically occur when cold air of Canadian origin reaches the coast via the ice cap behind a northeast moving low. The topography of the ice cap will canalize the cold outflow towards parts of the coastland. Most exposed is the wide sea bay to the south of Tasiilaq (Ammassalik).

4.9 Temperature

The long period of the midnight sun in North Greenland is the reason why the average summer temperature (July) is only about two degrees lower in Peary Land than in the southernmost part of the country. More important is the difference between the outer coasts where drifting ice or cold water makes the air cold and humid, and the ice-free inland where the weather is warmer and often sunny. Differences of up to about 5°C may be registered. The proximity of the ice cap does not have any major effect in the form of low temperatures; one reason being that air coming from the ice cap will be Foehn winds, as described above.

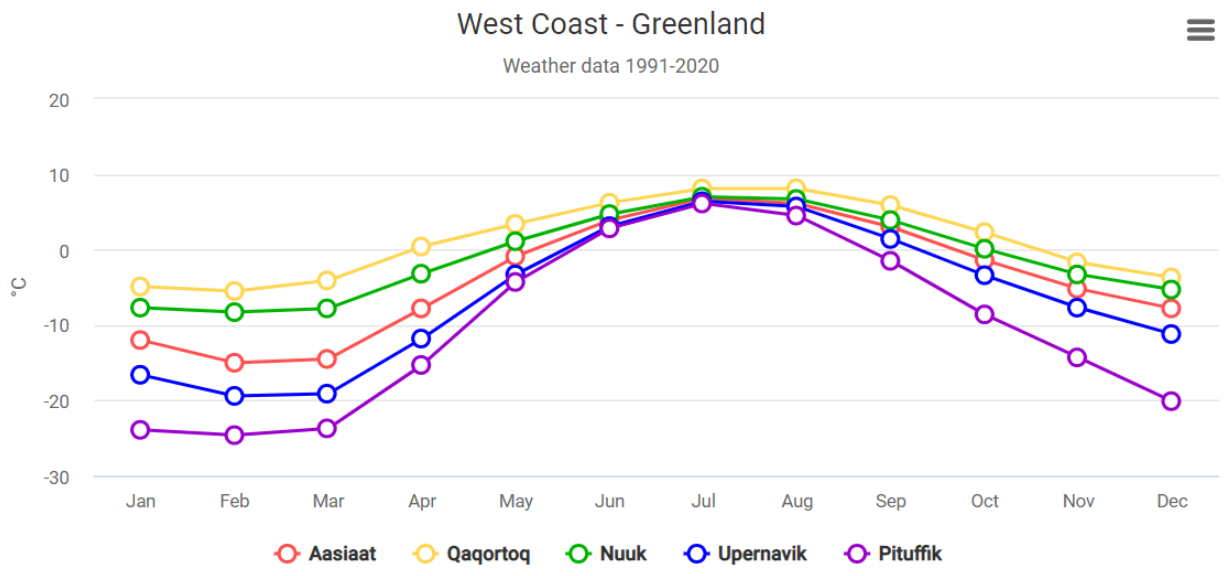

Figure 8: Monthly mean temperatures (1991-2020) for Qaqortoq, Nuuk, Aasiaat, Upernavik and Pituffik, which are located along the Greenland west coast.

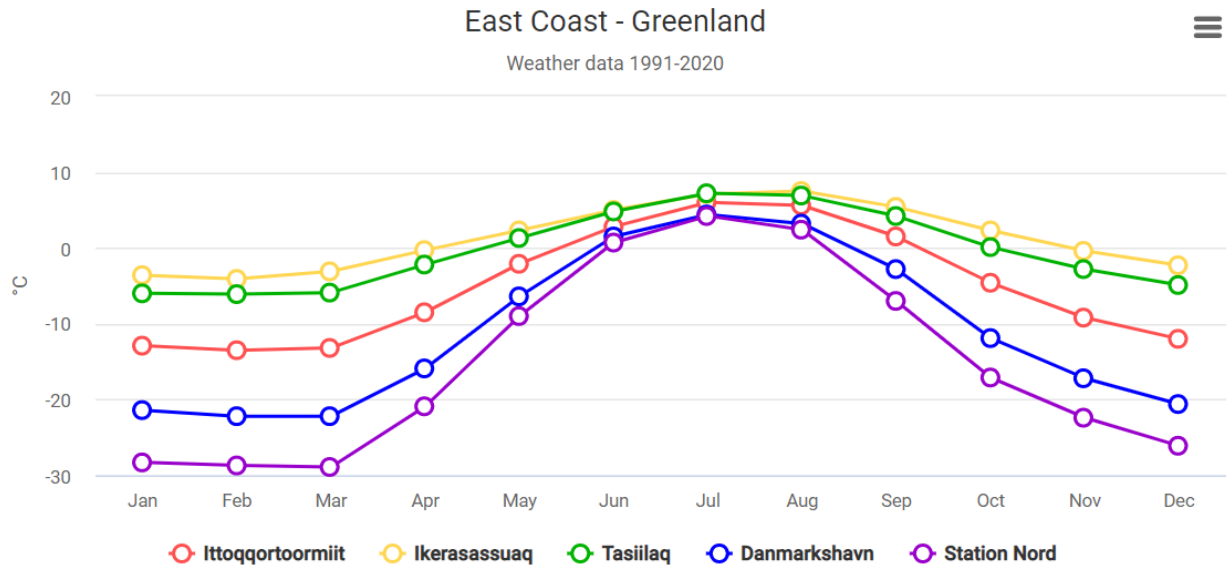

Figure 9: Monthly mean temperatures (1991-2020) for Ikerasassuaq, Tasiilaq, Ittoqqortoormiit, Danmarkshavn and Station Nord, which are located along the Greenland east coast.

Figure 8 and Figure 9 show that the summer temperatures in Greenland as a whole are relatively uniform. Despite the full extent of the country, the difference from the north to the south is a few degrees. In winter, the difference between average temperatures in the north and the south is much greater, up to around 30°C. While the annual fluctuation at Cape Farewell - which is affected by the sea - is around 10°C, the same difference in the northern parts of Greenland is between 30-35°C. As in the summer, there are temperature differences between coastal and inland areas, though ordinarily with opposite signs and mainly in places where the sea is completely or partly free of ice. Foehn winds inside the fjords may bring temperatures above zero even in the

middle of the winter, sometimes even up to 10°C or more. This is frequently seen in the southern part of the country but rarely in the northernmost part of Greenland. An outbreak of Foehn winds may make the snow disappear and the ice break, which is not always a welcome change in the life patterns of animals and human beings.

An important element in the temperature description is its vertical distribution. Normally, temperature will decrease with altitude by 6.5°C per kilometer on average. In the Arctic area, this decrease in temperature generally is lower, and over the first hundred meters the temperature will often increase with altitude - sometimes even considerably. A temperature distribution like that is called an inversion. In winter, the occurrence of such a “cold bottom layer” is due to radiation cooling of the snow surface and thereby of the lowest layer of air. In the summer, the cooling caused by melting ice is the crucial factor. While summer inversions are thus related to the coastal climate, winter inversions occur in places located far away from open sea areas.

In winter, the increase in temperature up through the inversion layer may be more than 20°C over just a few hundred meters. An inversion like that is possible only in calm, cloud-free weather. The onset of strong winds will result in a dramatic almost instant temperature increase followed by a more moderate drop in temperature if the wind calms down again.

One result of the frequent inversions is that in the spring, snow starts melting in the mountains rather than at sea level and that the most vigorous vegetation is often found at an altitude of a few hundred meters. If a weather station that measures temperature is moved from a low elevation to a slightly higher elevation it may result in the loss of continuity in measurements.

4.10 Cold and Mild Winters - the Temperature Seesaw

The Canadian cold vortex is not stationary but fluctuates from day to day around its normal position. In certain periods, there are more significant fluctuations of longer duration, which may have a significant impact on the winter weather not only in Greenland but also in the north-western part of Europe and elsewhere.

There are two types of deviation. In the first type, the vortex is displaced eastwards to Greenland where it may intensify. This causes a change in the behavior of Atlantic cyclones: the preferred tracks are pushed southwards, which implies an increase in the supply of Atlantic air to north-western Europe where the winter will be very mild. In contrast, Greenland will have a very cold winter, undisturbed by “Atlantic weather” but with a great likelihood of polar lows to develop.

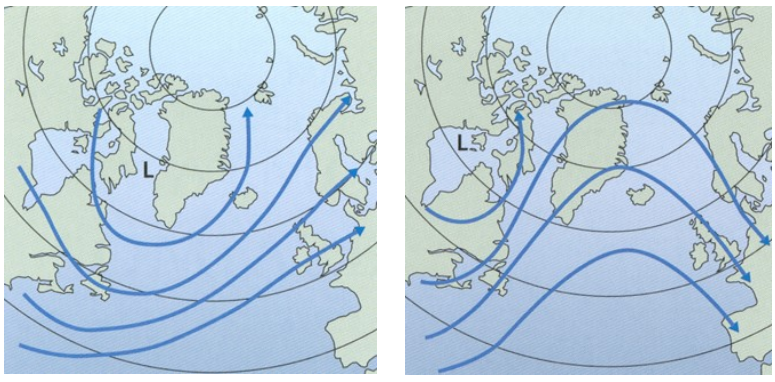

Figure 10: “The Temperature Seesaw” - sketch illustration of the two deviating 500hPa patterns in NAO (North Atlantic Oscillation). Source: Leif Rasmussen. The arrows represent contour lines as in Figure 5 and thus illustrate the airflow.

In the other type of deviation, the vortex is displaced towards the southwest, typically to the Hudson Bay area, and weakened. In this scenario, Atlantic cyclones will follow a northward track towards Greenland, where the weather will be very changeable with frequent temperature increases to several degrees above zero, especially in the southern part of the country. Further to the east over the Atlantic Ocean, high pressure will prevail, thus blocking the usual supply of maritime air to north-western Europe where the winter may be very cold.

These fluctuations are popularly called the temperature Seesaw. Another designation is NAO (North Atlantic Oscillation). More than half of all winters can be characterized as one of the two types of winters described in the paragraphs above. NAO patterns are also seen in the summer, though they are not as manifest. There is, of course, great interest in the possibility of predicting patterns like this.

4.11 Fog - Summer and Winter

Greenland is known for its clear air. When there is no precipitation or drifting snow, the curvature of the Earth rather than fog and mist limits people's field of vision. An exception to this is experienced in the surrounding waters in the summer period. The water will remain cold as compared with the air above it because of the ice, which is only melting very slowly, as described above. The lowest layer of air will be cooled and its content of water vapor may condense, leading to the formation of advection fog. Fog and drifting ice constitute a very unpleasant cocktail for navigation.

The sea fog season begins in May, peaks in July, and fades out in September. In coastal waters, there will be fog for about 20% of the time in July. Fog is also very common in the central part of the Greenland ice cap in the summer.

Summer sea breezes lead the sea fog into the fjords, where it is generally dissolved quickly by the sun-heated land. The further into the fjords, the less frequent the occurrence of fog is. Seen in this perspective, the airports in Kangerlussuaq and Narsarsuaq are ideally located.

In winter, the air is generally dry and clear unless snow is falling or drifting. However, in areas where cold air flows out over open water, sea smoke may be formed. Low radiation fog may sometimes be seen in areas with vast snow surfaces. However, a radiation-cooled snow surface will generally have a drying effect on the lowest layer of air since the humidity contained in this layer will be sublimated into white frost on the cold surface.

4.12 Precipitation

The amount of precipitation is generally higher at the coasts than inside the country. It is very high in the southern part of the country, especially on the east coast, while it is low in North Greenland, which has a number of "Arctic deserts", i.e. areas nearly snow-free in the winter, and where evaporation may exceed precipitation in the summer.

At sea level, precipitation takes the form of rain in the summer, while it mainly takes the form of snow in the winter in the southern part of the country. In the northernmost part of the country, it may sometimes snow in July, while rain is extremely rare in the winter. Precipitation in the form of showers is common in the winter at locations close to the open sea. In the summer, there may be showers inland as a result of sun warming.

Thunder occurs in unstable weather, though only very rarely and generally for very short periods. In the winter, heavy showers over the sea may be accompanied by thunder. Precipitation measurements carried out during the winter are unreliable because of frequent snow drifting.

4.13 Weather and Climate Regions in Greenland

Greenland can be divided into seven weather and climate regions. Each region has certain special characteristics, which will be described below. Figure 11 shows the location of climate regions in Greenland; the ice cap, North, Northwest, Southwest, South, Southeast, and Northeast Greenland.

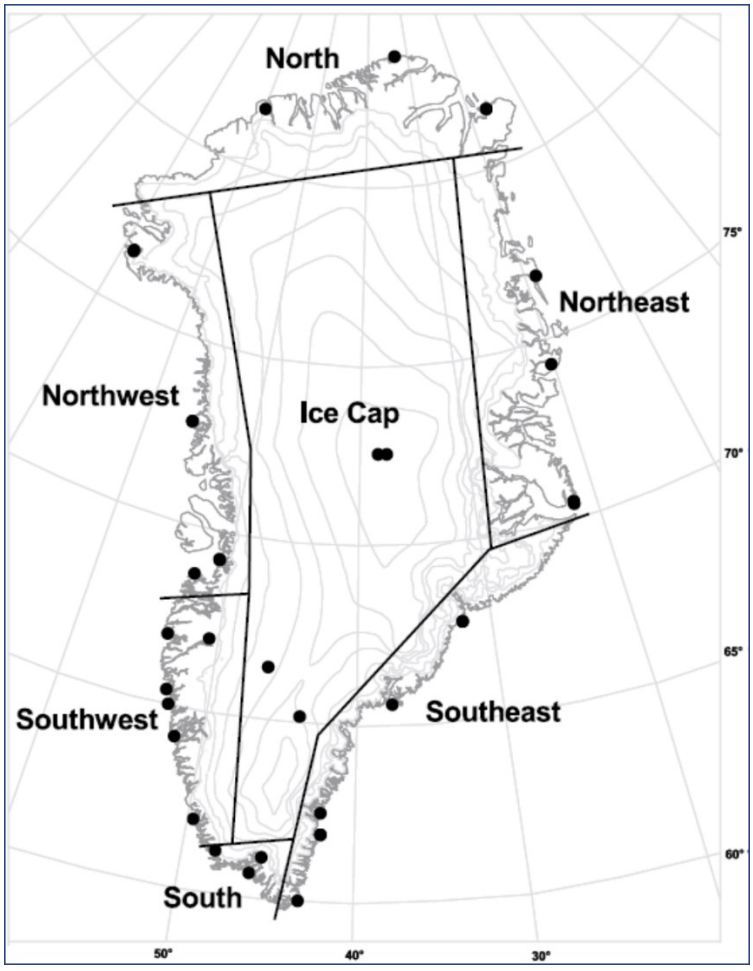

Figure 11: Location of climate regions in Greenland.

4.14 South Greenland

The large temperature differences in the area - between the cold sea and the warm inland area in the summer and between the warm sea and the cold inland area in the winter - give rise to a local but dominant monsoon system in the fjords, featuring sea breezes in the summer and equally dominant land breezes in the winter. This pattern is disturbed in times of unstable weather.

The winter weather is generally changeable but differs a great deal from year to year. Lows crossing South Greenland from the southwest to the northeast will make the weather change between easterly winds accompanied by rising temperature and precipitation in the form of snow or rain, and north-westerly winds with clearing and colder weather. Sometimes, with a stationary low-pressure area to the south of Greenland, strong, warm and dry Foehn winds from an easterly direction may blow in the fjords for relatively long periods, in rare cases for weeks. The temperature of such winds will be around 10°C or more. The winds may reach gale force with gusts of hurricane force. Locally, these winds are referred to as a “sydost” (“southeaster”) even though the wind direction is typically northeast. In such scenarios, the snow cover will disappear and the ice in the fjords will break. In contrast, a stationary low pressure area near Iceland may be characterized by a long period

of northwesterly winds with a hard frost and in the coastal area frequent snow showers. Inside the country, clear skies will prevail.

Summers are warm inside the country. In certain locations, the average temperature for July is above 10°C (Narsarsuaq 11.1°C). Temperatures are lower near the coast because of the cold sea, where fog is frequent (above 20% of the time). The sea breeze brings the fog into the sun-heated fjord areas where it is dissolved.

The amount of precipitation is high. In the summer, precipitation will always be in the form of rain, while snow is most common in the winter. The snow layer can occasionally be reduced by melting.

4.15 Southwest Greenland

This area is the part of the country where ships can navigate almost unimpeded in relation to sea ice all year round. The open sea means that the coastal zone, where the population is concentrated, has relatively mild winters, while the summers are characterized by relatively cool and often unsettled weather. Inside the fjords, winters are cold, while summers are warmer. However, just as in South Greenland, there are major fluctuations in the weather from year to year. The amount of precipitation is generally large in the southern part of the area but decreases further to the north and especially in the direction going from the coast and inwards. While winters in Sisimiut are characterized by relatively much snow, there is generally only a thin layer of snow in Kangerlussuaq (Sdr. Strømfjord).

In winter, winds from northerly directions are predominant. They are typically connected with clear, cold weather in the coastland, though there are many snow showers over the sea, which occasionally affect the coast. Unstable, rough weather accompanies lows passing through the Davis Strait from the south or the southwest. During the passage, temperatures will rise, and there will be abundant precipitation and strong wind from the south, often reaching gale force and occasionally even hurricane force in the coastal area. The best known of these winds is the “sydvesten” (“the southwester”) at Nuuk (called “nigersuaq” in Greenlandic). When combined with a Foehn effect, this southerly wind may bring temperatures up to 10-15°C even in the middle of winter, though this is relatively rare. The high temperatures will only last for a short period.

In the event of major outbreaks of cold air from Canada, polar lows will often develop over the sea. If they reach the coast, they will be very manifest in the form of strong winds combined with blinding drifting snow and hard frost.

In summer, lows passing from the south and southwest through the Davis Strait are relatively frequent. Just as in winter, these lows may cause rather abundant precipitation in coastal areas with strong winds from the south. In June, precipitation may still be in the form of snow, but otherwise, it will be rain. Inside the fjords, the winds generally are more moderate, though local outbreaks of strong Foehn winds or mountain gusts may occur.

Stable summer weather is seen in periods with high pressure over the central part of Greenland. In such conditions, there may be “midsummer weather” even in May, with day temperatures of up to 20°C and even higher in the inner part of the fjords, but with frequent fog and temperatures only slightly above 0°C at the outer coast.

The midnight sun line goes through Maniitsoq, while the limit for polar nights is located a little to the north of Sisimiut.

4.16 Northwest Greenland

Since the ice cover is almost uninterrupted in the Baffin Bay in the winter, winters are less unstable but colder than in southwest Greenland. The area has the same storm patterns: strong winds from the southeast or south bringing large amounts of precipitation both summer and winter and accompanying cyclones that moves

towards the Baffin Bay from directions between south and west. On the lee side of the Cape York Peninsula, south-easterly winds appear as extremely turbulent Foehn winds at Pituffik (Thule Air Base). Also, in the inner parts of the Disko Bay and Uummannaq Fjord, occasional strong Foehn winds from the southeast occur, while the strait between Disko and Nuussuaq, the Vaigat, is known for its changeable winds. Generally, the average wind velocity peaks in the autumn and falls again in December when the sea freezes over.

The amount of precipitation is relatively high in the southern part of the area but lower in the northern part. In winter, precipitation is almost always in the form of snow, while rain is most common in the summer, though it may sometimes snow in the northern part. Fog is very frequent at sea and in coastal areas in the summer.

The duration of the midnight sun/polar night periods in the northern part of the area is 127 and 110 days respectively, in the southern part 52 and 24 days.

4.17 North Greenland

In the winter, the average air pressure is highest in this part of the country, the core of the high pressure being located in the large northwest facing fjords - Sherard Osborn Fjord, Victoria Fjord, etc. The weather is often clear and calm, and the temperature is the lowest found at sea level anywhere in Greenland, the average temperature sometimes being close to -40°C. The cold snow surface results in a very persistent and strong low-level inversion. Because of relatively low air pressure (and relatively warm air) in the Baffin Bay, the cold surface air is drained like a winter monsoon to the southwest down through the Nares Strait. The resulting strong wind causes strong ice drifting in the Strait, peaking in early winter. Later in the winter, fast ice is formed down to a line slightly north of Cape Alexander, connecting Greenland and Ellesmere Land. To the south of this line, a polynya will form, called the “North Water”, the fauna of which ensures the survival of the local population.

A similar drainage pattern is seen to the east of the high-pressure area where the air flows along the north coast towards Nordostrundingen, where a marked wind maximum exists. It is best registered by the automatic weather station on Krøyers Holme, a small group of flat islets. Around these is another polynya called the “North East Water”, which at least partly is kept open by the wind.

Summers are short. The snow covering the area disappears in July and returns in September, though passing cyclones may cause occasional snowfalls, sometimes even blizzards in this period as well. However, summers are generally sunny and relatively warm inland, while coastal areas are often affected by fog or low clouds, which are characteristic of the ice-filled Arctic Ocean.

Precipitation is generally sparse, though unevenly distributed. In many areas, the wind moves considerable quantities of snow and several areas are almost free of snow in the winter because of the wind. A maximum of precipitation is seen around Station Nord on the wind side of Kronprins Christian Land. This precipitation contributes to preserving the ice cap on the peninsula.

The duration of the midnight sun/polar night periods at Cape Morris Jesup is 154 days and 143 days respectively.

4.18 Northeast Greenland

Winters are generally very cold since there is no open sea in the area. The weather is often clear with strong radiation cooling. Northerly wind directions are predominant. Strong winds and precipitation are usually connected with cyclonic activities over the Greenland Sea, and may sometimes last for relatively long periods. Maximum winds occur in the coastal area, though winds coming from the ice cap may be very strong in certain fjords, taking the form of northwesterly and westerly Foehn or fall winds. One example of this is the inner fjord complex in Scoresbysund. Another example is the north-western part of Dove Bay, where the wind moves considerable quantities of snow.

In the summer, the coastal zone is often affected by fog from the ice-filled sea, the average temperature of the fog being only a little above zero degrees Celsius. Inside the fjords, summers are relatively warm and sunny, though there may be periods of cold and unsettled weather when lows pass the area. The highest temperatures are registered a few hundred meters above sea level where there is no sea breeze.

For the year as a whole, the largest amounts of precipitation are seen in the southern part of the area. However, inside the fjords, precipitation is sparse, which is the reason why there is a wide zone of ice-free land to the south. A snow cover is formed in September, and the snow disappears again in the period from May to July. Sometimes snow falls locally in July and August, but it always melts away very quickly.

Fast ice in the fjords breaks in July in the southern part of the area, but in the northern part, it may last all summer. The formation of new ice begins in September.

The duration of the midnight sun/polar night periods in the northern part of the area is 137 days and 121 days respectively and 72 days and 52 days in the southern part.

4.19 Southeast Greenland

Winds and precipitation in this area are strongly affected by cyclonic activities around Iceland. The track of the lows typically goes from southwest to northeast. In front of such a low, there will be a barrier wind from the northeast along the coast (Greenlandic: “neqajaq”), accompanied by precipitation. The wind has its maximum where the coastline is protruding and may here quite often reach hurricane force. Tasiilaq (Ammassalik) and the Aputiteeq weather station are located close to the coastline but are often without the reach of the neqajaq, while Ikermiuarsuq and Ikerasassuaq are more exposed to it.

Behind the low, there may be strong winds from directions between north and west (the hurricane-like piteraq). In most cases, the piteraq is a rather local wind, the occurrence of which is determined by the topography of the coastal area and the ice cap. It blows frequently in the wide sea bay to the south of Tasiilaq (see Figure 7) where the Ikermiit weather station is located. Tasiilaq itself is sometimes affected by the piteraq, but the large Kangerlussuaq fjord (about 68°N) is very exposed to it. The piteraq may be a warm Foehn wind with local temperatures of more than 20°C, but in the winter, it is usually a cold fall wind. During a destructive piteraq in Tasiilaq in February 1970, the temperature was about -20°C and the peak wind speed was estimated to be near 90m/s.

The precipitation in the area is abundant, the largest amounts falling to the south (2,000-3,000mm a year). Coastal mountains appear half covered in snow, and at the Blosseville Coast in the northeast, the glaciation line is close to sea level at certain locations. The amount of precipitation is particularly high within the regime of relatively warm easterly (on-shore) winds blowing to the north of a major low pressure area that is stationary over South Greenland or over the sea to the south of Greenland. In such cases, precipitation may be in the form of rain even in winter. Snow in the summer is rare.

In terms of temperature, the area is affected by the East Greenland Polar Sea Current which has a surface temperature close to zero degrees throughout the year and which brings along drift ice most of the time. Winters are therefore cold with only short periods of thaw. Summers are cool with frequent fog at the outer coast but relatively warm and sunny in the fjords.

The midnight sun line passes through Tasiilaq, while the polar nightline is located about 200 km further north.

4.20 The Greenland Ice Sheet

The ice cap in Greenland is one of the most arid areas in the world. Along the edge, melting takes place in the summer, but in the central part air temperatures hardly rise above 0°C, but it happens. The reason for this is

partly the altitude, partly the high albedo (reflection of light) of the snow surface, which means that the surface is only to a limited extent warmed by the sun. Temperatures are extremely low in the winter, sometimes below - 60°C in the central and northern parts of the area. The British research station Northice registered a temperature of -70°C in the 1950s and an American research station registered a temperature of -69.6°C on 22 December 1991 near Summit. This registration has recently been validated by a WMO expert panel as the lowest temperature registered in the northern hemisphere.

The cold surface “drains” heat from the lowest layer of air, resulting in an almost permanent inversion, which may be very strong in the winter. The inversion layer is the cause of the katabatic winds mentioned earlier. They are strongest and most persistent in winter, while in the summer they are mostly felt at night and in the early morning hours. Passing cyclones may affect the inversion layer and break down the wind pattern. However, the pattern will quickly be re-established after the passage.

The southern part of the ice cap is partly maintained by abundant precipitation, while the central and northern parts exist because the melting is rather modest. The surface of the snow bears witness to the wind conditions. It is relatively even and loose in the central part of the area, where it is not affected to any great extent by the wind. Along the edges, the snow is hard blown with clear-cut snow drifts (“sastrugi”) lying parallel to the predominant wind direction.

5 Observations and Methods

5.1 The Meteorological Day and Month

The 'meteorological day' in Greenland starts at 06H01 UTC and ends at 06H00 UTC the following day. 06 hours UTC is 03 hours Greenland Winter Time or 05 hours Greenland Winter Time for a small part of the east coast. During the summer, 06 UTC is 04 hours Greenland Summer Time, 06 hours for a small part of the east coast. A good way to remember this is the fact that the time in most of Greenland is always 4 hours behind the time in Denmark.

The 'meteorological month' thus starts at 06H01 UTC on the first day of the month and ends at 06H00 UTC on the first day of the following month. In the tables and data files in this report, an event occurring during a meteorological day is always assigned to the date on which the meteorological day starts.

5.2 The Station Types

This report presents the monthly, seasonal and annual climatological standard normals or averages made of observations from two different types of observation stations: synoptic stations and manual precipitation stations.

5.2.1 Synoptic Station

This type of station ideally observes weather, cloud cover, visibility, air temperature, relative humidity, wind, air pressure, precipitation and radiation every hour round the clock or at least 00, 03, 06, 09, 12, 15, 18 and 21 hours UTC (older days). Synoptic stations all over the world follow at least the 3-hour interval all round the clock, and they always follow the same guidelines. Synoptic stations in Greenland have operated with different instrumentation and differing degrees of automation both in time and space, which of course has affected if and how the parameters have been observed. Some stations in remote areas have moreover been unmanned from the start. Nowadays, all synoptic stations in Greenland are unmanned and have at least a 1-hour schedule. The station number describing synoptic stations in Greenland consists of 5 digits, always starting with the numbers 04.

5.2.2 Manual Precipitation Station

This type of station measures precipitation once every day covering the accumulated precipitation for the last 24 hours.

5.3 Observation Sites

The network of stations in Greenland used in this report is shown on the map in Figure 12. The 55 stations are all presented with station numbers, station names and positions in Table 1. The position is defined as the place where the thermometers (2 meters above ground) are placed. The positions on the map and in the table represent the latest positions, since a few of them may have been relocated during the period. Some of the stations have now been closed. For more information on this, see Appendix 13.1.

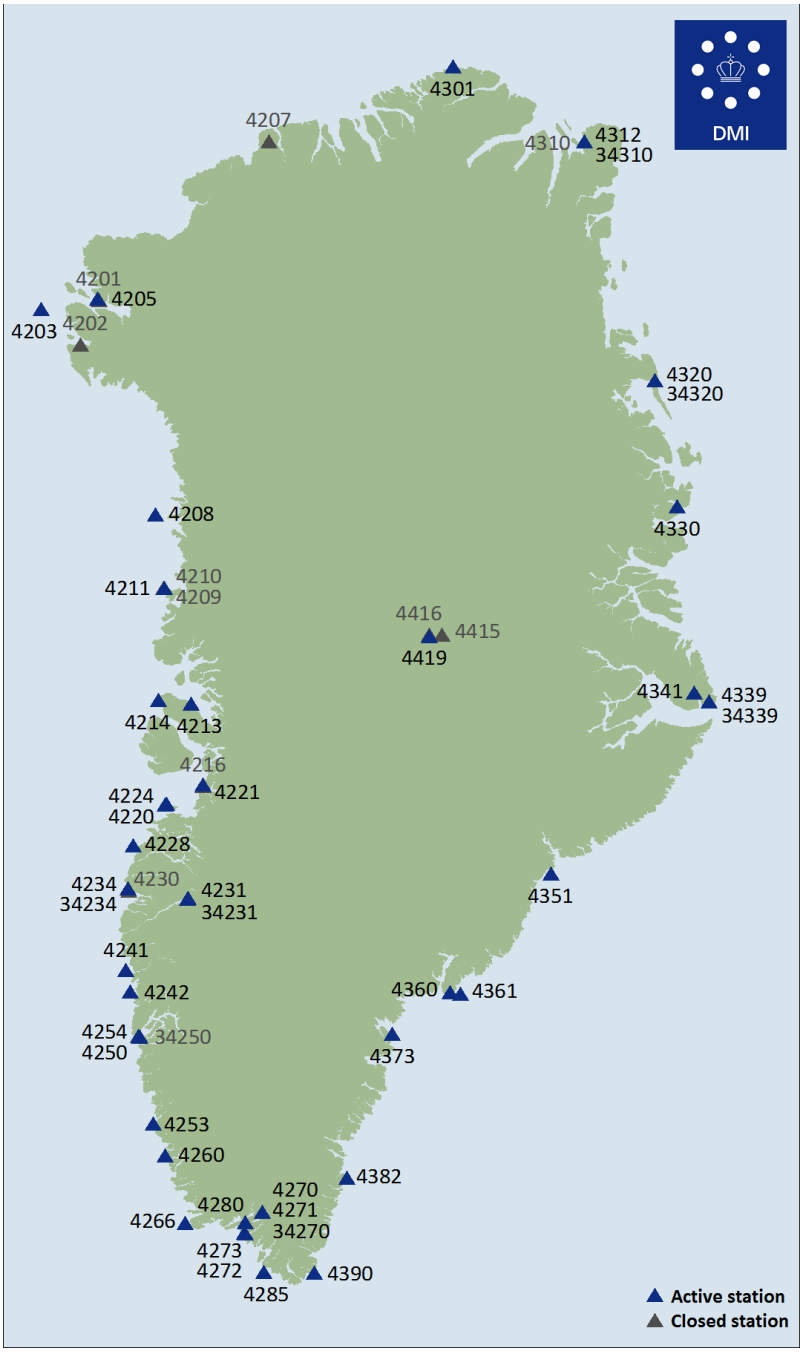

Figure 12: Location of synoptic (4XXX) and manual stations (34XXX) in Greenland. Map by M. Scharling.

Table 1: List of information about stations referred to is this report including station number, name, location, and elevation in meters above sea level (m.a.s.). Stations marked with an asterisk * indicate that data from several stations have been used to calculate climatological standard normals or averages. For more information see Appendix 13.2.

Station no.	Station name	Latitude (degrees)	Latitude (minutes)	Latitude N or S	Longitude (degrees)	Longitude (minutes)	Longitude W or E	Elevation (m.a.s.)
4201	Qaanaaq*	77	28	N	69	13	W	21
4202	Pituffik	76	32	N	68	42	W	77
4203	Kitsissut	76	44	N	73	07	W	11
4205	Qaanaaq Airport*	77	29	N	69	22	W	16
4207	Hall Land	81	41	N	59	57	W	105
4208	Kitsissorsuit	74	02	N	57	49	W	40
4209	Upernavik AWS*	72	47	N	56	10	W	63
4210	Upernavik Airport*	72	47	N	56	07	W	151
4211	Upernavik Airport*	72	47	N	56	08	W	126
4213	Uummannaq-Qaasut Airport	70	44	N	52	41	W	88
4214	Nuusuaq	70	39	N	54	36	W	27
4216	Ilulissat*	69	13	N	51	03	W	39
4220	Aasiaat	68	42	N	52	51	W	43
4221	Ilulissat Airport*	69	14	N	51	04	W	29
4224	Aasiaat Airport	68	43	N	52	47	W	23
4228	Kitsissut/Attu	67	47	N	53	58	W	10
4230	Sisimiut*	66	55	N	53	40	W	12
4231	Kangerlussuaq Airport*	67	0	N	50	43	W	50
4234	Sisimiut Airport*	66	57	N	53	43	W	10
4241	Maniitsoq Airport	65	24	N	52	56	W	28
4242	Sioralik	65	0	N	52	31	W	12
4250	Nuuk*	64	11	N	51	44	W	80
4253	Ukiiviit	62	34	N	50	24	W	20
4254	Nuuk Airport	64	11	N	51	40	W	86
4260	Paamiut Airport	62	0	N	49	40	W	36
4266	Nunarsuit	60	45	N	48	27	W	31
4270	Narsarsuaq Airport*	61	09	N	45	26	W	4
4271	Narsarsuaq Radiosonde	61	09	N	45	26	W	4
4272	Qaqortoq	60	43	N	46	03	W	57
4273	Qaqortoq Heliport	60	42	N	46	02	W	18
4280	Narsaq Heliport	60	55	N	46	03	W	19
4285	Angissoq	59	59	N	45	08	W	14
4301	Cape Morris Jesup	83	39	N	33	22	W	3
4310	Station Nord*	81	36	N	16	39	W	36
4312	Station Nord*	81	36	N	16	39	W	34
4320	Danmarkshavn*	76	46	N	18	40	W	14
4330	Daneborg	74	18	N	20	13	W	13
4339	Ittoqqortoormiit*	70	29	N	21	57	W	65

Station no.	Station name	Latitude (degrees)	Latitude (minutes)	Latitude N or S	Longitude (degrees)	Longitude (minutes)	Longitude W or E	Elevation (m.a.s.)
4341	Nerlerit Inaat Airport	70	44	N	22	39	W	14
4351	Aputiteeq	67	47	N	32	17	W	12
4360	Tasiilaq	65	36	N	37	38	W	50
4361	Kulusuk Airport	65	34	N	37	09	W	35
4373	Ikermiit	64	47	N	40	18	W	78
4382	Ikermiuarsuk	61	56	N	42	04	W	40
4390	Ikerasassuaq	60	03	N	43	10	W	88
4415	Summit*	72	35	N	37	38	W	3250
4416	Summit*	72	35	N	38	27	W	3220
4419	Summit*	72	34	N	38	27	W	3209
34231	Kangerlussuaq Airport Manual*	67	01	N	50	41	W	50
34234	Sisimiut Airport Manual *	66	57	N	53	43	W	10
34250	Nuuk Manual*	64	11	N	51	44	W	54
34270	Narsarsuaq Manual*	61	10	N	45	25	W	26
34310	Station Nord Manual*	81	36	N	16	39	W	36
34320	Danmarkshavn Manual*	76	46	N	18	40	W	11
34339	Ittoqqortoormiit Manual *	70	29	N	21	57	W	65

For a detailed overview of the beginning and end of the measurements from the stations see Appendix 13.2.

5.4 The Climate Elements

Table 2 contains an overview of the various climate elements referred to in this report, including the calculation methods by which the monthly, seasonal and annual values are calculated from the daily values (e.g. the monthly value for 'mean temperature' is calculated as the mean of all days in the month, each day containing 24 temperature readings per day).

Table 2: Climate element description including climate element number, unit and calculation method.

Element no.	Description	Unit	Calculation Method
101	Mean air temperature	°C	Mean
111	Mean maximum air temperature	°C	Mean
112	Highest air temperature + date	°C	Max
114	Number of ice days (Tmax < 0°C)	days	Count
115	Number of summer days (Tmax > 25°C)	days	Count
121	Mean minimum air temperature	°C	Mean
122	Lowest air temperature + date	°C	Min
124	Number of cold days (Tmin < -10°C)	days	Count
125	Number of days with frost (Tmin < 0°C)	days	Count
149	Accumulated heating degree days (19-tmean)	°C	Sum
201	Mean relative humidity	%	Mean
205	Highest relative humidity	%	Max
207	Lowest relative humidity	%	Min
210	Mean vapor pressure	hPa	Mean

Element no.	Description	Unit	Calculation Method
301	Mean wind speed (10 minutes average)	m/s	Mean
302	Highest wind speed (10 minutes average) + date	m/s	Max
305	Highest wind gust (3 seconds-average) + date	m/s	Max
311	Number of days with strong breeze (wind speed >= 10.8m/s)	days	Count
321	Number of days with strong gale (wind speed >= 20.8m/s)	days	Count
326	Number of days with whole storm (wind speed >= 24.5m/s)	days	Count
331	Number of days with violent storm (wind speed >= 28.5m/s)	days	Count
371	Mean wind direction	degrees	Mean*
401	Mean sea-level atmospheric pressure	hPa	Mean
410	Highest sea-level atmospheric pressure + date	hPa	Max
420	Lowest sea-level atmospheric pressure + date	hPa	Min
550	Accumulated global radiation	MJ/m^2	Sum
601	Accumulated precipitation	mm	Sum
602	Highest 24-hour precipitation + date	mm	Max
604	Number of days with precipitation >= 0.1mm	days	Count
605	Number of days with precipitation >= 1.0mm	days	Count
606	Number of days with precipitation >= 10.0mm	days	Count
801	Mean cloud cover	%	Mean
802	Number of clear days (N < 20%)	days	Count
803	Number of cloudy days (N > 80%)	days	Count

*Note to Table 2 : * see Appendix 13.4 for the calculation of mean wind direction.*

5.5 Erroneous or Missing Values

All the time series of original observations from the weather stations have been examined carefully and all erroneous data have been removed before calculating the monthly, seasonal and annual values. Additionally, monthly, seasonal and annual values that only contain a limited number of daily values have been removed before calculating the monthly, seasonal and annual climatological standard normal and average statistics.

The data behind the monthly, seasonal and annual statistics can be seen in the attached files. In case of missing data in the whole period in question, the gaps are left empty in the monthly and annual series. Otherwise, the number of days present behind the calculation is stated (see Appendix 13.3).

The monthly, seasonal and annual climatological standard normal and average statistics can be seen in the tables in Sections 6-12 and also in the attached files. For more information see Appendix 13.3.

The weather in Greenland varies a lot even over short distances. Furthermore, the network of DMI weather stations is rather sparse, which makes the use of observations from neighboring stations impossible in most cases.

DMI maintains information (metadata) on the origin of the monthly and annual values in every time series presented in this report.

5.6 Homogeneity of the Series

Temporal and spatial homogeneity of observations is crucial to any kind of analysis. The homogeneity of a series ideally requires the local measurement to have been carried out with the same type of instrument and according to instructions unchanged over time.

Inhomogeneity occurs when one or more factors change during the observation period. Changes in the instrumentation set-up, e.g. the introduction of automatic equipment, does not necessarily lead to abrupt inhomogeneity, but some changes do. The relocation of a station nearly always has an effect. The same sometimes applies to changes in observation methods, especially with regard to changes from visual (subjective) observations to automatic measurements.

Since 1991, different types of changes have occurred at the observation sites in Greenland, but these changes have not significantly affected the homogeneity of the series mainly because almost all the stations have been located at the same spot in the period. To ensure an acceptable level of homogeneity all the series - in addition to a careful examination of the original observations - have been subjected to close visual scrutiny.

5.7 Calculation of Climatological Standard Normals or Averages

Climatological standard normals can only be calculated for some of the stations and elements in Greenland due to the fact that the stations have been active in different periods of time or because of missing data. In this case so-called 'averages' are calculated instead, which enables the use of shorter time series than 30 years. The difference between the two calculations can be seen in the following two definitions put forth by WMO, 2017.

- ***Climatological standard normals:*** *"Averages of climatological data computed for the following consecutive periods of 30 years: 1 January 1981–31 December 2010, 1 January 1991–31 December 2020, and so forth" (WMO, 2017).*
- ***Average:*** *"The mean of monthly values of climatological data over any specified period of time (not necessarily starting in a year ending with the digit 1). In some sources, this is also referred to as "provisional normal" (WMO, 2017).*

When data is missing, these WMO guidelines are followed in the calculation of the individual monthly values and the climatological standard normals or averages:

- The calculation of individual monthly mean or count values for climate elements 101, 111, 114, 115, 121, 124, 125, 201, 210, 301, 311, 321, 326, 331, 371, 401, 604, 605, 606, 801, 802 and 803 should not be carried out if there are more than 11 or more missing days during the month. Furthermore, 5 continuous missing days of data or more during the month also mean that the monthly mean or count value should not be calculated (WMO, 2017).
- The calculation of individual monthly extreme values for climate elements 112, 122, 205, 207, 302, 305, 410, 420 and 602 can be carried out no matter the amount of missing data (WMO, 2017).
- The calculation of the individual monthly sum values for climate elements 149, 550 and 601 requires data completeness e.g. all daily values should be present (WMO, 2017).
- For the calculation of climatological standard normals or averages for all climate elements there should be at least 80% data coverage of the data period in question (WMO, 2017).

The guidelines described above have been followed to a large extend. However, a number of climatological standard normals or averages for certain stations and climate elements deviate from the guidelines. For an overview of this, please see Standard Normals Calculation – script in Appendix 13.5.

Furthermore, this report contains extra data compared to the datasets that were reported to the WMO. Only the following climate elements were reported to the WMO for Greenland: 101, 111, 112, 114, 115, 121, 122, 124, 125, 201, 207, 210, 301, 302, 311, 321, 326, 331, 371, 401, 410, 420, 601, 602, 604, 605, 606, 801, 802

and 803. In this report, extra stations have been included along with extra climate elements such as 149, 305 and 550. There are several reasons why the dataset to the WMO was reduced. In some cases, the data from the stations did not meet the data quality did recommended by the WMO, e.g. for 305 and 550 that has only been available since 2014. In other cases, the climate element was not relevant for the WMO such as 149, which is mainly used in Greenland.

For detailed information about the calculation of individual monthly values and climatological standard normals or averages, see the WMO Guidelines on the Calculation of Climate Normals (WMO, 2017).

6 Air Temperature and Heating Degree Days

Our understanding of temperature is actually a measure for the content of energy in the air - that is the average kinetic energy for a single molecule. The more energy there is in the air, the higher the temperature.

Reasonably correct and for that reason comparative, air temperature readings assume the protection of the sensor against unwanted influence from the surroundings (such as radiation or precipitation) according to regulations described by the World Meteorological Organization (WMO). In Denmark and other places, the thermometers are placed inside a so-called “radiation screen” 2 meters above the ground. The screen could be a white painted slat, allowing ventilation or more recently, a metal screen, when dealing with new types of sensors.

Air temperature is measured every hour or at least every 3 hours round the clock (older days). In addition, extremes are measured: highest and lowest air temperatures. Observations of air temperature extremes are not found at the automatic isolated weather stations. But for them, the highest and lowest of all hourly temperatures are included in the report. In addition to the different temperature averages and extremes, the number of ice days, and cold days, plus days with frost are also included in the report.

It appears from the following tables and Figure 8 and Figure 9 , that the summer temperatures in Greenland as a whole are relatively uniform. Despite the full extent of the country, the difference from the north to the south is a few degrees. The lower altitude of the sun in the north is compensated for by the fact that the sun in the summer never sets. In return, the summers here are very short. Everywhere in the country, there is a pronounced difference in summer between the raw and not very sunny coastal zone where the temperatures are characterized by the more or less ice-filled sea, and the interior parts of the fjords, which have been heated up.

In winter, the temperature difference between north and south is very large. The most essential cause for that in the southern parts of Greenland is the influence from an ice-free and relatively warm sea and the following changeable weather. The influence from the sea decreases upstream in frozen fjords, where the winter is more severe.

All year round, and in Greenland as a whole, but most often in the southern parts, periods with surprisingly high temperatures occur. Typically, the cause for that will be an inflow of mild air from the south. During these periods, the lowest layer of air in the atmosphere will be cooled down resulting in fog. But at a certain height, the heat will “survive” and vertical stirring caused by a rough landscape locally could transport the hot air down to sea level, often as a strong and irregular wind. The foehn effect connected with that (see Section 4.8) contributes to the increase in the temperature. In the winter, the effect could be a rise of 30 degrees Celsius during a short time period followed by the melting of snow and ice. A couple of examples could be mentioned:

In Qaqortoq in the southern parts of Greenland, foehn winds appeared from 26 November to 6 December 1997 (see Figure 13 below). The temperature rose from -21.9°C on 26 November 3 UTC to +8.6°C on 27 November 3 UTC. Parallel with this, the relative humidity decreased from approximately 80% to 40%. The wind was blowing from north-northeast, that is from the ice cap, with irregular winds of gale to storm force and with gusts reaching hurricane force. The situation lasted for 9 days thanks to a series of Atlantic lows moving towards the northwest south of Greenland. The foehn winds could be found along the west coast up to Sisimiut.

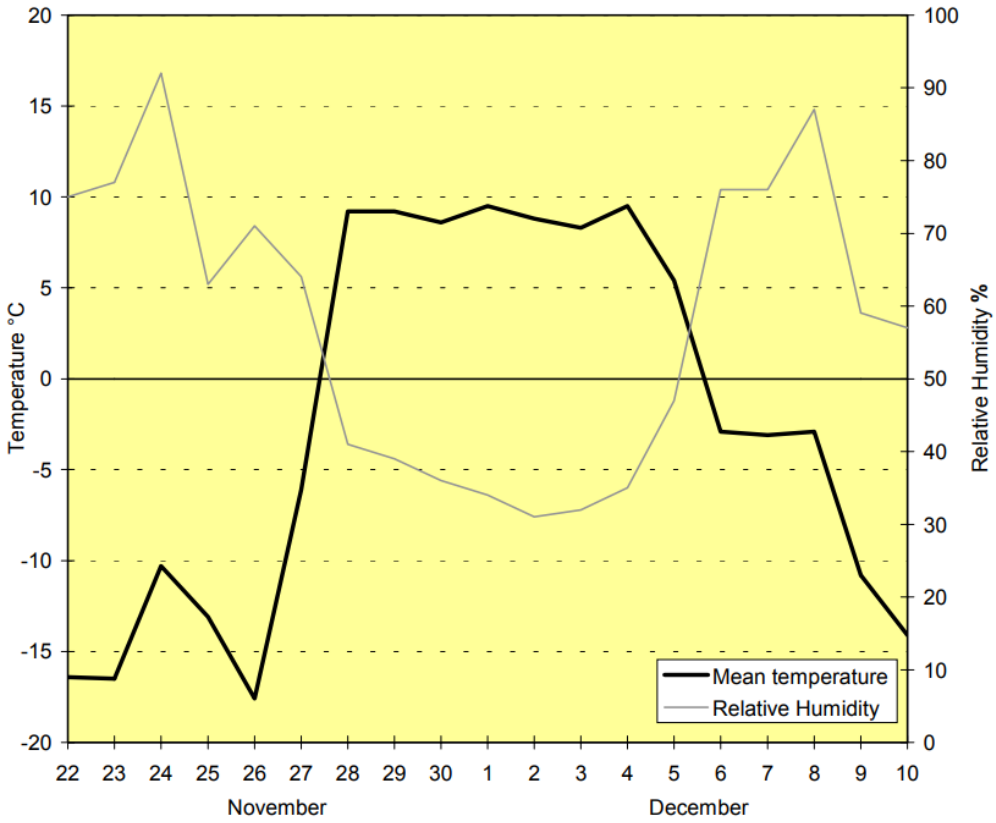

Figure 13: Foehn situation in Qaqortoq 28 November - 6 December, 1997. The minimum temperature 26 November at 03 UTC was actually -21.9°C. 24 hours later, the temperature was 30.5°C higher; +8.6°C. It is quite a change from low winter temperatures to near summer temperatures. Please note that the two curves show mean values.

The highest temperature ever recorded in Greenland since 1958 is 25.9°C from 30 July 2013 at the station Maniitsoq (see Table 8).

The coldest regions are situated in the northern parts of the ice cap, where the temperature probably can go below -70°C. A British research station registered a temperature of -70°C in the 1950s, but this registration is not officially validated. An American research station registered a temperature of -69.6°C on 22 December 1991 near Summit and this registration has been validated by a WMO expert panel. A DMI station situated at a place called “Summit” in the middle of the ice cap (app. 3,200 meters above sea level) registered -63,3°C in February 2002. This is considerably below the temperatures found in the free atmosphere at the same altitude. Near sea level, the coldest places absolutely must be Hall Land and Cape Morris Jesup situated at the north coast with yearly mean temperatures of -18.7°C (1991-1996) and -15.6°C (2010-2020) respectively (see Table 5). In January 1989, the temperature in Hall Land reached -52.1°C and probably even lower since this type of station does not measure absolute minimum temperatures.

The lowest temperatures are always connected with calm or nearly calm situations. Examples of gale winds or storms together with temperatures reaching -30°C are known in the parts of Greenland where the Sirius Patrol operates. The wind brings along an increased cooling of unprotected skin by evaporation and diversion of heat. The effect is calculated as a wind chill factor, a sort of “cooling index”, expressing the “temperature” we feel as a function of the observed temperature and the wind speed. For more information about wind chill see DMI’s Wind Chill Index here (in Danish): https://www.dmi.dk/vejr-og-atmosfare/temaforside-kuldeindeks-og-hedeindeks/kuldeindeks/

6.1 Mean Air Temperature

Table 3: Climatological standard normals 1991-2020, mean air temperature (°C) (climate element 101).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	-23.9	-24.6	-23.7	-15.3	-4.3	2.8	6.1	4.5	-1.5	-8.6	-14.3	-20.1	-22.9	-14.4	4.5	-8.1	-10.2
4208	-19.5	-22.0	-21.8	-14.2	-5.1	0.8	4.8	4.8	1.4	-2.9	-7.9	-13.8	-18.4	-13.7	3.5	-3.1	-8.0
4211	-16.7	-19.2	-19.0	-11.9	-3.3	3.2	6.4	5.7	1.4	-3.4	-7.6	-11.4	-15.8	-11.4	5.1	-3.2	-6.3
4214	-12.0	-15.2	-15.5	-8.8	-1.9	3.0	5.7	5.5	2.7	-1.3	-5.0	-7.8	-11.7	-8.7	4.7	-1.2	-4.2
4220	-12.0	-15.0	-14.5	-7.8	-0.9	3.9	6.8	6.1	3.0	-1.4	-5.2	-7.8	-11.6	-7.7	5.6	-1.2	-3.7
4221	-12.6	-14.8	-14.5	-7.3	0.3	5.8	8.3	6.6	2.6	-2.9	-7.0	-9.4	-12.3	-7.2	6.9	-2.4	-3.7
4228	-11.1	-13.5	-12.9	-7.0	-1.4	1.8	4.3	5.0	3.3	-0.2	-3.8	-7.2	-10.6	-7.1	3.7	-0.2	-3.6
4231	-18.5	-19.8	-16.6	-6.2	3.6	10.0	11.2	8.7	3.5	-4.6	-11.3	-15.2	-17.8	-6.4	10.0	-4.1	-4.6
4234	-11.5	-13.7	-12	-5.5	0.7	5.1	7.6	7.3	4.1	-0.7	-5.0	-8.0	-11.1	-5.6	6.7	-0.5	-2.6
4242	-7.6	-9.0	-7.9	-3.1	0.7	3.8	6.1	6.3	4.4	0.9	-2.9	-5.2	-7.3	-3.4	5.4	0.8	-1.1
4250	-7.7	-8.3	-7.8	-3.2	1.1	4.7	7.0	6.7	3.9	0.1	-3.3	-5.3	-7.1	-3.3	6.1	0.2	-1.0
4253	-5.9	-7.0	-5.7	-1.7	1.3	3.8	5.5	5.6	4.0	1.3	-1.9	-4.0	-5.6	-2.0	5.0	1.1	-0.4
4260	-6.4	-7.2	-5.7	-1.2	2.0	4.7	6.4	6.3	4.5	1.2	-2.7	-4.8	-6.1	-1.6	5.8	1.0	-0.2
4266	-3.5	-4.3	-3.7	-0.9	1.2	2.9	4.4	5.0	4.0	1.9	-0.6	-2.2	-3.3	-1.1	4.1	1.8	0.4
4270	-6.1	-6.5	-4.7	1.3	5.9	9.6	11.1	9.8	6.1	1.5	-3.3	-5.5	-6.0	0.8	10.2	1.4	1.6
4272	-4.9	-5.5	-4.1	0.4	3.4	6.2	8.1	8.1	5.9	2.3	-1.7	-3.7	-4.7	-0.1	7.5	2.2	1.2
4285	-2.8	-3.3	-2.5	-0.1	1.7	3.2	4.5	5.2	4.5	2.4	0.3	-1.4	-2.5	-0.3	4.3	2.4	1.0
4312	-28.3	-28.7	-28.9	-20.9	-9.0	0.7	4.2	2.4	-7.0	-17.1	-22.4	-26.1	-27.7	-19.6	2.4	-15.5	-15.1
4320	-21.4	-22.2	-22.2	-15.9	-6.4	1.5	4.4	3.2	-2.8	-11.9	-17.2	-20.6	-21.4	-14.8	3.0	-10.6	-11.0
4330	-18.2	-19.2	-19.0	-12.6	-4.3	1.8	5.1	4.7	-0.7	-8.5	-14.2	-17.9	-18.4	-12.0	3.9	-7.8	-8.6
4339	-12.9	-13.5	-13.2	-8.5	-2.1	2.8	6.0	5.6	1.5	-4.6	-9.2	-12	-12.8	-7.9	4.8	-4.1	-5.0
4360	-6.0	-6.1	-5.9	-2.2	1.3	4.8	7.2	6.9	4.2	0.1	-2.8	-4.9	-5.7	-2.3	6.3	0.5	-0.3
4373	-6.3	-6.8	-6.4	-2.9	0.4	3.7	6.2	5.8	2.7	-0.8	-3.3	-5.2	-6.1	-3.0	5.2	-0.5	-1.1
4382	-4.4	-4.9	-4.5	-1.9	0.7	2.8	4.9	5.5	3.9	0.9	-1.2	-3.0	-4.1	-1.9	4.4	1.2	-0.1
4390	-3.6	-4.1	-3.1	-0.3	2.3	5.0	7.1	7.5	5.4	2.3	-0.4	-2.3	-3.3	-0.4	6.5	2.4	1.3
4419	-39.0	-39.1	-38.4	-31.2	-22.5	-14.0	-11.7	-15.6	-23.6	-31.6	-36.7	-39.0	-39.0	-30.7	-13.8	-30.6	-28.5

Table 4: Averages, mean air temperature (°C) (climate element 101).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4203	2009	2020	-16.6	-17.7	-18.2	-11.6	-4.0	0.7	4.4	3.7	-0.3	-5.0	-10.9	-14.8	-16.4	-11.3	2.9	-5.4	-7.5
4205	1995	2020	-21.7	-23.0	-21.7	-13.8	-3.7	3.0	6.6	5.5	-0.4	-6.7	-12.6	-17.8	-20.8	-13.1	5.0	-6.6	-8.9
4207	1991	1996	-35.9	-34.3	-34.7	-24.3	-11.2	0.4	5.1	2.4	-8.0	-21.5	-28.6	-33.9	-34.7	-23.4	2.6	-19.4	-18.7
4213	2000	2020	-11.6	-14.3	-14.3	-8.6	-0.4	5.8	9.1	7.7	2.5	-2.5	-6.8	-9.1	-11.7	-7.8	7.5	-2.3	-3.5
4224	2000	2020	-10.0	-12.4	-12.2	-6.9	-0.1	4.6	7.3	6.8	3.5	-1.0	-4.7	-7.2	-9.9	-6.4	6.2	-0.7	-2.7
4241	2001	2020	-7.3	-8.4	-7.4	-3.0	1.8	5.5	8.2	8.0	4.9	0.9	-3.1	-5.6	-7.1	-2.9	7.2	0.9	-0.5
4254	2000	2020	-6.9	-7.6	-6.9	-2.7	1.9	5.8	8.4	8.0	4.5	0.3	-3.3	-5.4	-6.6	-2.6	7.4	0.5	-0.3
4273	2004	2020	-4.8	-3.8	-3.4	0.3	3.5	5.5	7.7	8.1	5.7	2.3	-1.3	-3.6	-4.1	0.1	7.1	2.2	1.3
4280	2009	2020	-4.0	-4.1	-3.3	1.0	4.4	7.5	8.9	8.4	5.4	1.5	-2.0	-3.4	-3.8	0.7	8.3	1.6	1.7

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4301	2010	2020	-28.4	-27.8	-28.8	-21.5	-9.4	0.2	2.2	0.5	-7.8	-16.8	-23.1	-26.2	-27.5	-19.9	1.0	-15.9	-15.6
4341	2002	2020	-14.1	-15.3	-15.9	-9.9	-2.2	3.1	6.7	6.5	1.7	-4.8	-10.9	-13.9	-14.4	-9.3	5.4	-4.7	-5.7
4351	1993	2020	-8.3	-9.2	-9.6	-5.4	-1.1	1.0	2.9	3.0	1.7	-1.4	-4.2	-7.2	-8.2	-5.4	2.3	-1.3	-3.2
4361	2000	2020	-5.0	-5.6	-5.7	-2.5	0.8	4.2	6.7	6.7	4.1	0.4	-2.2	-4.5	-5.0	-2.5	5.9	0.8	-0.2

6.2 Mean Maximum Air Temperature

Table 5: Climatological standard normals 1991-2020, mean maximum air temperature (°C) (climate element 111).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	-17.1	-19.5	-19.0	-11.6	-3.4	2.2	6.1	5.9	2.4	-1.9	-6.5	-11.8	-16.1	-11.3	4.7	-2.0	-6.2
4211	-14.3	-16.5	-16.0	-8.9	-0.9	6.2	9.4	8.2	3.3	-1.8	-5.9	-9.4	-13.4	-8.6	7.9	-1.5	-3.9
4214	-9.9	-12.9	-13.2	-6.5	-0.2	5.0	7.7	7.1	4.1	0.0	-3.5	-6.1	-9.6	-6.6	6.6	0.2	-2.4
4220	-9.2	-12.0	-11.7	-5.0	1.5	6.5	9.6	8.4	4.7	0.2	-3.2	-5.3	-8.8	-5.1	8.2	0.6	-1.3
4221	-9.2	-11.3	-10.9	-4.0	3.1	9.0	11.5	9.6	5.3	-0.3	-4.0	-6.3	-8.9	-3.9	10.0	0.3	-0.6
4228	-9.1	-11.3	-11.0	-5.4	-0.2	3.0	5.6	6.2	4.3	1.0	-2.4	-5.5	-8.6	-5.5	4.9	1.0	-2.1
4231	-13.5	-14.8	-10.8	-0.9	8.4	15.3	16.8	14.0	7.7	-0.8	-7.0	-10.5	-12.9	-1.1	15.4	0.0	0.3
4234	-8.4	-10.3	-8.4	-2.0	4.0	9.0	11.6	10.7	6.8	2.0	-2.3	-5.2	-8.0	-2.1	10.4	2.2	0.6
4242	-5.9	-7.2	-6.1	-1.5	2.2	5.4	7.7	7.8	5.7	2.2	-1.5	-3.6	-5.6	-1.8	7.0	2.1	0.4
4250	-5.3	-5.8	-5.5	-1.0	3.7	8.0	10.5	9.7	6.3	2.0	-1.3	-3.1	-4.7	-0.9	9.4	2.3	1.5
4253	-3.9	-4.9	-3.8	-0.1	2.8	5.4	7.1	7.0	5.3	2.6	-0.3	-2.2	-3.7	-0.4	6.5	2.5	1.2
4260	-3.4	-4.0	-2.3	1.9	4.7	7.7	9.4	9.0	7.1	3.9	0.2	-2.0	-3.1	1.4	8.7	3.7	2.7
4266	-1.9	-2.7	-2.2	0.5	2.6	4.5	6.0	6.5	5.2	3.1	0.7	-0.9	-1.8	0.3	5.7	3.0	1.8
4270	-2.1	-2.6	-0.7	4.9	10.0	14.0	15.7	14.1	9.9	5.1	0.4	-1.6	-2.1	4.7	14.6	5.1	5.6
4272	-1.9	-2.5	-1.1	3.4	6.7	9.8	11.7	11.2	8.7	4.8	0.9	-1.0	-1.8	3.0	10.9	4.8	4.2
4285	-1.1	-1.6	-0.9	1.5	3.5	5.4	6.7	7.2	6.2	3.9	1.7	0.1	-0.9	1.4	6.4	3.9	2.7
4312	-25.3	-25.6	-25.7	-17.9	-6.4	3.1	6.8	4.7	-5.0	-14.6	-19.5	-22.9	-24.6	-16.7	4.9	-13.0	-12.4
4320	-17.2	-18.0	-18.3	-11.8	-3.4	4.4	7.7	6.0	-0.7	-9.1	-13.6	-16.6	-17.3	-11.2	6.0	-7.8	-7.5
4330	-15.1	-16.2	-15.9	-9.2	-1.6	4.2	7.5	7.2	1.3	-6.7	-11.7	-14.8	-15.4	-8.9	6.3	-5.7	-5.9
4339	-9.4	-10.2	-9.7	-4.8	0.8	6.1	9.4	8.6	3.9	-2.3	-6.3	-8.8	-9.5	-4.6	8.0	-1.6	-1.9
4360	-3.3	-3.1	-2.6	1.3	4.5	8.4	10.9	10.3	6.9	2.5	-0.4	-2.3	-2.9	1.1	9.9	3.0	2.8
4373	-4.6	-4.9	-4.4	-0.8	2.7	6.0	8.7	8.1	4.6	0.7	-1.8	-3.6	-4.4	-0.8	7.6	1.2	0.9
4382	-2.9	-3.2	-2.5	0.1	2.6	4.9	7.1	7.6	5.7	2.4	0.2	-1.7	-2.6	0.1	6.5	2.8	1.7
4390	-1.7	-2.1	-1.0	1.9	4.8	7.8	10.2	10.4	7.8	4.3	1.4	-0.4	-1.4	1.9	9.5	4.5	3.6
4419	-34.3	-34.2	-32.5	-24.9	-17.3	-9.9	-8.0	-11.2	-18.9	-26.8	-31.7	-34.3	-34.3	-24.9	-9.7	-25.8	-23.7

Table 6: Averages, mean maximum air temperature (°C) (climate element 111).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	-21.9	-22.1	-21.2	-12.7	-2.6	4.2	7.1	5.2	0.4	-6.3	-13.2	-17.8	-20.6	-12.2	5.5	-6.4	-8.4
4203	2009	2020	-14.7	-15.8	-16.4	-10.0	-2.8	2.2	6.2	5.0	0.6	-3.8	-9.1	-13.0	-14.5	-9.7	4.5	-4.1	-6.0

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4205	1995	2020	-18.1	-19.1	-16.9	-8.3	0.5	6.4	10.0	8.4	2.4	-4.2	-9.8	-14.6	-17.3	-8.2	8.3	-3.9	-5.3
4207	1991	1996	-33.2	-31.7	-32.0	-21.6	-9.0	2.0	6.8	4.0	-5.7	-18.5	-25.5	-31.3	-32.1	-20.9	4.3	-16.6	-16.3
4213	2000	2020	-8.9	-11.2	-10.6	-4.7	2.7	9.0	12.2	10.6	4.8	-0.3	-4.4	-6.8	-9.0	-4.2	10.6	0.0	-0.6
4224	2000	2020	-7.5	-9.6	-9.5	-4.3	2.2	7.3	10.1	9.2	5.3	0.8	-2.7	-5.0	-7.4	-3.9	8.9	1.1	-0.3
4241	2001	2020	-5.1	-5.6	-4.4	-0.2	4.5	8.6	11.5	10.8	7.1	3.1	-1.0	-3.6	-4.8	0.0	10.3	3.1	2.1
4254	2000	2020	-4.2	-4.6	-3.7	0.6	5.3	9.9	12.7	11.8	7.4	3.2	-0.7	-2.7	-3.8	0.7	11.5	3.3	2.9
4273	2004	2020	-1.9	-0.9	-0.4	3.1	6.7	9.0	11.1	11.1	8.5	5.0	1.2	-1.0	-1.3	3.1	10.4	4.9	4.3
4280	2009	2020	-0.6	-0.4	0.8	4.8	8.5	11.8	13.3	12.8	9.5	5.0	1.2	-0.5	-0.5	4.7	12.6	5.2	5.5
4301	2010	2020	-25.0	-24.6	-26.1	-18.8	-7.6	1.8	4.0	2.3	-5.6	-13.9	-19.9	-23.1	-24.2	-17.5	2.7	-13.1	-13.0
4341	2002	2020	-10.1	-11.1	-11.8	-6.0	0.7	6.7	10.5	10.0	4.3	-2.5	-7.7	-10.1	-10.4	-5.7	9.1	-2.0	-2.3
4351	1993	2020	-5.7	-6.5	-6.6	-2.6	1.3	3.3	5.3	5.1	3.6	0.1	-2.6	-5.0	-5.7	-2.6	4.6	0.4	-0.9
4361	2000	2020	-2.5	-3.0	-2.9	0.1	3.3	7.4	10.1	9.8	6.4	2.4	-0.1	-2.2	-2.6	0.2	9.1	2.9	2.4

6.3 Highest Air Temperature

Table 7: Climatological standard normals 1991-2020, highest air temperature (°C) (climate element 112).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	3.4	5.5	4.9	6.3	9.0	13.1	13.8	14.2	14.2	6.8	6.3	7.2	7.2	9.0	14.2	14.2	14.2
4211	5.5	6.0	6.0	9.4	15.0	18.0	22.6	17.8	12.6	8.4	9.6	12.2	12.2	15.0	22.6	12.6	22.6
4214	7.7	7.8	8.8	12.6	13.0	18.7	17.5	15.7	15.9	12.9	13.3	10.1	10.1	13.0	18.7	15.9	18.7
4220	8.2	8.3	7.6	8.9	13.8	18.6	19.6	18.4	18.4	12.9	9.7	8.9	8.9	13.8	19.6	18.4	19.6
4221	9.6	11.9	9.9	13.3	17.2	21.1	21.7	20.6	18.5	19.4	15.3	12.2	12.2	17.2	21.7	19.4	21.7
4228	6.3	7.2	6.1	9.2	8.9	15.2	14.9	14.0	11.7	11.5	8.5	7.8	7.8	9.2	15.2	11.7	15.2
4231	12.3	13.9	14.4	17.8	22.4	25.2	24.7	22.9	21.1	17.1	15.8	11.9	13.9	22.4	25.2	21.1	25.2
4234	11.4	12.0	14.7	13.3	20.4	21.9	23.5	23.3	20.0	18.4	16.3	11.2	12.0	20.4	23.5	20.0	23.5
4242	8.1	8.8	7.0	9.6	11.9	17.4	18.3	19.3	18.8	14.5	11.8	8.6	8.8	11.9	19.3	18.8	19.3
4250	13.5	13.0	13.2	14.6	18.3	19.9	24.0	21.6	22.8	18.9	16.3	13.3	13.5	18.3	24.0	22.8	24.0
4253	9.5	10.2	9.9	11.3	17.6	18.3	19.4	16.2	16.8	17.1	13.1	9.8	10.2	17.6	19.4	17.1	19.4
4260	12.9	16.0	22.7	24.8	20.9	23.6	22.7	22.5	20.8	18.5	16.3	14.5	16.0	24.8	23.6	20.8	24.8
4266	16.9	10.2	10.5	10.3	14.6	14.1	16.3	15.6	20.3	14.6	12.7	12.0	16.9	14.6	16.3	20.3	20.3
4270	14.3	15.4	16.6	19.1	24.8	22.6	23.6	23.7	22.4	18.7	18.5	15.5	15.5	24.8	23.7	22.4	24.8
4272	11.4	12.0	12.5	13.7	21.8	19.9	21.7	23.0	21.6	17.8	13.0	13.0	13.0	21.8	23.0	21.6	23.0
4285	9.6	9.3	9.3	12.0	14.3	14.1	16.1	16.0	15.0	13.8	11.2	9.7	9.7	14.3	16.1	15.0	16.1
4312	0.4	2.5	-1.7	0.6	7.9	13.4	17.0	16.9	6.8	7.6	0.8	3.1	3.1	7.9	17.0	7.6	17.0
4320	1.4	2.1	0.2	3.4	7.6	17.1	19.7	19.7	8.6	4.8	1.6	1.4	2.1	7.6	19.7	8.6	19.7
4330	6.0	2.5	3.5	5.2	10.1	16.4	18.8	18.9	12.2	9.2	3.7	3.3	6.0	10.1	18.9	12.2	18.9
4339	13.5	15.9	6.8	9.2	11.9	18.5	18.6	21.0	13.0	9.0	9.7	7.5	15.9	11.9	21.0	13.0	21.0
4360	9.7	7.1	9.7	15.2	15.5	20.8	25.3	19.4	13.5	13.5	14.2	12.6	12.6	15.5	25.3	14.2	25.3
4373	6.1	4.8	7.6	14.2	15.6	16.3	21.4	17.9	11.7	13.3	10.4	9.4	9.4	15.6	21.4	13.3	21.4
4382	5.7	3.8	7.2	11.3	13.9	14.0	16.7	17.7	15.3	14.4	8.5	9.8	9.8	13.9	17.7	15.3	17.7

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4390	8.2	12.4	10.1	12.1	18.8	19.0	22.8	22.8	18.8	16.0	14.2	14.2	14.2	18.8	22.8	18.8	22.8
4419	-11.7	-11.0	-12.8	-6.5	-1.4	1.8	2.2	0.9	-2.6	-5.5	-7.1	-13.1	-11.0	-1.4	2.2	-2.6	2.2

Table 8: Extreme values, highest air temperature (°C) (climate element 112).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.7	1.0	1.2	4.5	11.2	13.8	15.6	14.3	9.4	7.0	4.4	1.9	1.9	11.2	15.6	9.4	15.6
4203	2009	2020	0.1	0.6	2.9	-0.1	8.9	10.5	13.1	10.4	8.0	2.4	1.6	-0.5	0.6	8.9	13.1	8.0	13.1
4205	1995	2020	5.9	4.1	9.8	6.0	14.0	17.9	20.3	17.6	13.3	12.5	9.0	7.0	7.0	14.0	20.3	13.3	20.3
4207	1991	1996	-18.1	-9.5	-15.3	-4.5	3.1	13.7	15.3	16.1	8.8	-6.9	-6.7	-17.2	-9.5	3.1	16.1	8.8	16.1
4213	2000	2020	8.0	9.2	9.6	14.4	18.2	18.7	21.4	20.6	16.4	14.0	9.7	11.2	11.2	18.2	21.4	16.4	21.4
4224	2000	2020	7.7	8.4	7.4	9.5	14.2	18.4	20.8	17.9	18.2	13.4	9.9	8.6	8.6	14.2	20.8	18.2	20.8
4241	2001	2020	9.0	9.7	12.3	13.4	18.4	21.0	25.9	23.3	22.0	17.8	11.6	9.9	9.9	18.4	25.9	22.0	25.9
4254	2000	2020	15.3	14.7	13.8	16.6	19.7	24.8	24.8	24.1	24.9	20.9	16.9	13.5	15.3	19.7	24.8	24.9	24.9
4273	2004	2020	11.1	11.8	11.0	13.9	22.4	19.0	21.8	20.0	19.3	18.0	12.9	11.0	11.8	22.4	21.8	19.3	22.4
4280	2009	2020	14.0	14.7	13.2	16.2	24.3	20.6	23.4	21.7	22.1	16.8	13.8	13.4	14.7	24.3	23.4	22.1	24.3
4301	2010	2020	3.4	7.8	0.1	1.4	7.4	9.5	15.3	17.0	4.5	5.6	4.1	2.6	7.8	7.4	17.0	5.6	17.0
4341	2002	2020	15.6	8.7	6.3	11.8	11.3	20.3	21.7	22.0	12.7	7.8	5.2	6.6	15.6	11.8	22.0	12.7	22.0
4351	1993	2020	8.1	6.1	7.4	10.4	9.9	13.4	17.9	14.4	11.3	11.0	9.0	6.8	8.1	10.4	17.9	11.3	17.9
4361	2000	2020	6.1	5.3	6.9	10.7	13.9	18.3	20.7	17.1	14.8	13.4	12.2	8.4	8.4	13.9	20.7	14.8	20.7

6.4 Mean Minimum Air Temperature

Table 9: Climatological standard normals 1991-2020, mean minimum air temperature (°C) (climate element 121).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	-21.8	-24.4	-24.7	-17.4	-7.3	-0.7	3.3	3.7	0.5	-3.9	-9.2	-15.8	-20.7	-16.5	2.1	-4.2	-9.8
4211	-18.9	-21.6	-21.7	-14.7	-5.5	0.6	3.8	3.6	-0.2	-4.9	-9.2	-13.3	-17.9	-14.0	2.7	-4.8	-8.5
4214	-14.0	-17.3	-18.0	-11.2	-3.7	1.1	3.8	3.8	1.4	-2.6	-6.5	-9.5	-13.6	-11.0	2.9	-2.6	-6.1
4220	-14.8	-18.0	-17.6	-10.9	-3.2	1.5	4.2	4.1	1.4	-3.2	-7.3	-10.2	-14.3	-10.6	3.3	-3.0	-6.2
4221	-16.2	-18.6	-18.8	-11.6	-2.9	2.7	4.9	3.1	-0.5	-6.0	-10.3	-12.7	-15.8	-11.1	3.6	-5.6	-7.2
4228	-13.0	-15.6	-14.9	-8.8	-2.7	0.6	3.0	3.9	2.3	-1.4	-5.1	-8.7	-12.4	-8.8	2.5	-1.4	-5.0
4231	-23.3	-24.9	-22.2	-11.6	-1.7	4.2	5.0	3.3	-1.0	-8.7	-15.7	-19.9	-22.7	-11.8	4.2	-8.5	-9.7
4234	-14.5	-17.0	-15.5	-8.9	-2.2	1.9	4.3	4.5	1.5	-3.2	-7.6	-10.7	-14.1	-8.9	3.6	-3.1	-5.6
4242	-9.3	-10.8	-9.8	-4.9	-0.8	2.4	4.6	5.0	3.2	-0.4	-4.3	-6.6	-8.9	-5.2	4.0	-0.5	-2.6
4250	-9.8	-10.5	-10.0	-5.3	-1.1	2.0	4.2	4.4	2.1	-1.6	-5.1	-7.3	-9.2	-5.5	3.5	-1.5	-3.2
4253	-7.8	-9.1	-7.8	-3.5	-0.1	2.4	4.0	4.2	2.7	-0.1	-3.5	-5.8	-7.6	-3.8	3.5	-0.3	-2.0
4260	-9.8	-10.9	-9.3	-4.4	-0.5	2.2	3.9	3.9	2.0	-1.6	-6.0	-8.3	-9.7	-4.7	3.3	-1.9	-3.2
4266	-5.1	-5.9	-5.2	-2.2	-0.1	1.4	2.8	3.5	2.9	0.8	-1.9	-3.6	-4.9	-2.5	2.6	0.6	-1.1
4270	-10.5	-11.1	-9.1	-2.6	1.6	5.1	6.7	5.8	2.3	-2.0	-7.3	-9.8	-10.5	-3.4	5.9	-2.3	-2.6

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4272	-7.8	-8.6	-7.4	-2.7	0.2	2.7	4.6	5.3	3.5	-0.1	-4.0	-6.4	-7.6	-3.3	4.2	-0.2	-1.7
4285	-4.4	-5.0	-4.2	-1.8	-0.2	1.0	2.2	3.3	2.9	1.0	-1.1	-2.8	-4.1	-2.1	2.2	0.9	-0.8
4312	-31.4	-32.0	-32.2	-24.2	-11.9	-1.6	1.7	0.0	-9.3	-19.9	-25.6	-29.4	-30.9	-22.8	0.0	-18.3	-18.0
4320	-25.8	-26.9	-27.0	-21.1	-9.9	-1.3	1.3	0.3	-5.4	-14.8	-20.8	-24.9	-25.9	-19.3	0.1	-13.7	-14.7
4330	-21.3	-22.4	-22.6	-16.3	-7.3	-0.5	2.7	2.5	-2.4	-10.3	-16.7	-20.9	-21.5	-15.4	1.6	-9.8	-11.3
4339	-16.2	-17.1	-17.1	-12.6	-5.2	-0.2	2.6	2.7	-0.7	-6.8	-11.9	-15.3	-16.2	-11.6	1.7	-6.5	-8.2
4360	-8.9	-9.2	-9.2	-5.7	-1.8	1.3	3.5	3.8	1.7	-2.2	-5.2	-7.6	-8.6	-5.6	2.9	-1.9	-3.3
4373	-8.1	-8.7	-8.5	-5.1	-1.6	1.5	3.8	3.6	0.9	-2.3	-4.8	-6.8	-7.9	-5.1	3.0	-2.1	-3.0
4382	-6.0	-6.7	-6.5	-3.9	-1.1	0.8	2.7	3.5	2.2	-0.6	-2.5	-4.3	-5.7	-3.8	2.3	-0.3	-1.9
4390	-5.4	-6.0	-5.2	-2.4	0.0	2.1	4.1	4.8	3.2	0.3	-2.1	-4.0	-5.1	-2.5	3.7	0.5	-0.9
4419	-43.9	-44.2	-44.4	-38.3	-29.3	-19.6	-17.0	-21.5	-29.4	-36.8	-41.9	-43.8	-44.0	-37.3	-19.4	-36.0	-34.2

Table 10: Averages, mean minimum air temperature (°C) (climate element 121).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	-27.9	-28.2	-27.2	-19.4	-7.0	0.6	3.5	1.9	-4.1	-11.1	-18.9	-23.6	-26.6	-17.9	2.0	-11.4	-13.4
4203	2009	2020	-18.4	-19.4	-20.1	-13.4	-5.4	-0.7	2.8	2.3	-1.3	-6.2	-12.5	-16.6	-18.1	-13.0	1.5	-6.7	-9.1
4205	1995	2020	-25.2	-26.8	-26.3	-19.3	-8.5	-0.1	3.4	2.9	-2.8	-9.1	-15.5	-21.1	-24.4	-18.0	2.1	-9.1	-12.4
4207	1991	1996	-38.5	-36.9	-37.6	-27.6	-14.0	-1.4	3.2	0.4	-10.5	-24.8	-31.6	-36.7	-37.4	-26.4	0.7	-22.3	-21.3
4213	2000	2020	-14.3	-17.4	-17.6	-12.4	-3.3	2.9	6.0	4.7	0.0	-4.8	-9.1	-11.6	-14.4	-11.1	4.5	-4.6	-6.4
4224	2000	2020	-12.5	-15.1	-15.0	-9.8	-2.2	2.3	4.8	4.8	1.8	-2.7	-6.7	-9.4	-12.3	-9.0	4.0	-2.5	-5.0
4241	2001	2020	-9.3	-10.7	-10.0	-5.5	-0.6	3.0	5.6	5.7	3.1	-1.0	-5.0	-7.5	-9.2	-5.4	4.8	-1.0	-2.7
4254	2000	2020	-9.5	-10.4	-9.7	-5.5	-0.8	2.5	5.0	5.0	2.1	-2.0	-5.7	-8.0	-9.3	-5.3	4.2	-1.9	-3.1
4273	2004	2020	-7.9	-6.8	-6.7	-2.4	0.5	2.5	4.8	5.6	3.4	-0.2	-3.6	-6.2	-7.0	-2.9	4.3	-0.1	-1.4
4280	2009	2020	-7.5	-7.6	-7.1	-2.5	0.5	3.5	5.0	4.8	2.0	-1.6	-5.1	-6.6	-7.2	-3.0	4.4	-1.6	-1.8
4301	2010	2020	-31.5	-31.0	-31.7	-24.4	-11.4	-1.2	0.8	-1.1	-10.3	-19.8	-26.3	-29.0	-30.5	-22.5	-0.5	-18.8	-18.1
4341	2002	2020	-18.5	-20.3	-21.4	-15.5	-5.7	0.2	3.5	3.1	-1.1	-7.6	-14.4	-18.1	-19.0	-14.2	2.3	-7.7	-9.6
4351	1993	2020	-10.9	-12.1	-13.1	-8.6	-3.5	-1.3	0.6	1.0	0.1	-2.8	-5.7	-9.3	-10.8	-8.4	0.1	-2.8	-5.5
4361	2000	2020	-7.7	-8.5	-8.8	-5.3	-1.9	1.0	3.1	3.7	1.9	-1.8	-4.7	-7.2	-7.8	-5.3	2.6	-1.5	-3.0

6.5 Lowest Air Temperature

Table 11: Climatological standard normals 1991-2020, lowest air temperature (°C) (climate element 122).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	-39.4	-39.2	-45.2	-35.7	-25.2	-9.1	-4.2	-4.3	-6.8	-19.9	-26.7	-37.0	-39.4	-45.2	-9.1	-26.7	-45.2
4211	-34.9	-34.4	-37.5	-29.7	-19.5	-7.5	-3.8	-3.8	-7.7	-14.5	-21.9	-29.9	-34.9	-37.5	-7.5	-21.9	-37.5
4214	-30.6	-34.8	-36.1	-30.8	-17.4	-5.0	-2.3	-7.2	-5.4	-10.3	-17.9	-25.7	-34.8	-36.1	-7.2	-17.9	-36.1
4220	-34.2	-34.8	-36.9	-27.8	-17.8	-4.8	-2.4	-0.4	-5.8	-12.9	-18.7	-23.6	-34.8	-36.9	-4.8	-18.7	-36.9
4221	-34.5	-36.4	-40.5	-29.2	-22.2	-3.2	-1.1	-3.4	-11.3	-17.2	-23.0	-27.3	-36.4	-40.5	-3.4	-23.0	-40.5

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4228	-27.8	-33.1	-36.5	-22.3	-15.6	-3.4	-2.1	-1.1	-4.0	-8.9	-17.8	-22.6	-33.1	-36.5	-3.4	-17.8	-36.5
4231	-44.9	-46.8	-45.4	-34.4	-21.8	-2.8	-0.7	-4.8	-15.4	-29.2	-35.0	-39.3	-46.8	-45.4	-4.8	-35.0	-46.8
4234	-34.6	-38.5	-38.2	-23.2	-16.5	-5.5	-2.5	-3.5	-6.6	-13.0	-19.4	-25.9	-38.5	-38.2	-5.5	-19.4	-38.5
4242	-26.6	-33.0	-27.2	-18.4	-13.3	-2.1	-3.0	0.1	-2.6	-8.6	-15.4	-20.0	-33.0	-27.2	-3.0	-15.4	-33.0
4250	-24.5	-25.9	-26.6	-19.6	-13.4	-3.3	-1.1	-0.2	-3.5	-12.3	-15.9	-18.7	-25.9	-26.6	-3.3	-15.9	-26.6
4253	-23.8	-26.5	-26.2	-14.1	-14.1	-2.6	-0.2	-2.9	-2.6	-8.0	-15.8	-22.6	-26.5	-26.2	-2.9	-15.8	-26.5
4260	-28.9	-29.6	-30.9	-17.9	-14.6	-4.0	-0.7	-1.6	-5.9	-14.1	-20.5	-25.3	-29.6	-30.9	-4.0	-20.5	-30.9
4266	-16.3	-19.4	-18.5	-11.2	-10.1	-4.3	-3.2	-2.7	-1.6	-5.0	-9.7	-13.9	-19.4	-18.5	-4.3	-9.7	-19.4
4270	-32.2	-32.0	-32.1	-17.6	-13.3	-2.8	0.1	-0.1	-4.9	-15.4	-27.3	-27.7	-32.2	-32.1	-2.8	-27.3	-32.2
4272	-24.2	-23.9	-23.7	-15.5	-12.8	-4.0	-1.2	-0.4	-2.7	-8.7	-17.5	-20.2	-24.2	-23.7	-4.0	-17.5	-24.2
4285	-16.1	-15.9	-16.3	-9.5	-9.4	-5.1	-2.5	-2.8	-1.8	-6.2	-9.1	-13.0	-16.1	-16.3	-5.1	-9.1	-16.3
4312	-47.9	-47.2	-46.0	-39.5	-24.7	-12.9	-7.4	-8.5	-25.9	-37.9	-39.9	-45.8	-47.9	-46.0	-12.9	-39.9	-47.9
4320	-44.4	-43.6	-45.0	-39.3	-22.4	-10.2	-7.0	-7.1	-16.0	-28.5	-34.7	-38.4	-44.4	-45.0	-10.2	-34.7	-45.0
4330	-35.4	-37.7	-39.6	-30.6	-23.0	-7.3	-4.4	-4.0	-9.7	-26.2	-30.2	-36.0	-37.7	-39.6	-7.3	-30.2	-39.6
4339	-36.9	-36.4	-34.5	-33.5	-20.7	-7.1	-3.5	-3.5	-8.0	-19.3	-25.1	-30.0	-36.9	-34.5	-7.1	-25.1	-36.9
4360	-25.6	-22.4	-22.1	-22.4	-12.3	-4.6	-2.9	-1.5	-4.9	-12.3	-16.0	-20.5	-25.6	-22.4	-4.6	-16.0	-25.6
4373	-19.3	-21.1	-19.8	-14.9	-10.1	-4.7	-3.2	-2.7	-4.5	-10.5	-14.0	-16.8	-21.1	-19.8	-4.7	-14.0	-21.1
4382	-16.0	-17.3	-15.3	-13.8	-7.6	-5.8	-3.2	-1.8	-2.8	-8.6	-10.3	-12.2	-17.3	-15.3	-5.8	-10.3	-17.3
4390	-15.8	-15.5	-16.9	-10.7	-10.2	-5.0	-2.3	-1.1	-5.7	-5.9	-9.4	-15.3	-15.8	-16.9	-5.0	-9.4	-16.9
4419	-64.9	-63.9	-63.0	-57.3	-47.4	-35.7	-33.3	-40.4	-47.3	-55.4	-60.0	-63.0	-64.9	-63.0	-40.4	-60.0	-64.9

Table 12: Extreme values, lowest air temperature (°C) (climate element 122).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	-40.5	-40.0	-41.2	-33.0	-23.1	-6.4	-3.0	-6.7	-15.4	-29.8	-32.5	-36.9	-40.5	-41.2	-6.7	-32.5	-41.2
4203	2009	2020	-33.4	-28.4	-32.7	-26.7	-15.0	-6.0	-2.3	-2.4	-6.2	-15.6	-23.9	-30.3	-33.4	-32.7	-6.0	-23.9	-33.4
4205	1995	2020	-37.3	-38.7	-40.5	-31.3	-22.9	-9.3	-3.0	-5.9	-11.0	-19.9	-26.1	-34.1	-38.7	-40.5	-9.3	-26.1	-40.5
4207	1991	1996	-46.7	-47.0	-50.5	-40.4	-27.0	-11.8	-1.4	-13.0	-24.0	-36.3	-42.6	-45.7	-47.0	-50.5	-13.0	-42.6	-50.5
4213	2000	2020	-30.3	-31.9	-33.9	-27.7	-16.2	-4.3	-1.1	-0.9	-9.6	-14.0	-18.8	-27.4	-31.9	-33.9	-4.3	-18.8	-33.9
4224	2000	2020	-28.8	-31.9	-30.1	-22.6	-14.0	-2.6	-1.0	1.0	-4.4	-12.3	-17.6	-19.3	-31.9	-30.1	-2.6	-17.6	-31.9
4241	2001	2020	-20.5	-29.1	-25.4	-15.4	-9.8	-1.5	1.0	1.4	-2.9	-8.9	-15.5	-17.8	-29.1	-25.4	-1.5	-15.5	-29.1
4254	2000	2020	-19.3	-25.8	-22.3	-17.6	-11.3	-1.9	-0.7	-1.4	-3.9	-11.8	-15.9	-19.7	-25.8	-22.3	-1.9	-15.9	-25.8
4273	2004	2020	-18.8	-20.0	-21.3	-14.3	-5.3	-3.0	0.0	0.8	-2.9	-9.0	-17.0	-18.5	-20.0	-21.3	-3.0	-17.0	-21.3
4280	2009	2020	-18.1	-21.0	-20.9	-14.2	-8.7	-1.8	0.7	0.0	-3.4	-10.1	-19.3	-19.4	-21.0	-20.9	-1.8	-19.3	-21.0
4301	2010	2020	-43.3	-44.2	-44.3	-36.5	-21.1	-7.3	-2.8	-10.0	-24.4	-34.5	-43.7	-39.2	-44.2	-44.3	-10.0	-43.7	-44.3
4341	2002	2020	-38.1	-38.8	-39.1	-32.2	-20.7	-7.2	-1.1	-2.4	-10.0	-23.3	-26.7	-33.3	-38.8	-39.1	-7.2	-26.7	-39.1
4351	1993	2020	-29.3	-29.3	-29.0	-25.5	-17.0	-8.5	-4.5	-5.1	-6.1	-11.6	-16.1	-22.8	-29.3	-29.0	-8.5	-16.1	-29.3
4361	2000	2020	-20.3	-21.8	-21.9	-16.9	-8.7	-4.9	-2.4	-1.5	-4.8	-10.9	-16.1	-19.8	-21.8	-21.9	-4.9	-16.1	-21.9

6.6 Number of Days with Frost (Tmin < 0.0°C)

Table 13: Climatological standard normals 1991-2020, number of days with frost (Tmin < 0.0°C) (days) (climate element 125).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	31.0	28.2	31.0	30.0	30.5	18.4	3.8	1.3	12.0	28.3	29.8	31.0	90.2	91.5	23.5	70.1	275.3
4211	31.0	28.2	30.9	29.8	28.9	14.2	2.7	1.3	14.6	28.8	29.7	30.9	90.1	89.6	18.2	73.1	271.0
4214	30.9	28.1	30.9	29.4	27.0	11.2	1.2	1.1	6.9	24.1	28.6	30.4	89.4	87.3	13.5	59.6	249.8
4220	31.0	28.2	31.0	29.7	26.6	8.1	0.7	0.1	7.1	26.2	29.2	30.8	90.0	87.3	8.9	62.5	248.7
4221	30.9	28.0	30.9	29.1	24.7	3.4	0.4	1.8	15.4	28.1	28.8	30.4	89.3	84.7	5.6	72.3	251.9
4228	30.8	28.2	30.9	29.7	26.7	11.1	1.5	0.3	3.1	21.0	28.4	30.4	89.4	87.3	12.9	52.5	242.1
4231	30.8	28.2	30.8	28.2	18.5	1.0	0.1	2.8	17.7	28.9	29.1	30.5	89.5	77.5	3.9	75.7	246.6
4234	30.7	28.0	30.8	29.0	22.7	5.9	0.7	0.3	7.4	25.5	28.9	30.3	89.0	82.5	6.9	61.8	240.2
4242	30.0	27.7	30.1	27.5	17.9	2.9	0.1	0.0	1.1	16.2	26.7	29.1	86.8	75.5	3.0	44.0	209.3
4250	30.4	27.5	30.1	27.8	20.3	5.4	0.2	0.0	3.7	22.1	27.9	29.5	87.4	78.2	5.6	53.7	224.9
4253	29.9	27.0	29.6	25.9	13.9	2.4	0.1	0.2	1.9	14.2	25.3	28.2	85.1	69.4	2.7	41.4	198.6
4260	30.0	27.2	29.4	25.9	16.5	2.7	0.1	0.4	5.5	19.4	26.7	29.5	86.7	71.8	3.2	51.6	213.3
4266	28.5	26.3	28.6	24.9	16.2	6.4	1.4	1.2	0.8	10.4	23.3	26.7	81.5	69.7	9.0	34.5	194.7
4270	28.7	25.2	27.9	21.8	8.2	0.3	0.0	0.0	6.6	21.9	26.5	27.9	81.8	57.9	0.3	55.0	195.0
4272	28.1	25.5	28.2	22.7	13.8	3.8	0.3	0.0	1.7	15.7	25.0	27.2	80.8	64.7	4.1	42.4	192.0
4285	27.6	25.2	27.7	24.7	17.5	8.8	3.4	1.6	0.7	8.5	20.0	25.2	78.0	69.9	13.8	29.2	190.9
4312	31.0	28.2	31.0	30.0	30.7	20.9	9.7	16.8	29.9	31.0	30.0	31.0	90.2	91.7	47.4	90.9	320.2
4320	31.0	28.2	31.0	30.0	30.7	20.7	8.1	13.2	28.4	30.9	30.0	31.0	90.2	91.7	42.0	89.3	313.2
4330	31.0	28.2	31.0	30.0	30.4	17.8	4.3	4.5	24.3	30.7	30.0	31.0	90.2	91.4	26.6	85.0	293.2
4339	31.0	28.2	31.0	29.9	29.6	15.4	3.1	2.6	17.3	30.3	30.0	30.9	90.1	90.5	21.1	77.6	279.3
4360	29.8	27.4	30.2	27.2	22.4	8.9	1.7	0.7	6.4	22.8	27.7	29.1	86.3	79.8	11.3	56.9	234.3
4373	30.8	28.2	30.8	28.7	24.0	8.2	1.4	1.0	9.0	25.7	29.4	30.4	89.4	83.5	10.6	64.1	247.6
4382	30.9	27.9	30.7	28.4	22.5	9.4	2.3	0.7	2.6	19.0	27.6	30.2	89.0	81.6	12.4	49.2	232.2
4390	30.2	27.4	29.6	26.2	14.9	4.0	1.2	0.5	1.1	13.0	24.4	28.7	86.3	70.7	5.7	38.5	201.2
4419	31.0	28.2	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0	90.2	92.0	92.0	91.0	365.2

Table 14: Averages, number of days with frost (Tmin < 0.0°C) (days) (climate element 125).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	31.0	28.2	31.0	29.9	29.1	12.7	2.8	7.3	24.0	30.5	30.0	30.9	90.1	90.0	22.8	84.5	287.4
4203	2009	2020	31.0	28.2	31.0	30.0	30.6	20.3	1.7	2.6	21.4	30.8	30.0	31.0	90.2	91.6	24.6	82.2	288.6
4205	1995	2020	31.0	28.2	31.0	30.0	30.8	14.2	2.3	4.3	24.4	30.7	30.0	31.0	90.2	91.8	20.8	85.1	287.9
4207	1991	1996	31.0	28.2	31.0	30.0	31.0	18.2	2.3	13.3	27.2	31.0	30.0	31.0	90.2	92.0	33.8	88.2	304.2
4213	2000	2020	30.9	28.2	30.9	29.4	25.7	4.5	0.1	0.4	13.0	27.3	29.0	30.6	89.7	86.0	5.0	69.3	250.0
4224	2000	2020	31.0	28.2	31.0	29.7	24.5	3.6	0.2	0.0	5.0	24.1	29.0	30.7	89.9	85.2	3.8	58.1	237.0
4241	2001	2020	30.0	27.7	30.0	27.9	16.5	1.8	0.0	0.0	1.7	17.8	27.7	29.4	87.1	74.4	1.8	47.2	210.5

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4254	2000	2020	30.2	27.3	29.8	27.7	19.1	3.4	0.1	0.1	4.2	22.3	28.1	29.4	86.9	76.6	3.6	54.6	221.7
4273	2004	2020	28.5	23.5	26.6	21.5	10.5	2.3	0.0	0.0	1.5	14.7	23.9	27.3	79.3	58.6	2.3	40.1	180.3
4280	2009	2020	28.7	25.9	28.2	23.9	13.0	0.5	0.0	0.0	5.8	21.5	26.5	28.3	82.9	65.1	0.5	53.8	202.3
4301	2010	2020	31.0	28.2	31.0	30.0	31.0	21.4	9.9	19.6	30.0	31.0	30.0	31.0	90.2	92.0	50.9	91.0	324.1
4341	2002	2020	31.0	28.2	31.0	29.5	29.9	13.1	1.0	1.6	19.1	29.5	30.0	31.0	90.2	90.4	15.7	78.6	274.9
4351	1993	2020	30.8	28.2	31.0	28.8	27.8	20.8	10.9	9.1	13.6	26.7	29.6	30.6	89.6	87.6	40.8	69.9	287.9
4361	2000	2020	30.2	27.7	30.1	27.1	24.3	9.1	1.4	1.1	5.3	21.9	27.4	29.8	87.7	81.5	11.6	54.6	235.4

6.7 Number of Ice Days (Tmax < 0.0°C)

Table 15: Climatological standard normals 1991-2020, number of ice days (Tmax < 0.0°C) (days) (climate element 114).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	30.7	28.0	30.7	28.9	24.7	7.5	0.6	0.2	5.0	22.4	27.6	30.0	88.7	84.3	8.3	55.0	236.3
4211	29.7	27.5	30.0	26.8	18.3	2.2	0.0	0.1	5.0	22.2	26.1	29.4	86.6	75.1	2.3	53.3	217.3
4214	28.4	26.6	29.4	25.1	15.4	2.0	0.0	0.6	0.9	16.3	24.1	27.6	82.6	69.9	2.6	41.3	196.4
4220	29.1	26.6	29.6	23.9	9.7	0.4	0.0	0.0	0.7	14.6	23.6	27.6	83.3	63.2	0.4	38.9	185.8
4221	26.7	24.8	27.6	21.4	7.0	0.1	0.0	0.0	1.8	17.0	22.2	26.3	77.8	56.0	0.1	41.0	174.9
4228	28.9	26.6	29.2	25.7	14.2	1.9	0.0	0.0	0.5	10.8	22.8	28.1	83.6	69.1	1.9	34.1	188.7
4231	27.0	25.0	26.3	15.8	2.8	0.0	0.0	0.0	1.1	16.4	22.7	26.3	78.3	44.9	0.0	40.2	163.4
4234	27.1	25.1	26.7	18.7	5.5	0.1	0.0	0.0	0.2	9.3	21.4	26.1	78.3	50.9	0.1	30.9	160.2
4242	26.9	24.7	26.0	18.4	5.3	0.1	0.0	0.0	0.0	6.3	19.1	24.7	76.3	49.7	0.1	25.4	151.5
4250	25.0	22.7	24.8	17.3	4.7	0.1	0.0	0.0	0.2	8.7	19.4	22.8	70.5	46.8	0.1	28.3	145.7
4253	24.2	22.4	23.9	14.4	4.2	0.2	0.0	0.0	0.1	5.0	16.3	21.6	68.2	42.5	0.2	21.4	132.3
4260	22.7	21.1	20.3	10.7	2.7	0.0	0.0	0.0	0.0	3.6	15.1	20.6	64.4	33.7	0.0	18.7	116.8
4266	22.1	20.4	21.8	12.8	4.3	0.4	0.0	0.1	0.0	2.3	12.3	18.2	60.7	38.9	0.5	14.6	114.7
4270	17.3	17.2	16.3	4.5	0.4	0.0	0.0	0.0	0.0	3.4	14.2	17.7	52.2	21.2	0.0	17.6	91.0
4272	18.1	18.2	17.0	5.3	0.6	0.0	0.0	0.0	0.0	2.8	12.8	17.8	54.1	22.9	0.0	15.6	92.6
4285	19.0	18.5	18.0	8.6	2.1	0.4	0.0	0.1	0.0	1.3	8.7	16.0	53.5	28.7	0.5	10.0	92.7
4312	31.0	28.1	31.0	29.9	27.4	5.6	0.4	3.1	26.5	30.5	29.9	30.8	89.9	88.3	9.1	86.9	274.2
4320	30.9	28.0	30.9	29.4	23.3	2.8	0.0	0.3	16.0	29.8	29.8	30.9	89.8	83.6	3.1	75.6	252.1
4330	30.7	28.1	30.8	28.6	19.8	1.7	0.0	0.1	9.3	28.3	29.6	30.6	89.4	79.2	1.8	67.2	237.6
4339	29.4	27.0	30.0	25.7	11.3	0.3	0.0	0.0	2.3	22.4	27.7	29.1	85.5	67.0	0.3	52.4	205.2
4360	22.2	20.1	21.7	9.8	1.3	0.0	0.0	0.0	0.1	7.3	16.4	20.7	63.0	32.8	0.0	23.8	119.6
4373	27.4	25.4	27.2	18.0	5.2	0.6	0.0	0.0	0.9	12.2	21.4	26.3	79.1	50.4	0.6	34.5	164.6
4382	25.7	24.0	24.8	14.3	2.9	0.5	0.0	0.0	0.0	4.5	13.7	23.4	73.1	42.0	0.5	18.2	133.8
4390	22.1	20.1	18.8	6.7	0.5	0.0	0.0	0.0	0.0	1.2	8.9	17.6	59.8	26.0	0.0	10.1	95.9
4419	31.0	28.2	31.0	30.0	31.0	29.9	30.4	30.9	30.0	31.0	30.0	31.0	90.2	92.0	91.2	91.0	364.4

Table 16: Averages, number of ice days (Tmax < 0.0°C) (days) (climate element 114).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	30.9	28.2	30.8	29.2	21.5	3.3	0.1	0.8	12.6	27.3	29.2	30.7	89.8	81.5	4.2	69.1	244.6
4203	2009	2020	30.8	28.2	30.5	30.0	26.6	5.9	0.0	0.2	11.4	28.4	29.3	31.0	90.0	87.1	6.1	69.1	252.3
4205	1995	2020	30.8	27.9	30.8	27.7	12.8	0.4	0.0	0.3	6.8	25.5	28.5	30.5	89.2	71.3	0.7	60.8	222.0
4207	1991	1996	31.0	28.2	31.0	30.0	30.2	8.0	0.2	1.9	24.8	31.0	30.0	31.0	90.2	91.2	10.1	85.8	277.3
4213	2000	2020	27.7	25.1	28.4	23.0	8.7	0.2	0.0	0.0	2.5	16.9	23.7	27.7	80.5	60.1	0.2	43.1	183.9
4224	2000	2020	28.6	26.2	29.4	24.1	6.5	0.0	0.0	0.0	0.3	11.2	23.0	27.4	82.2	60.0	0.0	34.5	176.7
4241	2001	2020	24.8	23.2	23.3	15.6	3.0	0.0	0.0	0.0	0.0	5.2	18.4	24.1	72.1	41.9	0.0	23.6	137.6
4254	2000	2020	23.9	21.9	22.1	14.1	2.8	0.0	0.0	0.0	0.1	6.8	17.5	21.4	67.2	39.0	0.0	24.4	130.6
4273	2004	2020	18.3	14.7	15.9	4.1	0.1	0.0	0.0	0.0	0.0	1.5	10.8	17.1	50.1	20.1	0.0	12.3	82.5
4280	2009	2020	16.5	14.0	12.9	3.1	0.3	0.0	0.0	0.0	0.0	1.7	13.2	17.5	48.0	16.3	0.0	14.9	79.2
4301	2010	2020	30.9	27.0	30.9	29.9	29.6	6.9	0.8	7.4	27.8	30.9	29.6	30.8	88.7	90.4	15.1	88.3	282.5
4341	2002	2020	30.2	26.5	30.4	25.9	10.8	0.2	0.0	0.0	2.4	21.4	28.4	29.8	86.5	67.1	0.2	52.2	206.0
4351	1993	2020	26.8	25.2	28.7	22.1	10.2	3.0	0.7	0.5	1.7	14.7	23.8	26.4	78.4	61.0	4.2	40.2	183.8
4361	2000	2020	21.0	20.7	24.1	14.9	2.5	0.1	0.0	0.0	0.2	7.7	15.6	21.6	63.3	41.5	0.1	23.5	128.4

6.8 Number of Cold Days (Tmin < -10.0°C)

Table 17: Climatological standard normals 1991-2020, number of cold days (Tmin < -10.0°C) (days) (climate element 124).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	29.4	27.5	30.2	25.9	7.5	0.0	0.0	0.0	0.0	1.0	12.0	24.8	81.7	63.6	0.0	13.0	158.3
4211	28.1	26.8	29.6	23.4	4.5	0.0	0.0	0.0	0.0	1.9	13.5	22.9	77.8	57.5	0.0	15.4	150.7
4214	22.7	23.7	25.9	16.5	2.4	0.0	0.0	0.0	0.0	0.0	4.9	12.5	58.9	44.8	0.0	4.9	108.6
4220	23.5	24.6	26.5	15.8	1.7	0.0	0.0	0.0	0.0	0.7	6.9	15.0	63.1	44.0	0.0	7.6	114.7
4221	25.2	24.5	26.4	16.7	1.6	0.0	0.0	0.0	0.1	6.5	16.0	21.4	71.1	44.7	0.0	22.6	138.4
4228	21.4	22.9	24.3	11.8	0.9	0.0	0.0	0.0	0.0	0.0	1.6	10.1	54.4	37.0	0.0	1.6	93.0
4231	28.3	26.2	27.4	15.7	1.5	0.0	0.0	0.0	0.6	12.3	22.4	26.9	81.4	44.6	0.0	35.3	161.3
4234	23.8	23.9	24.3	12.1	1.1	0.0	0.0	0.0	0.0	0.9	8.9	16.6	64.3	37.5	0.0	9.8	111.6
4242	12.8	14.9	15.1	3.0	0.2	0.0	0.0	0.0	0.0	0.0	1.3	6.6	34.3	18.3	0.0	1.3	53.9
4250	15.4	15.2	16.1	3.3	0.2	0.0	0.0	0.0	0.0	0.0	2.3	7.8	38.4	19.6	0.0	2.3	60.3
4253	10.4	11.4	9.6	1.3	0.3	0.0	0.0	0.0	0.0	0.0	1.1	5.1	26.9	11.2	0.0	1.1	39.2
4260	14.2	15.2	13.5	3.1	0.4	0.0	0.0	0.0	0.0	0.7	6.6	11.2	40.6	17.0	0.0	7.3	64.9
4266	2.5	4.3	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.5	3.4	0.0	0.0	10.9
4270	15.5	16.0	13.4	2.3	0.4	0.0	0.0	0.0	0.0	0.7	10.2	15.4	46.9	16.1	0.0	10.9	73.9
4272	10.8	12.0	10.0	1.5	0.3	0.0	0.0	0.0	0.0	0.0	2.3	8.2	31.0	11.8	0.0	2.3	45.1
4285	1.8	2.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.6	1.6	0.0	0.0	6.2
4312	30.9	27.9	30.8	29.7	19.1	0.2	0.0	0.0	12.7	29.5	29.6	30.8	89.6	79.6	0.2	71.8	241.2
4320	30.2	27.7	30.7	28.7	14.8	0.0	0.0	0.0	4.0	25.3	28.9	30.3	88.2	74.2	0.0	58.2	220.6
4330	29.1	26.7	30.5	25.7	8.3	0.0	0.0	0.0	0.0	15.0	26.1	29.3	85.1	64.5	0.0	41.1	190.7
4339	26.0	23.9	27.3	20.3	3.1	0.0	0.0	0.0	0.0	6.5	20.2	25.3	75.2	50.7	0.0	26.7	152.6

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4360	12.6	12.6	13.9	4.3	0.2	0.0	0.0	0.0	0.0	0.1	3.0	10.3	35.5	18.4	0.0	3.1	57.0
4373	10.2	10.3	11.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	1.4	6.4	26.9	13.5	0.0	1.4	41.8
4382	3.9	4.7	4.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	9.2	5.2	0.0	0.0	14.4
4390	2.4	3.7	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	6.6	2.1	0.0	0.0	8.7
4419	31.0	28.2	31.0	30.0	30.8	28.7	27.9	29.8	29.8	31.0	30.0	31.0	90.2	91.8	86.4	90.8	359.2

Table 18: Averages, number of cold days (Tmin < -10.0°C) (days) (climate element 124).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	30.9	28.0	30.7	27.6	8.0	0.0	0.0	0.0	3.2	17.2	27.8	29.6	88.5	66.3	0.0	48.2	203.0
4203	2009	2020	29.5	27.0	30.1	23.1	4.4	0.0	0.0	0.0	0.0	4.9	22.5	28.9	85.4	57.6	0.0	27.4	170.4
4205	1995	2020	30.9	28.1	30.8	28.2	11.0	0.0	0.0	0.0	0.2	12.7	26.7	30.1	89.1	70.0	0.0	39.6	198.7
4207	1991	1996	31.0	28.2	31.0	29.7	22.3	0.7	0.0	0.2	15.4	31.0	30.0	31.0	90.2	83.0	0.9	76.4	250.5
4213	2000	2020	23.7	23.6	26.3	19.6	1.8	0.0	0.0	0.0	0.0	2.7	13.1	19.9	67.2	47.7	0.0	15.8	130.7
4224	2000	2020	20.7	22.1	23.7	14.4	0.6	0.0	0.0	0.0	0.0	0.6	4.6	12.9	55.7	38.7	0.0	5.2	99.6
4241	2001	2020	14.3	15.6	16.2	4.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	8.6	38.5	20.6	0.0	1.4	60.5
4254	2000	2020	15.1	15.4	16.0	4.2	0.1	0.0	0.0	0.0	0.0	0.3	3.9	10.1	40.6	20.3	0.0	4.2	65.1
4273	2004	2020	11.3	8.3	9.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	1.2	7.3	26.9	10.2	0.0	1.2	38.3
4280	2009	2020	9.1	9.5	9.6	0.8	0.0	0.0	0.0	0.0	0.0	0.1	3.2	6.7	25.3	10.4	0.0	3.3	39.0
4301	2010	2020	31.0	28.1	31.0	29.9	18.5	0.0	0.0	0.0	14.6	29.9	29.8	30.8	89.9	79.4	0.0	74.3	243.6
4341	2002	2020	26.2	24.8	28.7	23.8	4.4	0.0	0.0	0.0	0.0	9.0	22.8	28.1	79.1	56.9	0.0	31.8	167.8
4351	1993	2020	17.1	17.9	21.2	11.1	0.5	0.0	0.0	0.0	0.0	0.1	2.5	13.3	48.3	32.8	0.0	2.6	83.7
4361	2000	2020	9.6	11.0	12.8	3.3	0.0	0.0	0.0	0.0	0.0	0.1	2.3	8.6	29.2	16.1	0.0	2.4	47.7

6.9 Number of Summer Days (Tmax > 25°C)

On rare occasions, summer days (Tmax > 25°C) have been registered in Greenland in the period 1991-2020 (see Table 7 and Table 8 and the attached data files). Therefore, the climatological standard normal and average statistics for this climate element is not included as a table (almost all values = 0, only very few stations in a couple of months have 0.1 days).

6.10 Heating Degree Days

Heating Degree Days (HDD) is a measure of likely energy consumption for heating buildings taking the climate into account. HDD are defined simply as the positive difference between a fixed indoor temperature (basis temperature) and the outdoor temperature during a time period under consideration (i.e. one day/one month). In Greenland the basis temperature is 19°C. The basis temperature is what the heating system should be able to produce energy for.

This may seem as a chilly indoor temperature, but as a rule of thumb one should add approximately 2°C originating from the so-called heating sources like ourselves, lightning, TV, computers, domestic appliances etc. Therefore, the indoor temperature will be equivalent to 21°C.

So, a daily mean temperature of +5°C results in a registration of 19-5 = 14 HDD's. In addition, sunshine and wind affect the amount of energy used for heating. Sunshine will reduce the number of HDD. On the other hand, wind speed above a certain level will increase the HDD number.

The following HDD are not corrected for sunshine and wind or anything else, they are calculated as the positive difference between 19°C and the outdoor temperature measured in a ventilated and shadowed screen.

Table 19: Climatological standard normal 1991-2020, accumulated heating degree days (19-Tmean) (°C) (climate element 149).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	1194.9	1158.9	1259.4	996.9	742.1	547.8	443.7	437.1	526.6	681.6	812.1	1018.0	3371.8	2998.4	1428.6	2020.3	9819.1
4211	1106.7	1085.8	1173.6	925.7	687.7	473.9	390.5	408.4	528.3	695.0	797.1	944.3	3136.8	2787.0	1272.8	2020.4	9217.0
4214	966.7	966.1	1061.1	832.7	643.0	482.5	414.1	407.5	487.6	629.6	721.0	830.1	2762.9	2536.8	1304.1	1838.2	8442.0
4220	968.2	957.9	1035.8	805.7	618.8	453.3	378.9	400.4	481.7	634.3	725.8	828.7	2754.8	2460.3	1232.6	1841.8	8289.5
4221	959.1	952.4	1036.9	785.6	580.2	395.1	331.3	384.0	495.9	680.3	780.9	881.3	2792.8	2402.7	1110.4	1957.1	8263.0
4228	927.0	915.2	975.3	781.1	630.4	512.2	453.9	432.1	470.2	592.9	681.1	810.5	2652.7	2386.8	1398.2	1744.2	8181.9
4231	1161.8	1096.3	1102.6	756.0	478.3	268.8	242.5	320.5	466.3	731.8	908.5	1060.4	3318.5	2336.9	831.8	2106.6	8593.8
4234	952.1	917.1	967.6	728.8	567.9	419.8	354.2	363.7	447.5	612.3	721.0	830.3	2699.5	2264.3	1137.7	1780.8	7882.3
4242	826.8	791.1	833.0	664.0	564.2	458.2	401.3	390.9	436.3	561.2	657.9	750.0	2367.9	2061.2	1250.4	1655.4	7334.9
4250	821.2	770.6	828.0	667.4	553.6	425.6	370.1	383.1	449.8	585.3	670.9	743.8	2335.6	2049.0	1178.8	1706.0	7269.4
4253	773.8	733.8	767.1	621.8	546.1	455.7	419.4	417.5	449.7	548.1	627.6	714.1	2221.7	1935.0	1292.6	1625.4	7074.7
4260	781.3	744.1	767.3	614.7	526.1	428.7	391.2	393.8	434.5	551.1	648.6	740.9	2266.3	1908.1	1213.7	1634.2	7022.3
4266	699.2	659.0	704.0	595.9	550.7	482.7	455.8	432.1	449.3	529.0	588.5	658.8	2017.0	1850.6	1370.6	1566.8	6805.0
4270	775.8	722.2	736.2	530.0	411.2	282.3	244.2	286.3	387.0	543.4	670.3	759.3	2257.3	1677.4	812.8	1600.7	6348.2
4272	733.4	697.5	721.5	557.5	484.0	383.6	337.7	339.5	390.8	519.8	618.2	703.6	2134.5	1763.0	1060.8	1528.8	6487.1
4285	678.1	637.6	667.3	574.0	537.1	474.4	451.4	423.6	433.1	513.7	561.5	629.1	1944.8	1778.4	1349.4	1508.3	6580.9
4312	1466.8	1348.5	1484.5	1198.0	870.5	550.4	458.0	509.7	779.3	1126.7	1242.9	1398.0	4213.3	3553.0	1518.1	3148.9	12433.3
4320	1253.3	1165.2	1278.6	1046.8	787.1	525.4	452.5	490.2	655.3	961.1	1085.0	1229.0	3647.5	3112.5	1468.1	2701.4	10929.5
4330	1147.1	1080.0	1176.0	946.9	724.8	516.6	431.8	439.0	592.3	854.1	997.4	1143.3	3370.4	2847.7	1387.4	2443.8	10049.3
4339	981.2	918.0	998.8	824.0	655.2	483.9	400.6	417.1	524.6	732.4	840.7	965.5	2864.7	2478.0	1301.6	2097.7	8742.0
4360	781.3	705.5	770.5	636.6	550.6	426.7	367.4	376.8	443.2	586.3	652.8	739.7	2226.5	1957.7	1170.9	1682.3	7037.4
4373	784.5	729.2	787.4	658.5	578.0	463.1	396.0	408.3	488.8	613.9	670.1	751.7	2265.4	2023.9	1267.4	1772.8	7329.5
4390	704.1	653.6	690.5	579.6	516.7	421.1	369.3	355.5	409.1	519.1	584.3	656.7	2014.4	1786.8	1145.9	1512.5	6459.6
4419	1789.2	1638.2	1776.2	1506.6	1287.4	994.9	954.4	1070.5	1278.9	1570.1	1673.6	1793.1	5220.5	4570.2	3019.8	4522.6	17333.1

Table 20: Averages, accumulated heating degree days (19-Tmean) (°C) (climate element 149).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	1364.0	1244.4	1333.3	1038.2	731.5	496.0	425.2	481.2	617.9	853.8	1050.4	1240.8	3849.2	3103.0	1402.4	2522.1	10876.7
4203	2009	2020	1095.5	1036.5	1152.6	917.0	714.4	548.3	451.9	475.2	579.4	743.0	896.3	1047.1	3179.1	2784.0	1475.4	2218.7	9657.2
4205	1995	2020	1261.4	1184.9	1253.5	985.6	703.2	478.0	383.9	414.6	579.3	803.9	945.0	1134.2	3580.5	2942.3	1276.5	2328.2	10127.5
4207	1991	1996	1702.0	1511.4	1674.6	1297.8	936.6	557.1	432.7	498.8	810.0	1254.9	1428.4	1641.6	4855.0	3909.0	1488.6	3493.3	13745.9
4213	2000	2020	948.1	942.4	1036.1	827.7	600.5	395.0	307.3	349.0	495.0	667.1	772.2	875.3	2765.8	2464.3	1051.3	1934.3	8215.7
4224	2000	2020	898.7	887.5	965.6	777.5	591.9	434.1	363.4	376.9	466.1	620.0	711.7	812.7	2598.9	2335.0	1174.4	1797.8	7906.1
4241	2001	2020	810.4	773.2	836.8	659.3	534.4	404.2	333.7	340.4	419.3	560.8	663.6	763.0	2346.6	2030.5	1078.3	1643.7	7099.1
4254	2000	2020	799.5	757.1	810.4	642.9	530.0	393.6	328.0	341.9	440.0	581.5	669.7	760.3	2316.9	1983.3	1063.5	1691.2	7054.9
4273	2005	2020	728.6	632.0	692.4	561.2	483.4	399.9	345.6	333.3	396.9	510.4	610.3	695.8	2056.4	1737.0	1078.8	1517.6	6389.8

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4280	2009	2020	710.3	655.1	689.6	535.9	452.6	345.5	307.1	325.3	404.1	540.7	630.1	702.1	2067.5	1678.1	977.9	1574.9	6298.4
4301	2010	2020	1441.2	1302.1	1481.3	1214.2	881.3	565.0	519.3	572.1	805.5	1106.0	1259.5	1392.7	4136.0	3576.8	1656.4	3171.0	12540.2
4341	2007	2020	1022.7	965.0	1085.0	884.2	661.0	478.4	384.0	391.2	525.7	726.0	898.5	1019.2	3006.9	2630.2	1253.6	2150.2	9040.9
4351	2005	2020	795.1	764.9	858.3	716.5	614.9	536.4	485.8	475.3	504.5	618.8	692.4	782.4	2342.4	2189.7	1497.5	1815.7	7845.3

7 Relative Humidity and Vapor Pressure

Humidity is the amount of water vapor present in the air. The higher the temperature, the greater the number of water molecules that the air can hold. The most commonly used measure of humidity is relative humidity given in percent.

But what does this mean? Relative humidity does not indicate the total amount of water vapor in the air but tells us how close the air is to being saturated at a given temperature. Air with 100% relative humidity is therefore said to be saturated: it is filled to capacity with water vapor.

Especially in cold regions, this can easily lead to misunderstandings for non-professionals. When it is very cold, the air can hold only a very small amount of water vapor. On the contrary, the relative humidity often shows very high values, because it is near to saturation. This can easily lead to misunderstanding.

A direct measure of humidity is absolute humidity. This is the mass of water vapor in a given volume of air, i.e. grams per m^3. The air's moisture content may also be described by measuring or calculating the pressure exerted by the water vapor in the air. The unit is hPa.

In Table 21 and Table 22, you can see average monthly relative humidity and in Table 23 and Table 24 you can see the lowest relative humidity registered at the stations. In Table 25 and Table 26 you can see the average vapor pressure.

Observations of humidity are a part of the observation program on most weather stations in Greenland, but it is a difficult parameter to measure, especially under extreme conditions like in Greenland. This is reflected in most of the long humidity series from Greenland. They are inhomogeneous, and that is the reason for the fact that only two series with data in the whole period 1991-2020 can be found in this report.

The tables reflect that coastal stations in Greenland situated by the sea mainly is characterized by the cold waters and sea ice. Frequent fog in the summer is the result and that can be seen in Table 21 and Table 22, indicating that the relative humidity i.e. in Nuuk reaches its peak in the summer.

Reversely, the relative humidity in Kangerlussuaq is lowest in the summer reflecting the more continental climate here with a lot of sunshine and clear weather.

Looking at Table 25 and Table 26 of vapor pressure, the actual amount of water vapor, and thus the vapor pressure, is determined by the temperature, and for that reason, the absolute humidity and vapor pressure is higher in the summer compared to the winter. A generally higher temperature in i.e. Nuuk results in a generally higher amount of water vapor here compared to i.e. Danmarkshavn.

7.1 Mean Relative Humidity

Table 21: Climatological standard normals 1991-2020, mean relative humidity (%) (climate element 201).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	83.7	83.1	83.0	86.0	88.6	91.1	89.6	87.0	80.1	77.1	78.7	83.1	83.3	85.9	89.2	78.6	84.3
4250	73.8	74.7	74.3	78.3	81.1	85.0	85.3	86.7	82.3	76.7	73.3	73.4	74.0	77.9	85.7	77.4	78.7

Table 22: Averages, mean relative humidity (%) (climate element 201).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	84.1	83.8	82.1	79.2	77.4	78.0	77.0	79.0	76.6	81.4	81.1	84.9	84.3	79.6	78.0	79.7	80.4
4203	2011	2020	75.4	74.1	74.4	75.5	80.5	87.4	86.5	88.7	81.5	79.5	77.3	76.1	75.2	76.8	87.5	79.4	79.7
4205	1995	2020	64.1	66.5	64.9	64.8	70.1	76.5	76.1	73.6	63.2	62.6	61.7	64.3	65.0	66.6	75.4	62.5	67.4
4207	1991	1996	78.5	79.4	79.6	84.7	88.9	84.1	80.4	81.7	86.9	84.2	81.5	78.9	78.9	84.4	82.1	84.2	82.4
4211	2005	2020	80.6	80.7	79.3	80.0	83.8	80.3	77.7	77.9	79.0	80.0	78.4	79.9	80.4	81.0	78.6	79.1	79.8
4213	2000	2020	63.0	64.6	66.3	67.8	75.0	75.2	71.6	69.6	67.1	63.1	62.4	62.0	63.2	69.7	72.1	64.2	67.3
4214	2010	2020	68.3	70.9	73.1	73.2	81.4	87.0	86.2	83.0	76.0	67.3	63.9	65.5	68.2	75.9	85.4	69.1	74.6
4220	2003	2020	76.5	77.7	78.4	78.7	81.5	83.7	84.5	85.7	80.7	78.1	76.7	76.4	76.9	79.5	84.6	78.5	79.9
4221	2010	2020	60.1	62.9	64.9	65.5	70.0	71.6	68.7	70.7	68.3	63.6	58.8	61.0	61.3	66.8	70.3	63.6	65.5
4228	2008	2020	80.3	81.9	81.4	81.8	85.3	92.3	92.7	91.5	83.0	77.9	76.8	78.4	80.2	82.8	92.2	79.2	83.6
4231	2002	2020	70.2	68.1	66.5	64.1	57.7	55.1	57.2	64.8	67.3	72.9	72.6	71.4	69.9	62.8	59.0	70.9	65.7
4234	1995	2020	68.5	68.5	67.3	69.1	74.8	78.2	78.5	79.2	73.3	69.7	68.6	68.6	68.5	70.4	78.6	70.5	72.0
4241	2001	2020	66.9	67.2	68.1	70.9	76.9	82.4	80.8	82.7	74.8	69.3	69.4	69.4	67.8	72.0	82.0	71.2	73.2
4242	2010	2020	69.4	71.0	72.3	74.4	82.8	89.9	90.8	90.8	81.5	73.6	70.8	72.7	71.0	76.5	90.5	75.3	78.3
4253	2009	2020	71.6	72.3	72.8	77.8	85.2	90.9	92.1	92.8	85.9	75.7	72.1	72.8	72.2	78.6	91.9	77.9	80.2
4254	2000	2020	73.4	74.5	74.2	75.8	78.2	80.2	77.9	82.2	79.6	74.3	74.6	75.0	74.3	76.1	80.1	76.2	76.7
4260	2008	2020	62.7	64.2	64.8	69.7	78.0	84.3	85.1	86.4	79.6	67.1	65.6	64.3	63.7	70.8	85.3	70.8	72.6
4270	1994	2020	56.8	57.2	57.7	58.2	56.7	61.4	65.4	69.2	66.2	61.9	64.0	59.3	57.8	57.5	65.3	64.0	61.2
4272	2004	2017	66.5	67.8	65.8	70.7	75.8	79.7	81.8	84.9	77.8	67.5	72.6	70.1	68.1	70.8	82.1	72.6	73.4
4273	2004	2020	67.6	66.5	66.6	70.8	75.3	82.6	84.4	85.1	77.9	68.8	71.6	68.8	67.6	70.9	84.0	72.8	73.8
4280	2009	2020	65.2	65.0	65.3	67.7	69.6	76.5	80.6	82.2	77.8	73.6	71.5	66.6	65.6	67.5	79.8	74.3	71.8
4285	2009	2020	71.8	71.8	72.1	77.9	82.8	87.9	89.7	90.7	85.7	77.8	75.9	73.8	72.5	77.6	89.4	79.8	79.8
4301	2010	2020	68.5	69.1	68.0	71.6	80.5	86.9	88.7	88.9	84.3	77.9	72.7	70.8	69.5	73.4	88.2	78.3	77.3
4312	2011	2020	72.6	71.2	71.3	72.2	78.1	81.4	80.0	81.8	83.3	79.7	74.7	74.6	72.8	73.9	81.1	79.2	76.7
4320	2011	2020	71.9	69.0	68.9	69.0	76.9	77.7	77.6	76.6	72.7	71.4	69.5	68.4	69.8	71.6	77.3	71.2	72.5
4330	2010	2020	69.9	67.2	64.6	67.3	76.7	82.8	80.1	77.0	74.0	71.6	67.3	66.4	67.8	69.5	80.0	71.0	72.1
4339	2001	2020	76.1	73.8	74.3	73.9	80.9	79.2	75.8	77.2	76.6	73.7	69.9	69.4	73.1	76.4	77.4	73.4	75.1
4341	2011	2020	71.2	70.0	68.2	70.2	78.8	81.3	78.0	73.5	70.8	72.4	67.6	66.9	69.4	72.4	77.6	70.3	72.4
4351	2010	2020	73.9	72.6	71.3	77.3	84.0	88.0	85.4	84.4	78.9	74.5	71.2	69.4	72.0	77.5	85.9	74.9	77.6
4360	2004	2020	70.7	71.6	72.3	73.9	77.6	78.4	78.0	78.9	72.7	70.5	68.8	69.3	70.5	74.6	78.4	70.7	73.6
4361	2011	2020	70.5	70.8	70.5	73.2	76.3	78.2	75.7	75.9	73.2	71.6	68.7	66.6	69.3	73.3	76.6	71.2	72.6
4373	2010	2020	74.3	74.9	72.8	76.5	78.9	83.0	75.8	70.3	70.2	69.3	70.5	70.4	73.2	76.1	76.4	70.0	73.9
4390	2004	2020	69.1	72.0	69.2	73.0	77.5	79.0	79.9	77.8	72.1	66.8	69.5	68.2	69.8	73.2	78.9	69.5	72.8

7.2 Lowest Relative Humidity

Table 23: Climatological standard normals 1991-2020, lowest relative humidity (%) (climate element 207).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	39.0	39.0	39.0	42.0	38.0	35.0	43.0	37.0	30.0	38.0	41.0	34.0	34.0	38.0	35.0	30.0	30.0
4250	17.0	18.0	20.0	18.0	23.0	26.0	23.0	26.0	15.0	12.0	23.0	20.0	17.0	18.0	23.0	12.0	12.0

Table 24: Extreme values, lowest relative humidity (%) (climate element 207).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	31.0	44.0	34.0	30.0	32.0	29.0	26.0	27.0	26.0	35.0	37.0	48.0	31.0	30.0	26.0	26.0	26.0
4203	2011	2020	44.0	42.0	46.0	40.0	44.0	51.0	36.0	40.0	44.0	45.0	40.0	44.0	42.0	40.0	36.0	40.0	36.0
4205	1995	2020	24.0	30.0	18.0	21.0	17.0	18.0	12.0	15.0	18.0	16.0	23.0	15.0	15.0	17.0	12.0	16.0	12.0
4207	1991	1996	66.0	70.0	70.0	74.0	57.0	42.0	40.0	40.0	49.0	60.0	65.0	72.0	66.0	57.0	40.0	49.0	40.0
4211	2005	2020	33.0	33.0	26.0	24.0	21.0	31.0	10.0	28.0	31.0	27.0	29.0	31.0	31.0	21.0	10.0	27.0	10.0
4213	2000	2020	21.0	20.0	17.0	17.0	22.0	17.0	16.0	16.0	21.0	20.0	19.0	20.0	20.0	17.0	16.0	19.0	16.0
4214	2010	2020	25.0	26.0	21.0	22.0	31.0	28.0	34.0	20.0	17.0	23.0	25.0	23.0	23.0	21.0	20.0	17.0	17.0
4220	2003	2020	39.0	33.0	31.0	31.0	33.0	29.0	29.0	28.0	33.0	34.0	35.0	40.0	33.0	31.0	28.0	33.0	28.0
4221	2010	2020	24.0	26.0	24.0	16.0	25.0	23.0	23.0	21.0	25.0	25.0	27.0	23.0	23.0	16.0	21.0	25.0	16.0
4228	2008	2020	31.0	38.0	34.0	39.0	37.0	54.0	48.0	30.0	38.0	42.0	44.0	38.0	31.0	34.0	30.0	38.0	30.0
4231	2002	2020	21.0	21.0	19.0	12.0	11.0	10.0	15.0	19.0	17.0	24.0	25.0	23.0	21.0	11.0	10.0	17.0	10.0
4234	1995	2020	15.0	15.0	16.0	17.0	17.0	18.0	18.0	17.0	13.0	13.0	21.0	15.0	15.0	16.0	17.0	13.0	13.0
4241	2001	2020	16.0	17.0	15.0	14.0	18.0	19.0	15.0	19.0	11.0	15.0	24.0	22.0	16.0	14.0	15.0	11.0	11.0
4242	2010	2020	31.0	34.0	33.0	31.0	37.0	32.0	46.0	36.0	30.0	28.0	37.0	36.0	31.0	31.0	32.0	28.0	28.0
4253	2009	2020	28.0	29.0	31.0	24.0	33.0	35.0	34.0	40.0	33.0	28.0	32.0	29.0	28.0	24.0	34.0	28.0	24.0
4254	2000	2020	20.0	20.0	10.0	12.0	7.0	22.0	15.0	18.0	17.0	19.0	25.0	22.0	20.0	7.0	15.0	17.0	7.0
4260	2008	2020	18.0	22.0	19.0	12.0	18.0	21.0	32.0	28.0	20.0	17.0	20.0	18.0	18.0	12.0	21.0	17.0	12.0
4270	1994	2020	10.0	14.0	11.0	11.0	7.0	10.0	14.0	11.0	14.0	11.0	12.0	10.0	10.0	7.0	10.0	11.0	7.0
4272	2004	2017	16.0	25.0	11.0	23.0	26.0	22.0	21.0	23.0	23.0	17.0	26.0	22.0	16.0	11.0	21.0	17.0	11.0
4273	2004	2020	23.0	28.0	8.0	21.0	17.0	23.0	20.0	22.0	20.0	17.0	19.0	22.0	22.0	8.0	20.0	17.0	8.0
4280	2009	2020	21.0	20.0	19.0	16.0	14.0	16.0	18.0	20.0	21.0	17.0	19.0	18.0	18.0	14.0	16.0	17.0	14.0
4285	2009	2020	29.0	26.0	29.0	32.0	38.0	37.0	36.0	35.0	34.0	30.0	26.0	31.0	26.0	29.0	35.0	26.0	26.0
4301	2010	2020	33.0	19.0	25.0	42.0	47.0	42.0	40.0	39.0	44.0	39.0	21.0	23.0	19.0	25.0	39.0	21.0	19.0
4312	2011	2020	37.0	35.0	42.0	35.0	38.0	34.0	32.0	28.0	44.0	44.0	39.0	42.0	35.0	35.0	28.0	39.0	28.0
4320	2011	2020	36.0	33.0	30.0	31.0	34.0	34.0	28.0	21.0	29.0	34.0	33.0	28.0	28.0	30.0	21.0	29.0	21.0
4330	2010	2020	27.0	29.0	27.0	25.0	25.0	24.0	24.0	24.0	25.0	25.0	21.0	21.0	21.0	25.0	24.0	21.0	21.0
4339	2001	2020	17.0	17.0	22.0	20.0	22.0	21.0	17.0	17.0	15.0	17.0	12.0	10.0	10.0	20.0	17.0	12.0	10.0
4341	2011	2020	25.0	34.0	25.0	26.0	28.0	25.0	20.0	18.0	21.0	30.0	17.0	31.0	25.0	25.0	18.0	17.0	17.0
4351	2010	2020	22.0	24.0	26.0	25.0	25.0	29.0	34.0	25.0	26.0	24.0	18.0	25.0	22.0	25.0	25.0	18.0	18.0
4360	2004	2020	15.0	16.0	24.0	22.0	21.0	16.0	19.0	20.0	16.0	20.0	21.0	19.0	15.0	21.0	16.0	16.0	15.0
4361	2011	2020	24.0	27.0	28.0	23.0	23.0	26.0	25.0	22.0	23.0	25.0	22.0	23.0	23.0	23.0	22.0	22.0	22.0
4373	2010	2020	28.0	25.0	24.0	30.0	25.0	24.0	30.0	27.0	28.0	26.0	20.0	32.0	25.0	24.0	24.0	20.0	20.0

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4390	2004	2020	14.0	20.0	13.0	18.0	10.0	25.0	20.0	16.0	14.0	12.0	14.0	16.0	14.0	10.0	16.0	12.0	10.0

7.3 Vapor Pressure

Table 25: Climatological standard normals 1991-2020, mean vapor pressure (hPa) (climate element 210).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4208	1.1	0.9	0.9	1.8	3.8	5.9	7.7	7.5	5.5	3.9	2.7	1.8	1.3	2.2	7.0	4.0	3.6
4250	2.5	2.5	2.6	3.9	5.5	7.2	8.5	8.5	6.7	4.8	3.5	3.1	2.7	4.0	8.1	5.0	4.9

Table 26: Averages, mean vapor pressure (hPa) (climate element 210).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.6	0.6	0.7	1.4	3.4	5.6	6.8	6.3	4.3	2.6	1.4	1.0	0.7	1.8	6.2	2.8	2.9
4203	2011	2020	1.2	1.0	1.0	1.8	3.6	5.6	7.2	7.0	4.9	3.4	1.9	1.3	1.2	2.1	6.6	3.4	3.3
4205	1995	2020	0.6	0.6	0.7	1.4	3.3	5.7	7.3	6.6	3.8	2.3	1.4	1.0	0.7	1.8	6.5	2.5	2.9
4207	1991	1996	0.2	0.2	0.2	0.7	2.3	5.4	7.0	6.1	3.1	0.9	0.4	0.2	0.2	1.1	6.2	1.5	2.2
4211	2005	2020	1.5	1.3	1.2	2.0	4.1	6.3	7.7	7.4	5.4	3.8	2.7	2.2	1.7	2.4	7.1	4.0	3.8
4213	2000	2020	1.6	1.3	1.4	2.3	4.5	6.7	8.0	7.2	5.0	3.2	2.3	1.9	1.6	2.7	7.3	3.5	3.8
4214	2010	2020	1.9	1.6	1.7	2.7	4.5	6.7	8.1	7.8	5.7	3.9	2.8	2.3	1.9	3.0	7.5	4.1	4.1
4220	2003	2020	2.1	2.0	2.0	2.9	4.9	6.9	8.5	8.4	6.2	4.4	3.3	2.6	2.2	3.3	7.9	4.6	4.5
4221	2010	2020	1.6	1.4	1.6	2.5	4.4	6.4	7.5	6.8	5.0	3.2	2.3	1.9	1.6	2.8	6.9	3.5	3.7
4228	2008	2020	2.3	1.9	2.0	3.2	4.8	6.4	8.0	8.3	6.6	4.8	3.6	3.0	2.4	3.3	7.6	5.0	4.6
4231	2002	2020	1.2	1.1	1.4	2.6	4.7	6.7	7.4	7.2	5.3	3.3	2.0	1.5	1.3	2.9	7.1	3.5	3.7
4234	1995	2020	1.9	1.6	1.8	3.0	4.9	6.9	8.2	8.2	6.1	4.1	3.0	2.5	2.0	3.2	7.8	4.4	4.4
4241	2001	2020	2.4	2.2	2.5	3.6	5.3	7.4	8.7	8.8	6.5	4.6	3.4	2.9	2.5	3.8	8.3	4.8	4.9
4242	2010	2020	2.6	2.4	2.7	3.7	5.3	7.2	8.8	9.0	7.0	5.0	3.7	3.2	2.7	3.9	8.3	5.2	5.1
4253	2009	2020	3.0	2.9	3.1	4.3	5.8	7.5	8.6	8.8	7.2	5.3	4.0	3.5	3.1	4.4	8.3	5.5	5.3
4254	2000	2020	2.6	2.5	2.8	3.8	5.5	7.4	8.5	8.8	6.7	4.7	3.6	3.1	2.7	4.0	8.2	5.0	5.0
4260	2008	2020	2.6	2.6	2.8	3.9	5.5	7.2	8.3	8.4	6.7	4.7	3.6	3.1	2.8	4.1	8.0	5.0	5.0
4270	1994	2020	2.4	2.3	2.6	4.0	5.2	7.1	8.3	8.2	6.1	4.2	3.2	2.6	2.4	3.9	7.9	4.5	4.7
4272	2004	2017	3.1	3.4	3.3	4.4	5.9	7.5	8.7	9.3	7.2	4.9	4.2	3.4	3.3	4.5	8.5	5.4	5.4
4273	2004	2020	3.0	3.2	3.3	4.5	5.8	7.4	8.8	9.2	7.2	5.0	4.1	3.3	3.2	4.5	8.5	5.4	5.4
4280	2009	2020	3.0	3.0	3.2	4.4	5.7	7.7	9.0	9.0	7.0	5.0	3.8	3.2	3.1	4.4	8.6	5.3	5.3
4285	2009	2020	3.7	3.7	3.8	4.7	5.7	6.8	7.7	8.3	7.3	5.9	4.9	4.3	3.9	4.7	7.6	6.0	5.6
4301	2010	2020	0.4	0.4	0.4	0.8	2.4	5.4	6.3	5.6	2.8	1.3	0.7	0.5	0.4	1.2	5.8	1.6	2.3
4312	2011	2020	0.5	0.5	0.4	0.7	2.4	5.3	6.6	6.0	3.2	1.4	0.8	0.6	0.5	1.2	6.0	1.8	2.4
4320	2011	2020	1.0	0.9	0.7	1.1	3.0	5.5	6.5	6.1	3.8	2.0	1.2	0.9	0.9	1.6	6.0	2.3	2.7
4330	2010	2020	1.2	1.0	0.8	1.4	3.4	5.6	7.0	6.7	4.5	2.7	1.4	1.0	1.1	1.9	6.4	2.9	3.1
4339	2001	2020	1.9	1.7	1.6	2.4	4.2	5.9	7.1	7.2	5.4	3.4	2.1	1.9	1.8	2.7	6.7	3.6	3.7

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4341	2011	2020	1.7	1.6	1.2	2.0	4.1	6.2	7.5	7.1	5.0	3.4	2.0	1.4	1.6	2.4	6.9	3.5	3.6
4351	2010	2020	2.9	2.6	2.3	3.4	4.8	5.8	6.5	6.6	5.8	4.5	3.4	2.7	2.7	3.5	6.3	4.6	4.3
4360	2004	2020	3.0	3.1	3.1	4.1	5.3	6.8	8.0	8.0	6.1	4.5	3.5	3.1	3.1	4.2	7.6	4.7	4.9
4361	2011	2020	3.1	3.1	2.9	3.9	5.0	6.4	7.4	7.4	6.1	4.7	3.6	2.9	3.0	3.9	7.1	4.8	4.7
4373	2010	2020	3.1	3.0	2.8	3.8	4.9	6.5	7.1	6.5	5.3	4.2	3.4	3.0	3.0	3.8	6.7	4.3	4.5
4390	2004	2020	3.5	3.6	3.6	4.5	5.7	7.1	8.2	8.2	6.6	4.9	4.3	3.7	3.6	4.6	7.8	5.3	5.3

8 Atmospheric Air Pressure

Atmospheric air pressure is defined as the weight of a column of air, standing on 1cm^2 of a horizontal plane. The atmospheric pressure is always decreasing with increasing height above ground.

In the old days, atmospheric pressure was registered in millimeters - the height of a column of mercury in a barometer. 760mmHg represents the normal atmospheric pressure at the surface of the earth. The atmospheric pressure can also be registered in hectopascal (hPa or with an older name millibar (mb)) - the international unit for the registration of atmospheric pressure. 1hPa (100Pa = 100N/m^2) is the same as 1mb (=1/1000bar). 1013.25hPa represents the normal atmospheric pressure at the surface of the earth. In this report, hPa is used and the atmospheric pressure is reduced to the same reference: the mean sea level (MSL) assuming a standard atmosphere between the official level of the station and MSL.

The mean sea-level atmospheric pressure in Greenland calculated this way (see Table 27 and Table 28) is generally highest in April/May at all the observation sites. At this time of year, the weather in Greenland is at its most constant. In the summer, the variations in the atmospheric pressure are small, reflecting the fact that there is a balance between the occurrence of northerly and southerly winds and relatively stable wind conditions. Large variations can be seen during the winter, where the atmospheric pressure on average is higher in the north compared to the south, which generally leads to a higher frequency of cold northerly winds and higher wind speeds.

The maximum and minimum extremes in sea-level atmospheric pressure (Table 29 to Table 32) are found during winter because of the very high temperature differences in the atmosphere. The highest sea-level atmospheric pressure registered in Greenland is 1062.3hPa at Station Nord on 19 March 2013. The lowest is 936.2hPa on two occasions, Ikermiuarsuk on 14 December 1986 and Paamiut on 16 January 1988.

8.1 Mean Sea-Level Atmospheric Pressure

Table 27: Climatological standard normals 1991-2020, mean sea-level atmospheric pressure (hPa) (climate element 401).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4203	1005.9	1007.8	1014.0	1015.8	1016.5	1013.7	1011.0	1009.6	1008.9	1011.1	1008.1	1007.4	1007.0	1015.4	1011.4	1009.4	1010.8
4208	1004.6	1006.9	1013.8	1015.4	1016.4	1013.7	1011.2	1009.8	1008.2	1010.3	1006.6	1006.5	1006.0	1015.2	1011.6	1008.4	1010.3
4211	1004.2	1006.9	1012.8	1015.2	1016.2	1013.6	1011.5	1010.1	1008.0	1010.5	1006.8	1005.5	1005.5	1014.7	1011.7	1008.4	1010.1
4214	1002.1	1004.4	1011.4	1013.8	1015.6	1012.9	1010.6	1009.5	1007.2	1009.6	1005.3	1003.3	1003.3	1013.6	1011.0	1007.4	1008.8
4220	1001.8	1004.3	1010.5	1013.5	1014.8	1013.0	1011.2	1009.7	1007.1	1009.7	1005.5	1003.5	1003.2	1012.9	1011.3	1007.4	1008.7
4221	1002.3	1004.7	1010.7	1013.5	1014.5	1012.9	1011.1	1009.7	1007.3	1009.8	1005.8	1004.4	1003.8	1012.9	1011.2	1007.6	1008.9
4228	1001.3	1004.1	1010.4	1013.0	1014.8	1012.8	1010.8	1009.4	1006.3	1009.0	1005.0	1003.6	1003.0	1012.7	1011.0	1006.8	1008.4
4231	1002.8	1005.0	1010.7	1013.0	1014.0	1011.8	1010.5	1009.4	1007.3	1010.6	1006.9	1005.0	1004.3	1012.6	1010.6	1008.3	1008.9
4234	1000.5	1003.1	1009.0	1011.9	1013.9	1012.1	1010.5	1009.0	1006.4	1009.0	1004.9	1002.8	1002.1	1011.6	1010.5	1006.8	1007.8
4242	999.3	1001.3	1007.6	1011.3	1014.1	1012.7	1011.1	1009.6	1006.6	1008.8	1004.0	1002.1	1000.9	1011.0	1011.1	1006.5	1007.4
4250	998.4	1001.2	1006.7	1010.7	1013.8	1012.4	1010.7	1009.3	1006.2	1008.3	1003.7	1001.3	1000.3	1010.4	1010.8	1006.1	1006.9
4253	997.7	999.0	1006.3	1010.0	1013.0	1012.8	1011.1	1009.3	1006.2	1007.2	1003.6	1001.0	999.2	1009.8	1011.1	1005.7	1006.4
4260	998.0	1000.0	1006.4	1009.8	1013.5	1012.6	1011.2	1009.6	1006.3	1007.7	1003.5	1001.3	999.8	1009.9	1011.1	1005.8	1006.7
4266	997.1	998.7	1005.7	1009.1	1013.1	1013.1	1011.3	1009.5	1006.1	1006.8	1003.3	1000.4	998.7	1009.3	1011.3	1005.4	1006.2
4270	997.3	998.7	1004.7	1009.1	1012.6	1012.2	1010.6	1009.2	1006.0	1007.1	1003.3	1000.4	998.8	1008.8	1010.7	1005.5	1005.9
4272	997.0	998.4	1004.5	1009.0	1013.1	1012.5	1011.2	1009.1	1006.0	1006.8	1002.7	1000.6	998.7	1008.9	1010.9	1005.2	1005.9
4285	996.6	997.9	1004.3	1008.8	1013.3	1012.9	1011.1	1009.6	1006.2	1006.7	1002.6	999.3	997.9	1008.8	1011.2	1005.2	1005.8

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4312	1011.8	1013.4	1017.4	1019.5	1019.4	1013.8	1011.2	1010.3	1011.3	1015.7	1012.9	1012.5	1012.6	1018.8	1011.8	1013.3	1014.1
4320	1009.2	1011.7	1015.4	1018.7	1019.4	1015.1	1012.6	1011.5	1011.4	1015.2	1011.9	1010.9	1010.6	1017.8	1013.1	1012.8	1013.6
4330	1008.1	1010.0	1013.7	1017.4	1018.9	1014.6	1012.1	1010.9	1010.9	1014.5	1011.0	1010.2	1009.4	1016.7	1012.5	1012.1	1012.7
4339	1005.4	1008.0	1011.8	1016.4	1017.9	1015.4	1012.8	1011.0	1010.3	1012.9	1009.0	1008.5	1007.3	1015.4	1013.1	1010.7	1011.6
4351	1000.7	1002.2	1007.5	1014.2	1016.5	1015.3	1012.5	1010.1	1007.9	1009.6	1005.5	1003.4	1002.1	1012.7	1012.6	1007.7	1008.8
4360	999.1	1000.2	1005.3	1012.0	1015.1	1014.8	1012.2	1009.9	1007.3	1008.5	1003.7	1001.3	1000.2	1010.8	1012.3	1006.5	1007.4
4373	998.6	1000.5	1005.7	1011.4	1015.3	1014.2	1011.7	1010.1	1006.5	1008.0	1003.2	1000.6	999.9	1010.8	1012.0	1005.9	1007.2
4382	996.2	997.5	1003.6	1010.3	1013.9	1013.8	1012.0	1009.9	1005.5	1007.3	1002.2	999.1	997.6	1009.3	1011.9	1005.0	1005.9
4390	995.9	997.7	1003.9	1008.9	1013.6	1013.3	1011.2	1009.4	1005.8	1006.5	1002.5	999.4	997.7	1008.8	1011.3	1004.9	1005.7

Table 28: Averages, mean sea-level atmospheric pressure (hPa) (climate element 401).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	1006.0	1007.9	1014.9	1016.8	1016.4	1011.9	1010.0	1008.2	1010.1	1012.0	1007.1	1007.2	1007.0	1016.0	1010.0	1009.7	1010.7
4205	1995	2020	1006.8	1008.8	1014.1	1015.9	1015.9	1013.9	1011.0	1009.8	1008.3	1010.7	1009.0	1007.9	1007.8	1015.3	1011.6	1009.3	1011.0
4207	1991	2006	1010.6	1012.7	1017.7	1019.9	1018.3	1012.0	1009.1	1009.0	1012.4	1015.8	1012.5	1011.4	1011.6	1018.6	1010.0	1013.6	1013.4
4213	2000	2020	1002.9	1005.9	1011.0	1012.8	1014.6	1013.2	1011.1	1010.3	1006.6	1010.0	1006.3	1004.8	1004.5	1012.8	1011.5	1007.6	1009.1
4224	2000	2020	1001.4	1004.8	1009.8	1011.9	1014.3	1013.1	1010.8	1010.2	1006.0	1009.4	1005.6	1003.6	1003.3	1012.0	1011.4	1007.0	1008.4
4241	2001	2020	998.9	1001.4	1007.3	1010.0	1013.2	1013.0	1010.8	1009.7	1005.2	1008.1	1004.1	1001.7	1000.7	1010.2	1011.2	1005.8	1007.0
4254	2000	2020	998.7	1001.6	1007.1	1009.8	1013.3	1013.0	1011.1	1010.0	1005.3	1008.1	1004.6	1002.0	1000.8	1010.1	1011.4	1006.0	1007.1
4273	2004	2020	996.3	998.9	1004.0	1008.5	1012.5	1013.2	1011.1	1010.1	1004.7	1005.6	1003.6	999.3	998.2	1008.3	1011.5	1004.6	1005.7
4280	2009	2020	995.0	998.3	1003.2	1008.4	1011.9	1013.0	1010.9	1010.4	1004.1	1005.2	1001.5	999.3	997.5	1007.8	1011.4	1003.6	1005.1
4301	2010	2020	1012.9	1012.1	1015.8	1017.3	1019.7	1014.2	1012.1	1010.8	1009.9	1014.8	1011.7	1012.8	1012.6	1017.6	1012.4	1012.1	1013.7
4341	2002	2020	1006.1	1009.0	1011.7	1016.3	1018.0	1015.5	1012.7	1011.6	1009.0	1014.1	1011.0	1008.4	1007.8	1015.3	1013.3	1011.4	1012.0
4361	2000	2020	999.1	1001.5	1006.5	1010.8	1015.8	1015.6	1012.9	1011.3	1006.2	1007.9	1004.7	1002.5	1001.0	1011.0	1013.3	1006.3	1007.9

8.2 Highest Sea-Level Atmospheric Pressure

Table 29: Climatological standard normals 1991-2020, highest sea-level atmospheric pressure (hPa) (climate element 410).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4203	1043.5	1055.1	1049.8	1055.8	1046.4	1035.9	1031.3	1030.5	1040.6	1043.1	1042.8	1057.8	1057.8	1055.8	1035.9	1043.1	1057.8
4208	1046.3	1053.1	1051.3	1057.9	1044.9	1042.3	1031.5	1029.0	1032.6	1041.1	1040.5	1058.0	1058.0	1057.9	1042.3	1041.1	1058.0
4211	1046.5	1053.6	1051.2	1056.9	1044.2	1043.4	1031.4	1030.0	1031.9	1041.6	1040.7	1056.4	1056.4	1056.9	1043.4	1041.6	1056.9
4214	1042.0	1047.7	1050.0	1053.7	1044.2	1040.6	1030.3	1030.6	1030.0	1040.3	1038.1	1051.6	1051.6	1053.7	1040.6	1040.3	1053.7
4220	1043.1	1047.3	1050.2	1051.9	1044.6	1040.1	1030.3	1031.9	1031.8	1039.2	1038.4	1047.2	1047.3	1051.9	1040.1	1039.2	1051.9
4221	1043.2	1049.6	1050.2	1052.3	1045.3	1040.0	1029.9	1032.1	1030.3	1039.6	1038.8	1048.5	1049.6	1052.3	1040.0	1039.6	1052.3
4228	1042.6	1046.5	1049.5	1051.9	1044.5	1039.3	1029.5	1030.6	1027.6	1037.9	1039.6	1045.5	1046.5	1051.9	1039.3	1039.6	1051.9
4231	1044.9	1048.5	1048.7	1051.2	1043.3	1037.3	1029.8	1030.4	1030.5	1039.7	1039.6	1047.1	1048.5	1051.2	1037.3	1039.7	1051.2
4234	1042.7	1046.5	1047.9	1050.8	1043.9	1036.9	1029.6	1030.4	1030.4	1038.4	1039.4	1044.2	1046.5	1050.8	1036.9	1039.4	1050.8
4242	1042.7	1043.4	1045.2	1045.7	1044.2	1034.8	1029.5	1030.5	1031.0	1038.5	1038.3	1044.4	1044.4	1045.7	1034.8	1038.5	1045.7

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4250	1042.4	1043.9	1045.1	1044.0	1043.8	1033.7	1029.0	1030.1	1031.5	1039.3	1039.9	1042.7	1043.9	1045.1	1033.7	1039.9	1045.1
4253	1043.1	1038.6	1043.4	1041.0	1040.8	1033.3	1029.4	1028.4	1030.4	1039.3	1036.7	1044.1	1044.1	1043.4	1033.3	1039.3	1044.1
4260	1042.1	1039.0	1043.2	1040.1	1042.8	1031.3	1029.6	1028.4	1029.2	1039.3	1037.1	1043.3	1043.3	1043.2	1031.3	1039.3	1043.3
4266	1041.3	1037.9	1042.2	1045.6	1040.5	1031.8	1030.4	1028.6	1029.1	1040.3	1036.6	1043.1	1043.1	1045.6	1031.8	1040.3	1045.6
4270	1041.3	1040.7	1043.0	1040.6	1040.7	1031.5	1031.0	1031.1	1030.4	1042.9	1038.7	1044.4	1044.4	1043.0	1031.5	1042.9	1044.4
4272	1040.7	1040.6	1042.5	1040.2	1040.8	1031.6	1031.2	1030.9	1030.4	1042.8	1038.1	1043.7	1043.7	1042.5	1031.6	1042.8	1043.7
4285	1040.0	1040.0	1041.5	1039.6	1040.5	1038.2	1040.9	1030.5	1031.3	1042.7	1038.4	1043.0	1043.0	1041.5	1040.9	1042.7	1043.0
4312	1047.8	1052.5	1062.3	1050.3	1048.0	1035.4	1031.4	1031.3	1033.4	1048.5	1048.7	1057.5	1057.5	1062.3	1035.4	1048.7	1062.3
4320	1043.8	1049.1	1058.7	1051.8	1046.6	1036.0	1035.1	1032.1	1034.8	1045.9	1046.9	1053.8	1053.8	1058.7	1036.0	1046.9	1058.7
4330	1044.8	1046.6	1056.7	1049.9	1045.3	1036.1	1031.8	1032.7	1033.9	1044.3	1046.2	1051.0	1051.0	1056.7	1036.1	1046.2	1056.7
4339	1044.0	1049.5	1047.9	1049.1	1042.2	1036.3	1033.3	1033.6	1035.3	1046.2	1046.3	1047.1	1049.5	1049.1	1036.3	1046.3	1049.5
4351	1043.5	1052.1	1047.2	1046.9	1042.2	1036.5	1029.6	1031.5	1036.3	1044.9	1048.0	1045.4	1052.1	1047.2	1036.5	1048.0	1052.1
4360	1042.5	1047.5	1048.3	1047.5	1042.2	1036.3	1030.9	1033.2	1036.4	1042.6	1048.1	1049.1	1049.1	1048.3	1036.3	1048.1	1049.1
4373	1056.4	1046.6	1049.7	1047.6	1042.8	1035.1	1030.8	1033.0	1035.6	1042.4	1048.0	1049.5	1056.4	1049.7	1035.1	1048.0	1056.4
4382	1043.6	1045.9	1046.4	1046.1	1050.0	1037.2	1033.9	1033.3	1033.5	1041.3	1046.5	1050.9	1050.9	1050.0	1037.2	1046.5	1050.9
4390	1042.2	1034.8	1043.3	1043.6	1044.5	1032.7	1033.6	1032.5	1031.3	1041.7	1045.8	1048.3	1048.3	1044.5	1033.6	1045.8	1048.3

Table 30: Extreme values, highest sea-level atmospheric pressure (hPa) (climate element 410).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	1045.9	1055.8	1052.4	1050.9	1046.3	1037.8	1030.3	1030.3	1035.6	1043.8	1037.9	1050.5	1055.8	1052.4	1037.8	1043.8	1055.8
4205	1995	2020	1043.1	1056.6	1051.8	1056.4	1043.3	1036.8	1030.4	1030.7	1035.4	1043.8	1043.2	1057.0	1057.0	1056.4	1036.8	1043.8	1057.0
4207	1991	2006	1041.9	1050.4	1052.9	1044.5	1047.4	1037.6	1029.9	1031.0	1033.1	1043.5	1045.5	1042.7	1050.4	1052.9	1037.6	1045.5	1052.9
4213	2000	2020	1042.4	1040.9	1050.7	1054.5	1039.2	1035.2	1027.2	1030.8	1031.6	1040.3	1038.0	1053.8	1053.8	1054.5	1035.2	1040.3	1054.5
4224	2000	2020	1042.9	1040.0	1050.0	1051.7	1039.9	1032.6	1028.4	1031.5	1028.3	1038.8	1035.1	1047.4	1047.4	1051.7	1032.6	1038.8	1051.7
4241	2001	2020	1042.5	1038.5	1045.1	1045.8	1039.6	1031.2	1028.2	1030.2	1031.0	1037.6	1031.9	1043.8	1043.8	1045.8	1031.2	1037.6	1045.8
4254	2000	2020	1042.6	1038.5	1044.7	1043.9	1040.5	1031.9	1028.5	1029.7	1031.5	1038.9	1034.0	1043.9	1043.9	1044.7	1031.9	1038.9	1044.7
4273	2004	2020	1040.8	1039.9	1041.7	1034.7	1040.0	1031.6	1026.8	1030.9	1030.3	1042.2	1037.4	1043.8	1043.8	1041.7	1031.6	1042.2	1043.8
4280	2009	2020	1040.5	1040.7	1042.8	1034.1	1040.7	1032.3	1026.2	1030.9	1030.1	1042.4	1036.3	1034.3	1040.7	1042.8	1032.3	1042.4	1042.8
4301	2010	2020	1046.3	1044.5	1055.7	1046.5	1045.7	1030.8	1029.1	1031.8	1032.6	1044.1	1047.0	1058.3	1058.3	1055.7	1031.8	1047.0	1058.3
4341	2002	2020	1044.5	1047.9	1050.0	1045.5	1042.2	1033.7	1032.5	1032.3	1034.0	1046.8	1046.6	1048.7	1048.7	1050.0	1033.7	1046.8	1050.0
4361	2000	2020	1043.1	1047.7	1048.5	1043.5	1039.1	1035.5	1031.5	1033.4	1034.1	1042.7	1048.1	1049.4	1049.4	1048.5	1035.5	1048.1	1049.4

8.3 Lowest Sea-Level Atmospheric Pressure

Table 31: Climatological standard normals 1991-2020, lowest sea-level atmospheric pressure (hPa) (climate element 420).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4203	963.0	960.8	975.7	980.5	986.9	987.5	983.2	978.8	946.2	971.0	965.5	960.0	960.0	975.7	978.8	946.2	946.2
4208	958.0	958.6	972.8	971.6	989.5	988.4	985.7	982.7	976.7	975.9	960.5	960.5	958.0	971.6	982.7	960.5	958.0
4211	958.7	957.0	971.8	975.3	985.0	985.9	985.8	984.0	976.9	971.0	959.5	961.9	957.0	971.8	984.0	959.5	957.0

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	956.0	948.0	964.9	972.3	982.2	986.0	985.9	984.0	959.2	976.6	958.0	956.7	948.0	964.9	984.0	958.0	948.0
4220	953.4	943.9	962.3	970.6	982.1	985.3	985.7	984.1	973.2	975.6	958.3	955.3	943.9	962.3	984.1	958.3	943.9
4221	961.1	948.6	961.8	969.1	983.2	985.0	984.3	983.3	971.8	976.5	959.6	953.1	948.6	961.8	983.3	959.6	948.6
4228	953.7	945.5	968.9	972.1	980.9	984.0	985.0	983.0	975.6	974.6	956.4	956.5	945.5	968.9	983.0	956.4	945.5
4231	955.7	947.3	967.3	971.6	981.6	985.6	986.1	984.7	971.0	974.6	962.5	956.9	947.3	967.3	984.7	962.5	947.3
4234	952.2	946.1	969.2	970.6	980.1	984.2	985.4	981.9	973.2	974.1	959.6	954.9	946.1	969.2	981.9	959.6	946.1
4242	951.0	944.8	962.6	966.2	977.2	986.5	987.5	983.9	971.0	972.7	959.9	955.2	944.8	962.6	983.9	959.9	944.8
4250	951.2	947.9	962.1	964.2	983.4	985.7	987.6	982.0	972.2	970.4	957.1	955.9	947.9	962.1	982.0	957.1	947.9
4253	951.1	943.7	958.1	973.2	979.1	984.5	987.8	985.5	972.5	971.7	950.5	951.5	943.7	958.1	984.5	950.5	943.7
4260	952.2	948.9	957.7	973.1	980.3	984.9	986.8	986.0	971.9	972.5	948.9	953.8	948.9	957.7	984.9	948.9	948.9
4266	951.9	945.6	965.1	969.1	980.4	984.3	985.0	983.4	971.8	972.2	944.4	950.4	945.6	965.1	983.4	944.4	944.4
4270	952.9	940.3	947.7	971.1	979.7	982.8	984.4	980.7	972.3	967.4	944.0	951.2	940.3	947.7	980.7	944.0	940.3
4272	953.0	941.5	951.7	970.3	980.2	981.9	984.0	981.5	971.3	970.6	942.5	947.6	941.5	951.7	981.5	942.5	941.5
4285	952.3	939.3	956.5	970.3	977.2	979.6	982.4	980.1	965.8	968.0	946.5	946.2	939.3	956.5	979.6	946.5	939.3
4312	960.2	962.8	975.0	982.2	983.0	990.9	988.9	985.7	981.4	975.7	960.7	967.0	960.2	975.0	985.7	960.7	960.2
4320	955.6	960.6	966.1	978.4	978.6	990.2	991.1	985.7	970.9	972.0	963.2	957.9	955.6	966.1	985.7	963.2	955.6
4330	953.8	965.2	965.5	971.0	979.0	984.8	991.0	983.5	972.7	966.1	965.7	959.9	953.8	965.5	983.5	965.7	953.8
4339	947.8	951.5	948.4	975.1	979.0	984.4	990.1	982.3	974.1	971.7	958.9	945.3	945.3	948.4	982.3	958.9	945.3
4351	948.7	946.5	956.6	971.1	975.3	992.5	965.6	971.5	966.0	967.2	964.0	946.9	946.5	956.6	965.6	964.0	946.5
4360	949.5	946.8	947.5	969.1	975.6	984.4	986.5	970.2	966.9	965.4	957.5	938.6	938.6	947.5	970.2	957.5	938.6
4373	947.0	945.3	955.4	967.2	972.7	983.9	988.2	966.5	967.6	959.9	953.7	945.5	945.3	955.4	966.5	953.7	945.3
4382	950.1	934.4	944.4	969.6	980.7	980.8	986.7	971.5	963.0	965.8	945.2	941.7	934.4	944.4	971.5	945.2	934.4
4390	947.4	941.7	953.4	971.0	982.5	981.7	983.0	972.6	967.1	967.4	941.9	950.9	941.7	953.4	972.6	941.9	941.7

Table 32: Extreme values, lowest sea-level atmospheric pressure (hPa) (climate element 420).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	962.1	959.8	970.4	986.2	988.3	986.6	982.6	977.8	979.2	982.8	962.0	960.6	959.8	970.4	977.8	962.0	959.8
4205	1995	2020	963.0	965.0	973.8	980.4	987.5	987.5	985.0	983.3	980.7	969.7	964.8	962.5	962.5	973.8	983.3	964.8	962.5
4207	1991	2006	975.8	975.1	987.7	992.9	989.7	990.0	985.0	981.8	990.5	986.5	976.9	974.4	974.4	987.7	981.8	976.9	974.4
4213	2000	2020	964.0	956.6	965.1	972.0	982.8	984.7	985.8	984.9	977.2	978.3	957.0	959.4	956.6	965.1	984.7	957.0	956.6
4224	2000	2020	962.5	950.0	961.9	970.4	981.8	985.2	987.5	983.8	976.2	977.3	958.1	961.1	950.0	961.9	983.8	958.1	950.0
4241	2001	2020	959.8	951.4	962.6	966.4	977.2	986.9	985.7	984.8	974.6	978.4	960.1	961.8	951.4	962.6	984.8	960.1	951.4
4254	2000	2020	959.8	954.8	963.9	966.1	976.9	984.5	988.7	983.3	973.8	977.0	957.3	959.4	954.8	963.9	983.3	957.3	954.8
4273	2004	2020	956.4	956.1	962.2	970.5	981.6	987.3	987.3	980.9	978.5	976.2	952.2	949.8	949.8	962.2	980.9	952.2	949.8
4280	2009	2020	955.0	956.0	961.1	966.1	980.4	989.3	990.0	981.3	979.3	973.0	957.8	944.6	944.6	961.1	981.3	957.8	944.6
4301	2010	2020	976.7	974.6	977.3	981.1	993.8	993.6	987.8	987.6	984.8	987.1	967.9	974.7	974.6	977.3	987.6	967.9	967.9
4341	2002	2020	954.8	969.2	956.7	976.8	979.5	993.4	991.5	984.9	976.3	974.3	971.6	954.0	954.0	956.7	984.9	971.6	954.0
4361	2000	2020	949.4	943.0	952.3	973.1	975.8	984.1	986.6	977.8	966.9	965.2	961.0	947.9	943.0	952.3	977.8	961.0	943.0

9 Wind

The term “wind” generally means the movement of air. In meteorological terms, the “wind” is the actual horizontal movement over a certain period, normally 10 minutes. The wind direction is given as the mean direction from where the wind blows over the time period in question (i.e. 10 minutes). The wind speed is the speed with which the wind moves compared to the ground. Gust, on the other hand, is both negative and positive deviations from the mean wind speed over a short time period, normally a few seconds (the duration of the gust must not exceed 1 minute). Only the positive deviations are reported.

The wind direction and especially the wind speed normally change relatively fast at low elevations just above the ground, because of the braking and deflection of the air when moving over terrain (hills, vegetation, buildings, etc.). Because of this, an international agreement states that wind measurements must be carried out 10m over open and flat terrain.

In Greenland, the local conditions and especially the topography play a major role when dealing with wind direction and speed. Table 33 to Table 40 and the wind roses (in the attached files) show large differences from place to place, which partly reflect local conditions and partly reflect the large distances in the country. Especially at very remote stations, the wind instrument can be out of operation in shorter or longer periods because of ice cover or damages caused by strong winds.

In addition to the wind direction and speed, this report shows the number of days with strong breeze, strong gale, storm and violent storm all calculated from the wind speed.

It is characteristic for Greenland that there are many days with calm or nearly calm conditions (0-1.5m/s). In Tasiilaq at the east coast, it is calm approximately 45% of the time (see the wind roses). If light to fresh breezes (1.6-10.7m/s) are added, it is calm above 98% of the time in Tasiilaq. During calm situations, a pattern of locally determined winds (the katabatic wind pattern, land and sea breezes in the coastal areas etc.; see Section 4.8) can be seen. Those patterns are influenced by passing lows, which especially in the coastal areas give rise to strong winds, heavily influenced by the topography (see Figure 7). Especially the southernmost area of Greenland - with frequently passing lows - has a windy and stormy climate.

The gusts can be very strong in Greenland. In Danmarkshavn, the reading was 75.1m/s on 13 January 1995, but stronger gusts have certainly occurred in connection with the so-called piteraq situations. For more information about the event or other extreme events in Greenland see:
https://www.dmi.dk/vejrarkiv/vejrekstremer-groenland/

These fall winds from the ice cap appear in a number of places in the country and they are characterized by an abrupt transition from calm winds to storm. Piteraq means “that, which attacks you” in the local language. The term is especially used in East Greenland, where Tasiilaq from time to time is very badly affected.

Tasiilaq was almost blown into the sea on 6 February 1970. On the day before, a deep low was moving from Labrador to Baffin Island in Canada, followed by an extraordinary cold outbreak towards Western Greenland. A secondary and very intense cyclone development over the Denmark Strait “picked up” the cold air and moved it across the ice cap to the east coast, thus arriving the night before 6 February. In Tasiilaq, the night up to 5 February 1970 was clear and calm with temperatures around minus 18 °C. The following day it was snowing with rising temperatures and decreasing atmospheric pressure. After a short period in which the weather clear up in the evening, the town was “drowned” in an intense snowstorm the night to 6 February. This was the inception of the worst documented Piteraq ever in Greenland.

The wind anemometer in Tasiilaq was blown into pieces in the afternoon - the last readings being 54m/s (mean wind speed) with gusts reaching 72m/s. An estimation of the even more severe winds, later on, suggested that gusts were reaching 90m/s and in conditions where the temperature was around minus 20°C. Some of the inhabitants got frostbites, but all survived. The storm damages in Tasiilaq were very severe. A complete closure

of the city was considered after the event. For further information about the event see: https://www.dmi.dk/vejr-og-atmosfare/temaforside-vind/piteraq/

9.1 Mean Wind Speed

Table 33: Climatological standard normals 1991-2020, mean wind speed (m/s) (climate element 301).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	5.6	4.6	4.6	4.6	4.3	4.0	3.9	4.0	4.5	5.4	6.3	6.4	5.5	4.5	4.0	5.4	4.8
4220	4.7	4.0	3.8	3.6	3.3	3.1	2.9	3.0	3.7	4.3	4.8	5.1	4.6	3.6	3.0	4.3	3.9
4221	5.3	4.5	3.8	3.7	3.3	2.9	2.6	2.7	3.5	4.2	5.4	5.7	5.2	3.6	2.7	4.4	4.0
4228	6.5	5.9	6.1	6.2	5.7	5.5	5.1	5.2	5.9	6.5	6.9	7.1	6.5	6.0	5.3	6.4	6.0
4231	3.7	3.5	3.2	3.3	3.8	4.1	4.0	3.8	3.5	3.6	4.0	3.9	3.7	3.4	4.0	3.7	3.7
4234	4.0	3.2	3.3	3.3	3.3	3.4	3.1	3.1	3.3	3.3	3.8	4.1	3.8	3.3	3.2	3.5	3.4
4242	7.7	7.4	7.1	6.2	5.4	5.0	4.6	5.1	6.0	6.3	7.3	7.5	7.5	6.2	4.9	6.5	6.3
4250	7.1	6.9	6.9	6.2	5.3	5.0	4.9	5.1	5.7	6.0	6.7	6.8	6.9	6.1	5.0	6.1	6.0
4253	7.9	7.9	7.8	6.9	6.2	5.4	4.9	5.4	6.4	6.7	7.2	7.5	7.8	7.0	5.2	6.8	6.7
4266	11.6	11.7	11.5	10.0	8.5	7.3	7.0	8.1	9.3	10.2	10.8	11.3	11.5	10.0	7.5	10.1	9.8
4270	5.1	5.0	4.4	4.5	4.4	4.2	3.6	3.2	3.4	3.4	3.8	4.5	4.9	4.4	3.7	3.5	4.1
4285	9.4	9.3	8.7	7.4	6.7	5.7	5.6	6.4	7.1	7.4	8.5	8.8	9.2	7.6	5.9	7.7	7.6
4339	4.9	4.7	4.3	3.6	3.5	2.5	2.5	3.1	3.7	4.4	4.6	4.7	4.8	3.8	2.7	4.2	3.9

Table 34: Averages, mean wind speed (m/s) (climate element 301).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	4.1	4.0	3.9	3.3	3.3	3.3	3.5	3.4	3.5	4.4	4.5	4.2	4.1	3.5	3.4	4.1	3.8
4203	2011	2020	6.0	6.2	6.2	5.6	5.0	5.2	5.0	5.3	6.0	6.8	6.5	6.0	6.1	5.6	5.2	6.4	5.8
4205	1995	2020	1.8	1.8	1.7	1.8	2.1	2.4	2.7	3.0	3.5	3.7	3.3	2.2	1.9	1.9	2.7	3.5	2.5
4207	1991	1996	3.7	4.3	3.5	3.8	4.5	5.5	5.6	5.2	3.9	3.1	3.8	3.0	3.7	3.9	5.4	3.6	4.2
4208	1991	2015	5.1	4.9	4.9	5.3	5.4	5.6	5.3	5.6	6.3	7.3	7.4	6.7	5.6	5.2	5.5	7.0	5.8
4211	2005	2020	4.2	3.5	3.6	4.0	3.6	3.7	3.4	3.5	3.9	4.8	5.6	5.1	4.3	3.7	3.5	4.8	4.1
4213	2000	2020	5.2	4.5	3.6	3.9	4.1	4.2	4.4	4.4	4.5	5.1	5.9	5.8	5.2	3.9	4.3	5.2	4.6
4224	2000	2020	5.3	4.9	4.6	4.3	3.6	3.4	3.2	3.1	4.0	4.6	5.3	5.5	5.2	4.2	3.2	4.6	4.3
4241	2001	2020	5.5	5.2	5.0	4.8	4.4	4.4	4.2	4.2	5.0	4.7	5.5	5.5	5.4	4.7	4.3	5.1	4.9
4254	2000	2020	5.8	5.8	5.8	5.4	4.8	4.5	4.3	4.3	5.1	5.1	6.1	5.8	5.8	5.3	4.4	5.4	5.2
4260	2008	2020	5.1	5.5	5.3	5.2	4.6	3.9	3.5	3.7	4.9	4.7	5.0	4.9	5.2	5.0	3.7	4.9	4.7
4272	1991	2013	5.8	6.4	4.8	4.4	3.7	3.5	3.1	3.1	3.8	3.9	4.8	5.3	5.8	4.3	3.2	4.2	4.4
4273	2004	2020	3.5	4.0	3.4	2.9	2.9	2.7	2.5	2.4	2.7	2.7	3.1	3.3	3.6	3.1	2.5	2.8	3.0
4280	2009	2020	4.0	3.9	3.4	3.3	2.9	2.5	2.2	2.0	2.4	2.5	3.3	3.5	3.8	3.2	2.2	2.7	3.0
4320	2001	2020	5.2	5.2	4.5	3.8	3.5	3.2	3.2	3.3	4.2	4.8	5.3	5.5	5.3	3.9	3.2	4.8	4.3
4330	2010	2020	6.2	5.1	4.4	3.9	3.9	3.3	4.0	4.2	5.1	5.3	5.2	4.9	5.4	4.1	3.8	5.2	4.6
4341	2006	2020	6.0	5.0	4.3	4.0	4.0	3.6	4.3	4.2	4.5	4.6	4.6	5.5	5.5	4.1	4.0	4.6	4.6
4351	2010	2020	5.6	4.9	4.9	4.3	3.5	2.6	2.3	2.7	3.7	4.7	5.1	5.0	5.2	4.2	2.5	4.5	4.1
4360	1991	2018	2.9	3.3	2.9	2.2	1.8	1.9	1.7	1.7	2.1	2.3	3.0	2.8	3.0	2.3	1.8	2.5	2.4

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4361	2006	2020	6.9	6.7	6.1	5.9	4.5	3.9	3.3	3.4	4.5	4.8	5.8	5.7	6.4	5.5	3.5	5.0	5.1
4373	2010	2020	10.9	10.3	9.6	7.6	4.9	3.4	3.0	3.9	6.7	8.3	10.4	10.8	10.7	7.4	3.4	8.5	7.5
4390	1993	2020	8.6	8.8	8.4	7.4	6.3	5.6	4.6	4.4	5.6	6.1	6.9	7.8	8.4	7.4	4.9	6.2	6.7

9.2 Highest Wind Speed (10-minutes average)

Table 35: Climatological standard normals 1991-2020, Highest wind speed (10-minutes averages) (m/s) (climate element 302).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	27.8	34.0	27.8	22.1	23.7	19.6	29.4	23.2	23.7	27.3	28.8	27.8	34.0	27.8	29.4	28.8	34.0
4220	26.3	25.2	22.1	24.2	22.1	22.1	21.1	19.4	22.1	23.4	28.3	24.7	26.3	24.2	22.1	28.3	28.3
4221	23.5	24.5	24.2	18.5	19.5	16.0	17.5	16.5	20.1	38.6	20.6	22.3	24.5	24.2	17.5	38.6	38.6
4228	31.9	32.9	28.3	27.8	27.3	25.2	22.7	24.7	29.9	27.8	32.9	27.3	32.9	28.3	25.2	32.9	32.9
4231	18.0	18.0	16.0	17.2	16.8	13.9	14.9	16.0	15.1	17.0	19.6	18.0	18.0	17.2	16.0	19.6	19.6
4234	24.8	25.3	23.1	20.6	25.2	20.6	16.9	19.0	20.6	21.6	24.8	23.7	25.3	25.2	20.6	24.8	25.3
4242	26.8	26.8	26.8	24.7	23.7	23.7	19.6	22.7	23.7	25.2	27.8	27.3	27.3	26.8	23.7	27.8	27.8
4250	33.5	30.9	29.7	30.9	27.0	30.4	26.8	26.4	30.9	29.8	32.0	27.3	33.5	30.9	30.4	32.0	33.5
4253	29.3	30.9	31.9	27.8	31.4	27.3	27.8	23.7	26.8	29.9	35.0	28.3	30.9	31.9	27.8	35.0	35.0
4266	35.5	34.5	31.4	29.9	34.0	34.5	24.7	30.4	32.9	34.0	35.5	35.5	35.5	34.0	34.5	35.5	35.5
4270	32.9	32.4	41.7	31.4	26.8	29.9	23.2	24.7	31.3	28.6	34.5	31.7	32.9	41.7	29.9	34.5	41.7
4285	34.0	36.6	34.5	27.8	28.8	23.2	27.3	28.8	31.4	32.4	33.5	34.5	36.6	34.5	28.8	33.5	36.6
4339	35.1	38.1	34.0	28.3	36.0	29.9	25.1	25.9	34.5	33.7	32.4	35.7	38.1	36.0	29.9	34.5	38.1

Table 36: Extreme values, Highest wind speed (10-minutes averages) (m/s) (climate element 302).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	24.2	36.0	30.9	27.3	23.7	25.7	22.7	21.6	18.6	22.7	28.3	28.3	36.0	30.9	25.7	28.3	36.0
4203	2011	2020	24.2	24.7	20.6	23.7	19.0	20.1	20.6	21.6	25.2	21.6	28.8	25.7	25.7	23.7	21.6	28.8	28.8
4205	1995	2020	22.1	30.9	25.8	23.2	21.5	27.8	19.6	24.1	27.7	28.3	31.9	34.9	34.9	25.8	27.8	31.9	34.9
4207	1991	1996	21.6	22.1	18.1	16.0	19.5	16.5	15.5	17.0	20.6	16.0	20.6	15.5	22.1	19.5	17.0	20.6	22.1
4208	1991	2015	28.8	34.0	27.3	31.5	30.9	37.1	22.1	24.8	25.2	28.8	29.3	31.9	34.0	31.5	37.1	29.3	37.1
4211	2005	2020	29.9	32.5	29.6	33.0	35.0	31.7	26.7	28.5	28.6	29.8	34.5	36.2	36.2	35.0	31.7	34.5	36.2
4213	2000	2020	21.3	24.2	22.7	21.1	20.5	17.4	21.2	18.7	20.1	20.5	22.2	22.2	24.2	22.7	21.2	22.2	24.2
4224	2000	2020	19.5	22.3	18.7	20.5	21.0	16.5	17.5	15.4	17.1	19.0	21.1	21.6	22.3	21.0	17.5	21.1	22.3
4241	2001	2020	31.0	25.7	29.9	26.7	26.2	20.2	20.7	21.6	25.0	28.3	27.5	32.0	32.0	29.9	21.6	28.3	32.0
4254	2000	2020	31.6	30.4	35.0	27.5	30.1	28.1	26.1	27.8	29.9	28.5	30.8	27.5	31.6	35.0	28.1	30.8	35.0
4260	2008	2020	22.1	23.4	23.0	21.1	18.0	15.4	15.1	17.3	27.1	20.1	24.7	22.4	23.4	23.0	17.3	27.1	27.1
4272	1991	2013	41.2	43.8	36.1	33.5	28.3	30.9	25.7	25.5	36.0	33.7	34.9	36.1	43.8	36.1	30.9	36.0	43.8
4273	2004	2020	21.3	21.5	18.0	19.0	19.2	16.5	15.1	15.9	16.5	20.2	19.7	22.9	22.9	19.2	16.5	20.2	22.9
4280	2009	2020	28.2	30.0	26.7	28.2	19.9	20.2	18.9	21.2	33.8	27.6	28.8	40.2	40.2	28.2	21.2	33.8	40.2
4320	2001	2020	35.2	33.8	37.6	31.4	22.8	19.6	18.5	22.1	21.9	29.0	29.4	33.5	35.2	37.6	22.1	29.4	37.6

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4330	2010	2020	35.0	27.8	28.3	25.2	22.1	28.8	20.1	20.6	23.7	28.3	28.8	26.8	35.0	28.3	28.8	28.8	35.0
4341	2006	2020	27.3	26.5	23.1	24.2	22.5	18.7	17.1	20.2	23.9	23.5	24.8	31.7	31.7	24.2	20.2	24.8	31.7
4351	2010	2020	26.3	31.4	33.5	25.2	24.7	20.6	17.0	22.1	25.2	26.3	28.3	26.3	31.4	33.5	22.1	28.3	33.5
4360	1991	2018	29.4	49.9	51.0	26.3	22.8	16.5	21.6	22.1	26.3	30.9	32.4	30.9	49.9	51.0	22.1	32.4	51.0
4361	2006	2020	28.3	32.2	40.4	29.1	23.7	23.4	23.3	24.1	25.9	27.5	30.4	37.2	37.2	40.4	24.1	30.4	40.4
4373	2010	2020	42.2	38.6	38.6	36.0	36.0	27.8	23.2	33.5	34.0	35.5	43.8	43.2	43.2	38.6	33.5	43.8	43.8
4390	1993	2020	33.0	34.2	37.6	31.9	31.9	36.0	44.3	24.2	27.8	32.7	29.1	31.4	34.2	37.6	44.3	32.7	44.3

9.3 Highest Wind Gust (3-seconds average)

Table 37: Extreme values, Highest wind gust (3-seconds averages) (m/s) (climate element 305).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4203	2014	2020	29.3	32.4	27.8	31.4	25.7	26.8	29.9	31.9	33.5	32.4	35.5	38.1	38.1	31.4	31.9	35.5	38.1
4205	2014	2020	30.9	51.0	40.2	41.7	31.8	37.6	24.2	35.5	42.2	31.9	32.9	50.5	51.0	41.7	37.6	42.2	51.0
4208	2014	2020	30.4	42.2	30.4	36.6	31.9	36.6	24.7	28.8	24.2	33.5	37.1	29.3	42.2	36.6	36.6	37.1	42.2
4211	2014	2020	29.2	47.3	30.8	45.5	27.0	30.0	32.4	42.3	39.1	37.3	51.5	33.8	47.3	45.5	42.3	51.5	51.5
4213	2014	2020	26.8	35.6	24.5	29.9	25.5	23.1	25.8	27.0	23.6	26.6	30.0	27.2	35.6	29.9	27.0	30.0	35.6
4214	2014	2020	36.0	32.4	25.7	31.4	24.7	22.1	21.1	27.8	29.9	29.9	38.6	34.0	36.0	31.4	27.8	38.6	38.6
4220	2014	2020	27.8	29.4	27.1	32.5	24.4	18.7	24.0	25.4	23.9	29.1	32.4	30.1	30.1	32.5	25.4	32.4	32.5
4221	2014	2020	32.1	23.8	24.4	25.0	19.4	19.8	16.6	17.8	20.2	22.1	24.8	30.3	32.1	25.0	19.8	24.8	32.1
4224	2014	2020	28.8	30.4	25.2	32.4	24.7	20.1	23.2	24.2	23.2	28.3	31.4	29.9	30.4	32.4	24.2	31.4	32.4
4228	2014	2020	35.5	26.8	25.7	31.9	31.9	31.4	26.8	29.9	35.5	36.6	37.1	32.9	35.5	31.9	31.4	37.1	37.1
4231	2014	2020	26.4	23.5	21.8	24.6	22.0	20.7	16.6	23.0	19.7	21.9	23.8	25.2	26.4	24.6	23.0	23.8	26.4
4234	2014	2020	28.7	26.7	25.9	28.3	21.9	24.8	18.9	21.8	23.2	24.7	27.0	25.8	28.7	28.3	24.8	27.0	28.7
4241	2014	2020	27.6	32.5	31.9	34.3	34.1	28.3	19.2	24.2	33.3	29.7	36.3	35.6	35.6	34.3	28.3	36.3	36.3
4242	2014	2020	27.8	30.9	32.4	32.9	27.3	21.1	24.7	26.3	30.4	31.9	36.6	34.5	34.5	32.9	26.3	36.6	36.6
4250	2014	2020	35.0	34.7	34.6	36.6	32.2	35.1	28.4	35.7	36.3	35.4	44.9	37.6	37.6	36.6	35.7	44.9	44.9
4253	2014	2020	33.5	30.9	31.4	38.1	31.4	32.4	24.7	25.7	36.0	34.5	44.3	36.0	36.0	38.1	32.4	44.3	44.3
4254	2014	2020	35.7	39.4	37.5	39.6	36.4	38.8	33.2	31.0	37.1	39.5	46.0	41.0	41.0	39.6	38.8	46.0	46.0
4260	2014	2020	34.0	25.5	27.7	27.4	25.3	21.9	21.0	22.4	30.4	32.9	36.3	27.2	34.0	27.7	22.4	36.3	36.3
4266	2014	2020	51.5	45.3	43.2	38.6	50.5	34.0	35.0	34.5	44.3	42.2	44.8	47.9	51.5	50.5	35.0	44.8	51.5
4270	2014	2020	38.7	39.5	41.0	47.1	31.4	32.2	25.6	25.5	33.9	38.4	41.4	39.6	39.6	47.1	32.2	41.4	47.1
4271	2014	2020	42.1	39.1	42.7	40.9	34.6	32.4	27.2	28.0	35.6	36.9	43.6	35.0	42.1	42.7	32.4	43.6	43.6
4273	2014	2020	32.5	29.3	26.7	32.2	25.6	26.0	18.4	23.3	21.9	28.5	30.4	30.6	32.5	32.2	26.0	30.4	32.5
4280	2014	2020	39.0	39.9	36.2	43.0	30.3	34.3	28.7	28.7	34.2	42.9	43.6	44.2	44.2	43.0	34.3	43.6	44.2
4285	2014	2020	43.2	45.3	37.6	36.6	36.6	27.3	28.8	30.9	34.0	48.9	43.8	41.7	45.3	37.6	30.9	48.9	48.9
4320	2014	2020	44.0	34.5	38.2	27.7	30.5	22.5	25.6	29.3	24.1	41.4	37.8	35.3	44.0	38.2	29.3	41.4	44.0
4330	2014	2020	42.2	38.6	32.4	31.9	25.7	39.1	27.8	29.9	34.0	37.6	35.0	34.5	42.2	32.4	39.1	37.6	42.2
4339	2014	2020	49.6	41.1	42.5	40.5	39.4	27.8	37.0	36.2	48.6	43.0	48.4	48.3	49.6	42.5	37.0	48.6	49.6
4341	2014	2020	35.7	44.5	38.0	30.3	27.4	21.2	23.7	25.0	30.3	31.2	29.8	41.2	44.5	38.0	25.0	31.2	44.5
4351	2014	2020	29.9	39.6	43.2	29.9	35.0	25.7	24.7	21.6	33.5	37.6	40.2	32.9	39.6	43.2	25.7	40.2	43.2

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4360	2014	2020	34.5	37.6	41.3	49.3	28.1	23.7	22.0	25.7	36.3	31.4	54.8	35.3	37.6	49.3	25.7	54.8	54.8
4361	2014	2020	44.4	56.1	55.4	51.5	39.8	36.8	32.6	40.2	41.4	41.5	53.2	50.0	56.1	55.4	40.2	53.2	56.1
4373	2014	2020	57.7	52.0	46.3	46.3	40.2	30.9	26.8	43.8	41.2	45.8	53.5	56.1	57.7	46.3	43.8	53.5	57.7
4390	2014	2020	48.2	48.2	44.7	46.6	45.9	40.2	34.1	35.9	37.7	36.0	42.3	45.4	48.2	46.6	40.2	42.3	48.2

9.4 Mean Wind Direction

Table 38: Climatological standard normals 1991-2020, mean wind direction (degrees) (climate element 371).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	30	16	10	358	338	335	3	40	49	69	73	55	34	355	6	64	25
4220	129	151	138	131	351	304	314	333	43	102	118	133	138	108	317	89	96
4221	110	118	121	108	3	311	317	339	74	107	110	109	112	85	322	97	80
4228	16	7	358	5	351	316	298	325	6	53	66	37	20	358	313	42	3
4231	57	56	61	66	74	91	60	56	60	56	56	57	57	67	69	57	62
4234	70	60	58	44	278	241	238	241	16	85	85	74	68	22	240	63	54
4242	52	40	35	26	316	256	247	250	49	68	66	61	51	7	251	61	27
4250	40	31	18	13	347	248	235	238	81	58	62	59	43	6	240	67	27
4253	53	43	27	4	311	269	268	264	298	55	69	66	54	355	267	32	0
4266	357	349	345	347	338	316	291	325	344	358	355	358	355	343	311	352	341
4270	83	82	81	191	223	247	293	12	76	74	81	79	81	176	301	77	83
4285	339	332	318	294	272	265	269	266	276	312	325	331	334	295	267	305	300
4339	45	46	45	57	96	166	176	92	43	33	33	37	43	66	147	36	64

Table 39: Averages, mean wind direction (degrees) (climate element 371).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	109	108	108	116	195	262	260	236	126	117	112	110	109	137	253	118	140
4203	2011	2020	288	274	261	220	306	170	172	204	357	346	289	293	285	262	182	332	269
4205	1995	2020	54	64	81	131	223	229	220	198	60	47	48	47	55	139	216	52	91
4207	1991	1996	114	99	157	120	100	308	298	285	149	136	139	151	121	125	297	141	136
4208	1991	2015	4	23	30	32	14	344	354	75	81	97	60	11	13	25	15	79	33
4211	2005	2020	35	44	41	36	16	1	10	45	77	92	85	54	44	31	18	85	44
4213	2000	2020	178	177	187	181	17	15	46	92	151	165	169	174	176	172	51	162	148
4224	2000	2020	126	140	144	145	335	295	317	342	57	102	116	127	131	134	318	92	100
4241	2001	2020	52	39	37	42	249	227	222	226	37	65	63	60	50	16	225	55	48
4254	2000	2020	70	60	40	49	98	231	226	229	94	78	86	84	71	62	229	86	86
4260	2008	2020	51	35	19	348	294	281	264	275	297	31	64	65	50	341	273	17	351
4272	1991	2013	346	338	333	303	224	223	224	217	245	337	336	339	341	290	221	310	292
4273	2004	2020	10	13	4	286	242	231	237	238	274	14	16	8	10	294	235	347	314
4280	2009	2020	72	61	50	330	292	280	291	298	308	7	65	70	68	341	290	7	356

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4320	2001	2020	315	316	312	307	323	202	199	232	318	318	314	315	315	314	211	317	297
4330	2010	2020	3	356	357	360	60	135	121	85	23	3	355	357	359	18	114	7	27
4341	2008	2020	342	346	349	357	41	118	128	88	342	332	338	340	343	9	111	337	8
4351	2010	2020	14	11	13	5	359	323	314	325	349	355	1	1	9	6	321	355	353
4360	1991	2018	303	303	280	243	190	150	134	135	186	297	299	306	304	238	140	268	247
4361	2006	2020	92	107	106	100	84	318	287	278	88	113	85	119	106	97	294	95	92
4373	2010	2020	328	331	325	331	329	331	321	316	318	321	321	322	327	328	323	320	325
4390	1993	2020	311	306	312	338	1	13	16	3	333	324	302	309	309	337	11	320	334

Table 40: Wind direction names with corresponding wind direction in degrees. Wind directions have been divided into 12 sectors. The sign "~" indicates that the degrees e.g. "~30" more or less correspond to the name of the wind direction NNE.

Wind direction	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
Degrees	0/360	~30	~60	90	~120	~150	180	~210	~240	270	~300	~330

9.5 Wind Roses

The wind roses included in this report show the distribution of wind direction and wind speed. The wind direction is divided into 12 sectors, each 30 degrees. Furthermore, the wind speed is divided into sub groups. The distribution in percent can also be seen in the frequency table just below the wind roses.

Please note that calm situations are defined as wind speeds below or equal to 1.5m/s. Calm wind situations are not included in the wind roses. This means that the calculation of the total mean wind speed in the frequency table below the wind rose could be higher compared to a mean wind speed calculated in the conventional manner, as this takes all wind speeds (also calm) into account.

9.6 Number of Days with Strong Breeze (wind speed ≥ 10.8m/s)

Table 41: Climatological standard normals 1991-2020, number of days with strong breeze (wind speed ≥ 10.8m/s) (days) (climate element 311).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	11.6	8.1	7.9	7.3	5.1	4.5	4.9	5.3	7.2	10.2	13.9	14.6	34.3	20.3	14.7	31.3	100.6
4220	7.1	5.0	4.2	3.1	2.2	1.6	1.3	1.6	3.2	4.7	7.1	7.3	19.4	9.5	4.5	15.0	48.4
4221	11.1	7.2	6.5	4.7	2.8	2.1	1.7	2.3	4.5	6.5	11.0	11.9	30.2	14.0	6.1	22.0	72.3
4228	13.6	9.0	9.2	8.8	6.1	5.6	4.5	5.9	8.6	12.3	14.6	15.8	38.4	24.1	16.0	35.5	114.0
4231	1.6	1.4	1.3	1.1	0.9	1.0	0.4	0.2	0.5	1.1	1.3	1.8	4.8	3.3	1.6	2.9	12.6
4234	6.7	4.3	4.5	3.4	3.1	3.4	3.1	2.6	3.0	3.9	5.9	7.0	18.0	11.0	9.1	12.8	50.9
4242	16.2	13.0	13.6	10.2	6.8	5.0	4.3	6.1	9.8	10.1	13.3	15.0	44.2	30.6	15.4	33.2	123.4
4250	15.1	13.2	13.8	10.6	8.0	7.5	6.7	7.9	10.0	11.6	13.3	14.7	43.0	32.4	22.1	34.9	132.4
4253	18.0	17.1	18.0	14.6	11.4	7.7	6.1	8.8	13.0	14.4	16.3	17.2	52.3	44.0	22.6	43.7	162.6
4266	26.0	23.6	24.3	21.5	18.5	13.3	12.7	17.3	20.2	22.5	24.0	25.5	75.1	64.3	43.3	66.7	249.4
4270	11.1	9.8	9.8	7.5	6.7	5.0	3.8	3.4	5.3	6.3	7.5	9.7	30.6	24.0	12.2	19.1	85.9
4285	22.5	19.8	19.8	15.8	13.7	10.4	11.4	13.9	16.3	16.4	18.9	20.5	62.8	49.3	35.7	51.6	199.4

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4339	12.5	10.9	11.3	8.8	6.4	3.8	4.4	5.7	6.8	8.9	9.8	12.6	36.0	26.5	13.9	25.5	101.9

Table 42: Averages, number of days with strong breeze (wind speed ≥ 10.8m/s) (days) (climate element 311).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	2.7	3.7	2.9	2.5	3.0	2.7	4.1	3.5	2.6	4.2	3.5	4.0	10.4	8.4	10.3	10.3	39.4
4203	2011	2020	13.3	12.0	13.8	10.0	7.1	9.2	8.8	9.3	11.9	15.1	14.3	13.8	39.1	30.9	27.3	41.3	138.6
4205	1995	2020	2.2	2.3	1.3	1.6	1.5	1.6	2.2	2.6	3.8	5.7	5.2	3.7	8.2	4.4	6.4	14.7	33.7
4207	1991	1996	4.2	4.3	3.0	2.3	2.8	5.2	4.7	5.7	4.5	1.3	3.3	2.7	11.2	8.1	15.6	9.1	44.0
4208	1991	2015	7.2	5.6	6.0	5.5	6.9	6.6	5.4	7.2	9.5	14.2	15.3	12.8	25.6	18.4	19.2	39.0	102.2
4211	2005	2020	5.4	4.2	3.7	5.4	4.1	4.5	4.4	4.7	3.9	7.1	8.1	6.3	15.9	13.2	13.6	19.1	61.8
4213	2000	2020	10.4	8.4	6.5	7.4	5.2	6.0	6.9	6.7	6.2	9.3	11.9	11.7	30.5	19.1	19.6	27.4	96.6
4224	2000	2020	8.7	7.0	5.6	4.5	2.2	0.8	0.9	1.1	3.5	5.6	8.9	9.3	25.0	12.3	2.8	18.0	58.1
4241	2001	2020	9.8	8.0	8.7	7.5	5.6	6.1	5.7	5.0	8.8	7.5	9.8	9.5	27.3	21.8	16.8	26.1	92.0
4254	2000	2020	9.4	9.1	8.1	7.4	6.8	6.9	5.3	6.0	8.3	7.9	10.9	10.3	28.8	22.3	18.2	27.1	96.4
4260	2008	2020	10.4	11.7	10.4	9.9	5.0	2.2	1.5	2.7	7.4	8.0	10.1	11.1	33.2	25.3	6.4	25.5	90.4
4272	1991	2013	12.7	13.1	10.3	8.8	5.8	3.8	3.0	3.6	6.2	7.4	9.4	11.2	37.0	24.9	10.4	23.0	95.3
4273	2004	2020	6.1	6.7	5.9	3.5	2.3	0.9	0.6	1.0	1.9	3.0	3.9	5.6	18.4	11.7	2.5	8.8	41.4
4280	2009	2020	11.1	9.9	9.5	6.4	4.3	2.2	1.1	1.3	4.2	4.5	7.7	9.2	30.2	20.2	4.6	16.4	71.4
4320	2001	2020	13.4	11.5	9.8	7.4	5.0	2.6	2.0	4.1	6.4	10.4	12.0	12.3	37.2	22.2	8.7	28.8	96.9
4330	2010	2020	14.2	10.7	9.4	7.9	6.0	2.5	4.6	5.8	9.5	9.7	10.7	11.3	36.2	23.3	12.9	29.9	102.3
4341	2006	2020	12.9	9.1	9.4	7.5	5.1	2.5	4.1	4.3	7.0	7.8	9.6	11.2	33.2	22.0	10.9	24.4	90.5
4351	2010	2020	13.2	11.3	10.6	9.2	5.2	2.4	1.9	3.0	6.2	8.6	10.6	11.2	35.7	25.0	7.3	25.4	93.4
4360	1991	2018	4.6	5.2	4.5	2.2	1.0	0.6	0.5	0.4	1.9	2.5	4.2	4.3	14.1	7.7	1.5	8.6	31.9
4361	2006	2020	15.4	15.0	14.7	13.2	8.0	4.9	3.1	3.3	8.0	9.3	12.5	12.8	43.2	35.9	11.3	29.8	120.2
4373	2010	2020	26.5	22.8	22.3	19.3	10.3	5.2	5.5	7.0	16.7	20.3	22.4	24.7	74.0	51.9	17.7	59.4	203.0
4390	1993	2020	22.1	18.8	20.7	17.5	14.0	11.1	8.4	7.8	13.0	15.0	17.0	18.8	59.7	52.2	27.3	45.0	184.2

9.7 Number of Days with Strong Gale (wind speed ≥ 20.8m/s)

Table 43: Climatological standard normals 1991-2020, number of days with strong gale (wind speed ≥ 20.8m/s) (days) (climate element 321).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.3	0.7	0.6	1.2	0.4	0.1	1.2	2.9
4220	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.5	0.3	0.0	0.3	1.1
4221	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.3
4228	0.4	0.5	0.3	0.4	0.1	0.1	0.2	0.2	0.4	0.8	0.5	0.5	1.4	0.8	0.5	1.7	4.4
4231	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4234	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.6	0.2	0.0	0.1	0.9
4242	0.8	0.6	0.5	0.1	0.1	0.1	0.0	0.1	0.2	0.5	0.6	0.6	2.0	0.7	0.2	1.3	4.2
4250	1.2	1.2	1.1	0.8	0.8	0.6	0.4	0.6	1.1	1.1	1.6	1.3	3.7	2.7	1.6	3.8	11.8

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4253	2.3	1.8	1.9	0.7	0.5	0.3	0.1	0.1	0.8	1.0	1.7	1.4	5.5	3.1	0.5	3.5	12.6
4266	7.9	7.4	7.6	4.2	2.6	1.3	0.7	1.2	3.9	5.5	6.2	7.4	22.7	14.4	3.2	15.6	55.9
4270	2.5	2.4	1.8	1.4	0.7	0.6	0.1	0.2	0.5	1.1	1.6	2.1	7.0	3.9	0.9	3.2	15.0
4285	4.1	4.8	3.5	1.9	0.7	0.2	0.1	0.5	1.3	2.1	3.6	4.6	13.5	6.1	0.8	7.0	27.4
4339	2.9	2.8	2.1	0.9	1.0	0.2	0.3	0.5	0.8	1.2	1.5	2.6	8.3	4.0	1.0	3.5	16.8

Table 44: Averages, number of days with strong gale (wind speed ≥ 20.8m/s) (days) (climate element 321).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.9	0.3	0.3	0.2	1.7
4203	2011	2020	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.2	0.3	0.2	0.9	0.3	1.0	0.1	0.2	1.4	2.7
4205	1995	2020	0.0	0.3	0.2	0.2	0.1	0.2	0.0	0.1	0.2	0.4	0.4	0.3	0.6	0.5	0.3	1.0	2.4
4207	1991	1996	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4
4208	1991	2015	0.5	0.5	0.1	0.2	0.2	0.4	0.0	0.3	0.4	0.6	0.9	0.8	1.8	0.5	0.7	1.9	4.9
4211	2005	2020	0.6	0.6	0.4	0.6	0.1	0.3	0.4	0.4	0.4	0.6	1.3	0.8	2.0	1.1	1.1	2.3	6.5
4213	2000	2020	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.5	0.2	0.1	0.1	0.9
4224	2000	2020	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.3
4241	2001	2020	0.6	0.8	0.7	0.3	0.2	0.0	0.0	0.1	0.4	0.5	0.9	0.5	1.9	1.2	0.1	1.8	5.0
4254	2000	2020	1.0	0.7	1.2	1.4	1.2	1.1	0.9	0.6	1.9	1.5	1.8	1.4	3.1	3.8	2.6	5.2	14.7
4260	2008	2020	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.5	0.2	0.6	0.3	0.0	0.7	1.6
4272	1991	2013	2.8	3.4	1.6	1.3	0.6	0.5	0.1	0.2	0.6	1.2	1.7	2.0	8.2	3.5	0.8	3.5	16.0
4273	2004	2020	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.3
4280	2009	2020	1.6	1.8	1.3	0.7	0.0	0.0	0.0	0.1	0.4	0.9	1.5	1.4	4.8	2.0	0.1	2.8	9.7
4320	2001	2020	1.8	1.9	1.4	0.7	0.1	0.0	0.0	0.1	0.1	0.7	1.0	2.1	5.8	2.2	0.1	1.8	9.9
4330	2010	2020	3.2	1.4	1.5	0.9	0.2	0.2	0.0	0.0	0.5	0.6	1.5	2.0	6.6	2.6	0.2	2.6	12.0
4341	2006	2020	1.9	1.0	0.6	0.1	0.2	0.0	0.0	0.0	0.1	0.3	0.3	1.6	4.5	0.9	0.0	0.7	6.1
4351	2010	2020	1.0	1.4	1.6	0.8	0.2	0.0	0.0	0.1	0.4	0.7	1.2	1.0	3.4	2.6	0.1	2.3	8.4
4360	1991	2018	0.3	0.6	0.5	0.1	0.0	0.0	0.1	0.0	0.2	0.3	0.6	0.0	0.9	0.6	0.1	1.1	2.7
4361	2006	2020	3.1	2.7	2.4	1.1	0.7	0.1	0.1	0.1	0.5	1.4	1.5	2.3	8.1	4.2	0.3	3.4	16.0
4373	2010	2020	8.5	8.0	8.0	4.8	1.9	0.2	0.1	0.5	2.9	5.2	8.5	8.3	24.8	14.7	0.8	16.6	56.9
4390	1993	2020	4.8	5.1	4.7	3.1	1.7	0.8	0.5	0.2	1.0	1.4	2.4	3.8	13.7	9.5	1.5	4.8	29.5

9.8 Number of Days with Storm (wind speed ≥ 24.5m/s)

Table 45: Climatological standard normals 1991-2020, number of days with storm (wind speed ≥ 24.5m/s) (days) (climate element 326).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.1	0.0	0.1	0.5
4220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4221	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4228	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.2	0.2	0.5	0.4	0.0	0.6	1.5

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4231	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4234	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2
4242	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.1	0.0	0.2	0.7
4250	0.6	0.4	0.5	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.6	0.4	1.4	0.9	0.4	1.2	3.9
4253	0.9	0.5	0.3	0.1	0.1	0.1	0.0	0.0	0.2	0.1	0.4	0.4	1.8	0.5	0.1	0.7	3.1
4266	3.1	3.1	2.8	1.3	0.5	0.3	0.0	0.3	1.1	2.1	2.5	3.1	9.3	4.6	0.6	5.7	20.2
4270	0.9	1.2	0.9	0.7	0.2	0.2	0.0	0.0	0.2	0.5	0.8	0.9	3.0	1.8	0.2	1.5	6.5
4285	1.6	1.6	0.9	0.3	0.3	0.0	0.0	0.1	0.4	0.6	1.2	1.7	4.9	1.5	0.1	2.2	8.7
4339	1.4	1.3	1.0	0.4	0.4	0.1	0.0	0.1	0.4	0.6	0.8	1.2	3.9	1.8	0.2	1.8	7.7

Table 46: Averages, number of days with storm (wind speed ≥ 24.5m/s) (days) (climate element 326).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.0	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.1	0.1	0.7
4203	2011	2020	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.2	0.0	0.0	0.3	0.5
4205	1995	2020	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.4	0.1	0.0	0.5	1.0
4207	1991	1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4208	1991	2015	0.2	0.3	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.3	0.3	0.2	0.7	0.1	0.2	0.7	1.7
4211	2005	2020	0.2	0.3	0.2	0.3	0.1	0.1	0.2	0.3	0.2	0.2	0.9	0.5	1.0	0.6	0.6	1.3	3.5
4213	2000	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4224	2000	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4241	2001	2020	0.1	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.3	0.5	0.0	0.4	1.2
4254	2000	2020	0.3	0.4	0.5	0.6	0.4	0.3	0.1	0.1	1.0	0.7	1.2	0.3	1.0	1.5	0.5	2.9	5.9
4260	2008	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.3	0.3
4272	1991	2013	1.2	1.9	0.9	0.7	0.2	0.1	0.1	0.1	0.3	0.5	0.8	1.1	4.2	1.8	0.3	1.6	7.9
4273	2004	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4280	2009	2020	0.4	1.1	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.7	0.6	0.5	2.0	0.6	0.0	1.5	4.1
4320	2001	2020	0.8	0.9	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.5	1.1	2.8	0.9	0.0	0.7	4.4
4330	2010	2020	1.1	0.4	0.4	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.5	2.0	0.5	0.1	0.4	3.0
4341	2006	2020	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.7	0.0	0.0	0.1	0.8
4351	2010	2020	0.3	0.6	0.7	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.9	0.2	1.1	0.9	0.0	1.1	3.1
4360	1991	2018	0.1	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.4	0.3	0.0	0.5	1.2
4361	2006	2020	1.2	0.8	1.1	0.2	0.0	0.0	0.0	0.0	0.1	0.2	1.1	1.0	3.0	1.3	0.0	1.4	5.7
4373	2010	2020	5.5	5.7	4.9	2.8	0.9	0.1	0.0	0.2	1.4	2.6	5.8	6.0	17.2	8.6	0.3	9.8	35.9
4390	1993	2020	2.3	2.8	2.3	0.9	0.6	0.1	0.1	0.0	0.2	0.5	0.6	1.6	6.7	3.8	0.2	1.3	12.0

9.9 Number of Days with Violent Storm (wind speed ≥ 28.5m/s)

Table 47: Climatological standard normals 1991-2020, number of days with violent storm (wind speed ≥ 28.5m/s) (days) (climate element 331).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4214	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4221	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4228	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	0.3
4231	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4234	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4250	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.1	0.0	0.2	0.6
4253	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	0.3
4266	0.9	0.6	0.4	0.0	0.1	0.1	0.0	0.1	0.2	0.4	0.7	1.3	2.8	0.5	0.2	1.3	4.8
4270	0.3	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.8	0.5	0.0	0.3	1.6
4285	0.2	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.7	0.4	0.0	0.6	1.7
4339	0.6	0.4	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.5	0.4	0.0	0.4	2.3

Table 48: Averages, number of days with violent storm (wind speed ≥ 28.5m/s) (days) (climate element 331).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2
4203	2011	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1
4205	1995	2020	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.2	0.4
4207	1991	1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4208	1991	2015	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.3
4211	2005	2020	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.3	0.5	0.3	0.2	0.6	1.6
4213	2000	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4224	2000	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4241	2001	2020	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.3
4254	2000	2020	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.3	0.0	0.2	0.3	0.0	0.6	1.1
4260	2008	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4272	1991	2013	0.6	0.6	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.4	1.6	0.5	0.0	0.5	2.6
4273	2004	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4280	2009	2020	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.4	0.7	0.0	0.0	0.3	1.0
4320	2001	2020	0.2	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.7	0.3	0.0	0.2	1.2
4330	2010	2020	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.1	0.1	0.5
4341	2006	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1
4351	2010	2020	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.4
4360	1991	2018	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.3
4361	2006	2020	0.0	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.4	0.0	0.1	1.0

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4373	2010	2020	3.7	2.4	3.0	1.4	0.3	0.0	0.0	0.2	0.3	1.2	3.1	3.5	9.6	4.7	0.2	4.6	19.1
4390	1993	2020	0.6	1.1	0.6	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.3	2.0	0.9	0.2	0.1	3.2

10 Radiation

Global radiation is the total short-wave radiation from the sky falling onto a horizontal surface on the ground. It includes both the direct solar radiation and the diffuse radiation resulting from reflected or scattered sunlight. The unit of the observations is W/m^2. The unit of the accumulated global radiation is MJ/m^2.

In Greenland there is not much light in the heart of the winter, depending on the latitude. On the contrary, days are longer in the summer. North of the polar circle (app. 66.5 northern latitude) midnight sun and polar nights prevail in shorter or longer periods of time depending on the latitude. The term midnight sun indicates that the sun will prevail during all 24 hours of the day. The term polar nights is defined by the fact that the sun never rises at all.

Table 49: Averages, accumulated global radiation (MJ/m^2) (climate element 550).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4220	2014	2020	9.9	55.6	229.3	442.6	589.2	652.1	598.3	409.7	225.0	81.7	12.0	1.2	66.7	1261.1	1660.1	318.7	3306.6
4250	2014	2020	18.7	71.3	215.1	410.4	588.5	600.3	581.7	427.3	239.0	130.8	34.9	8.2	98.2	1214.0	1609.3	404.7	3326.2
4271	2014	2020	39.9	114.6	292.1	453.2	588.5	600.5	634.2	486.6	271.5	151.5	54.2	25.1	179.6	1333.8	1721.3	477.2	3711.9
4360	2015	2020	10.7	54.4	220.8	383.0	582.6	571.2	653.7	450.3	206.6	81.3	16.1	3.3	68.4	1186.4	1675.2	304.0	3234.0

11 Cloud Cover

Clouds are structures developed in the lower atmosphere by condensation of water vapor. They consist of tiny water drops or ice crystals “floating” in the air. Clouds can also contain larger particles of water or ice as well as non-aqueous fluid or solid particles like those found in smoke or dust.

The amount of clouds specifies how much of the sky is actually covered by clouds - seen from the observation site. The cloud cover, specified for every single layer or as the total cloud cover, can be stated in octas or in percent (% in this report). 0% total cloud cover (0/8) corresponds to clear sky, while 100% (8/8) correspond to overcast.

From the total cloud cover, the number of clear days (total cloud cover < 20%) and the number of cloudy days (total cloud cover > 80%) are calculated.

Formations of clouds in Greenland and elsewhere too, are in broad terms partly connected to the passage of lows and the adjoining cloud systems, and partly connected to local conditions. During the year, these conditions characterize the cloud formation in different ways depending on the location.

The passages of lows influence the weather everywhere in Greenland, with the absolute largest impact in Southern Greenland. During the winter, the preferred cyclone tracks are from the east coast of the United States towards the Northeast passing south of Greenland and continuing to Iceland and the Norwegian Sea. This will, in particular, influence the cloud cover in the southern and eastern parts of the country with a tendency to a larger cloud cover (see

Table 50 and Table 51). In the summer, the cyclone tracks tend to be displaced more northward, often straight towards West Greenland and this will generally result in an increased cloud cover in those places.

The northern parts of Greenland are less influenced by the passages of lows and for that reason, clear skies are more common here during the winter. On the other hand, the weather during the summer is more characterized by fog and low clouds because of local conditions (the interaction between the insolation and ice/sea/land).

11.1 Mean Cloud Cover

Table 50: Climatological standard normals 1991-2020, mean cloud cover (%) (climate element 801).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4231	57	54	50	53	57	54	51	60	64	61	61	60	57	53	55	62	57
4250	72	68	66	65	69	68	64	72	71	66	67	71	70	67	68	68	68
4320	50	50	49	45	56	57	53	57	58	51	50	44	48	50	56	53	52
4360	71	73	69	67	67	60	56	62	66	67	68	69	71	68	59	67	66

Table 51: Averages, mean cloud cover (%) (climate element 801).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	42	44	43	48	61	66	66	71	64	67	53	49	45	51	68	61	56
4220	2010	2020	65	65	61	58	61	57	53	59	63	60	68	68	66	60	56	64	62
4221	1991	2004	65	66	56	63	69	63	60	68	70	66	64	69	67	63	64	67	65
4234	1991	1999	59	61	55	62	69	65	65	74	71	70	67	66	62	62	68	69	65
4260	1991	2001	75	72	69	72	76	80	80	85	80	70	66	67	71	72	82	72	74
4270	1991	2008	64	63	59	64	65	66	65	69	68	57	60	60	62	63	67	62	63

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4272	1991	2017	61	58	54	58	63	65	64	69	65	54	58	57	59	58	66	59	60
4339	1991	2010	61	64	64	61	66	57	60	61	64	61	64	59	61	64	59	63	62
4390	1992	2012	64	60	58	64	63	62	60	61	61	56	56	58	61	62	61	58	60

11.2 Number of clear days

Table 52: Climatological standard normals 1991-2020, number of clear days (mean cloud cover < 20%) (days) (climate element 802).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4231	5.1	4.4	7.0	5.7	4.4	4.6	6.5	4.4	3.3	4.2	3.9	3.8	13.3	17.1	15.5	11.4	57.3
4250	2.0	1.8	2.5	2.7	1.9	2.2	2.9	1.5	2.4	3.2	2.6	2.1	5.9	7.1	6.6	8.2	27.8
4320	7.8	7.0	8.7	9.4	5.3	5.1	7.2	4.9	5.1	7.0	7.5	10.0	24.8	23.4	17.2	19.6	85.0
4360	2.9	2.4	3.5	4.1	3.7	5.7	5.6	5.1	4.1	3.9	3.2	3.9	9.2	11.3	16.4	11.2	48.1

Table 53: Averages, number of clear days (mean cloud cover < 20%) (days) (climate element 802).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	11.3	8.4	10.0	9.2	4.4	3.7	3.7	2.3	4.2	3.7	7.5	7.7	27.4	23.6	9.7	15.4	76.1
4220	2010	2020	3.4	3.2	4.5	5.1	3.7	5.7	7.3	5.1	3.5	3.7	1.5	2.3	8.9	13.3	18.1	8.7	49.0
4221	1991	2004	4.3	3.5	6.8	4.5	2.9	3.7	4.8	3.4	2.4	4.1	4.3	3.6	11.4	14.2	11.9	10.8	48.3
4234	1991	1999	7.1	4.7	6.2	5.8	2.7	3.5	4.0	1.8	3.0	2.9	2.8	3.7	15.5	14.7	9.3	8.7	48.2
4260	1991	2001	1.7	2.5	3.1	2.0	1.3	0.3	0.6	0.4	1.2	3.4	3.8	3.6	7.8	6.4	1.3	8.4	23.9
4270	1991	2008	4.3	4.3	5.1	3.3	2.9	2.4	2.7	2.6	2.3	6.1	5.1	5.2	13.8	11.3	7.7	13.5	46.3
4272	1991	2017	4.8	5.4	6.6	5.5	3.8	2.6	3.2	2.4	3.6	7.4	6.1	6.1	16.3	15.9	8.2	17.1	57.5
4339	1991	2010	5.8	4.5	4.1	5.0	3.8	4.6	4.4	4.5	3.8	4.8	4.8	5.7	16.0	12.9	13.5	13.4	55.8
4390	1992	2012	4.1	5.3	5.6	5.2	4.6	4.9	4.7	5.1	4.8	7.4	6.1	5.9	15.3	15.4	14.7	18.3	63.7

11.3 Number of cloudy days

Table 54: Climatological standard normals 1991-2020, number of cloudy days (mean cloud cover > 80%) (days) (climate element 803).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4231	8.7	6.6	5.6	6.7	8.3	6.4	7.1	10.2	11.0	10.8	10.2	9.8	25.1	20.6	23.7	32.0	101.4
4250	16.5	11.9	12.2	12.5	14.4	13.6	12.7	15.5	15.7	13.0	12.1	15.1	43.5	39.1	41.8	40.8	165.2
4320	7.9	6.6	8.0	6.4	9.5	9.7	9.1	9.8	10.0	8.0	8.0	6.0	20.5	23.9	28.6	26.0	99.0
4360	16.7	15.9	15.7	15.0	14.5	11.6	9.6	12.6	14.2	15.2	14.7	16.5	49.1	45.2	33.8	44.1	172.2

Table 55: Averages, number of cloudy days (mean cloud cover > 80%) (days) (climate element 803).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	4.9	4.2	5.8	6.7	11.9	13.4	14.2	16.5	11.9	14.6	8.5	7.7	16.8	24.4	44.1	35.0	120.3
4220	2010	2020	12.9	12.1	12.1	11.5	11.6	10.2	9.4	12.5	10.8	10.6	11.6	14.6	39.6	35.2	32.1	33.0	139.9
4221	1991	2004	12.6	11.6	10.2	12.3	14.8	11.5	11.4	13.8	13.4	14.0	12.4	14.9	39.1	37.3	36.7	39.8	152.9
4234	1991	1999	12.2	10.8	9.3	12.3	13.7	11.8	12.4	16.8	15.4	14.7	12.9	13.4	36.4	35.3	41.0	43.0	155.7
4260	1991	2001	18.3	15.5	14.7	15.8	18.2	19.2	19.2	22.1	19.5	15.0	12.4	13.7	47.5	48.7	60.5	46.9	203.6
4270	1991	2008	13.0	11.3	11.0	11.5	12.5	12.5	12.8	15.4	13.4	10.3	11.6	11.4	35.7	35.0	40.7	35.3	146.7
4272	1991	2017	12.0	10.0	9.4	10.9	12.6	12.1	12.1	14.9	13.2	10.3	10.6	10.5	32.5	32.9	39.1	34.1	138.6
4339	1991	2010	12.4	12.3	13.2	11.5	14.2	9.6	11.2	11.6	12.3	12.4	13.4	10.8	35.5	38.9	32.4	38.1	144.9
4390	1992	2012	13.6	11.0	11.1	13.8	13.2	13.1	11.9	13.1	11.6	10.8	10.5	12.0	36.6	38.1	38.1	32.9	145.7

12 Precipitation

Precipitation is defined as the solid or liquid result of the precipitation processes, which take place in a cloud and subsequently fall from it. The result can be coherent precipitation or showers or what can be deposited from the air to the ground or the surface of the sea. In broad terms, this can be rain, sleet, snow, hail, dew, white frost, and deposit of fog.

The total amount of precipitation falling on the ground in a given period (in this report days, months, seasons and years) is defined by the depth of a volume of precipitation (in liquid form; solid precipitation is melted before the reading) covering a horizontal plane on the surface of the ground if there was no run-off or evaporation.

No matter which method is used to measure the amount of precipitation, it is important that the registration should be as close as possible to the “true” precipitation. Obviously, this can be very difficult, especially under extreme conditions.

Greenland is characterized by many extreme conditions, and for that reason registrations of precipitation are difficult. Especially because of lack of shelter, high wind speeds and high amounts of solid precipitation, which result in both drifting snow and considerable snow deposits in most places (see below concerning snow in Greenland). For practical reasons, the rain gauges are placed 3 meters above the ground and in addition they are provided with a considerably large shelter arrangement in order to minimize the problems. In recent times, automatic rain gauges have been introduced. These instruments weigh the precipitation - after melting - providing the amount and intensity. No matter what, the registration of precipitation in Greenland will always be subject to a considerable degree of uncertainty.

Table 56 and Table 57 show that the accumulated precipitation in Greenland generally decreases with increasing latitude, but also from the coast up along the fjords. A considerable seasonal variation can be seen especially at the southern observation sites. Cyclone activity, elevation and temperature conditions are the key factors explaining this distribution in the precipitation pattern.

The precipitation in the southernmost parts of Greenland, and especially in the south-eastern parts, is abundant; from slightly above 600mm (Narsarsuaq 612.4mm; Qaqortoq 971.7mm) to probably nearly an average of 2,500mm in some south east coastal areas (no precipitation gauges in these areas in the period 1991-2020, but older statistics indicates that (Cappelen et al., 2001). The precipitation amounts are lower near the ice cap. The precipitation in Kangerlussuaq is only 167.7mm a year. In the northern parts of Greenland, the precipitation is sparse, from app. 325mm to below 150mm (Pituffik 149.4mm, Station Nord 328.7mm; Danmarkshavn 209.7mm).

Table 58 to Table 65 show the same patterns, both when looking at the number of days with precipitation exceeding 0.1mm, 1.0mm and 10.0mm, and also concerning precipitation extremes. Not surprisingly, the highest 24-hours precipitation in the period 1991-2020 – 118.0mm - was registered at Qaqortoq from 7-8 October 2012. The highest 24-hours precipitation all over – 183.5mm - was registered at Ikerasassuaq from 1-2 November 1964.

Snow is precipitation in the form of ice crystals, stuck together as snowflakes. The word “snow” is also used when talking about precipitation that has already fallen and thus lying on the surface of the ground. Snow is - not surprisingly - a very common thing in Greenland. As a matter of fact, snow can fall in all places all year round and not necessarily with the forming of a snow cover. However, in July/August this seldom happens apart from the northern parts of Greenland.

In the northern parts a permanent snow cover is already formed in early autumn, subsequently disappearing in early summer. In some places, there are still snow cover even in mid-summer. The sparse precipitation in the northern parts of Greenland gives a relatively small number of days with snowfall and a rather low snow depth. This fact together with low temperatures here means that a snow cover with a rather constant but low snow depth in the cold months is maintained. In some places, even snow free areas can be found, so-called

"arctic deserts". The snow cover in the southern parts of Greenland can disappear during the winter in connection with warm foehn winds (see also about foehn in Section 6).

It has not been possible to calculate statistics for snow parameters like snowfall, snow cover and snow depth in the period in question due to a lack of data. For that reason, snow statistics is not a part of this report. In Cappelen et al., (2001) snow statistics can be found for the period 1961-1990.

12.1 Mean Accumulated Precipitation

Table 56: Climatological standard normals 1991-2020, mean accumulated precipitation (mm) (climate element 601).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	5.3	4.5	5.7	7.3	9.8	13.7	22.7	26.5	13.6	15.0	12.2	13.1	22.9	22.8	62.9	40.8	149.4
4220	28.1	17.6	17.8	19.6	18.6	21.7	25.7	45.8	33.7	36.5	33.8	31.7	77.4	56.0	93.2	104.0	330.6
4231	7.9	6.1	5.2	7.6	10.9	13.4	27.6	31.7	22.7	13.1	11.7	9.8	23.8	23.7	72.7	47.5	167.7
4250	72.8	55.4	59.2	53.0	60.5	61.7	75.5	92.7	106.0	79.7	82.6	74.9	203.1	172.7	229.9	268.3	874.0
4270	40.0	52.3	37.1	44.7	32.8	44.8	49.8	66.3	80.2	56.7	68.2	39.5	131.8	114.6	160.9	205.1	612.4
4272	75.6	77.7	63.8	66.7	58.3	69.3	81.6	103.0	116.2	88.8	100.6	70.1	223.4	188.8	253.9	305.6	971.7
4320	30.9	21.0	21.0	13.2	7.7	4.1	13.6	20.9	19.7	17.7	19.1	20.8	72.7	41.9	38.6	56.5	209.7
4360	113.2	99.3	93.6	75.4	58.3	34.9	39.4	58.8	89.8	71.0	91.4	90.0	302.5	227.3	133.1	252.2	915.1

Table 57: Averages, mean accumulated precipitation (mm) (climate element 601).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4234	2002	2020	48.8	29.9	31.5	32.0	30.3	25.1	51.6	62.4	60.5	62.4	62.4	55.7	134.4	93.8	139.1	185.3	552.6
4312	1992	2020	25.3	23.8	29.4	24.6	20.6	11.3	30.4	29.3	40.5	34.6	31.9	27.0	76.1	74.6	71.0	107.0	328.7
4339	1994	2020	63.2	62.6	42.4	26.8	20.3	12.0	28.3	37.3	68.0	56.1	42.7	57.1	182.9	89.5	77.6	166.8	516.8

12.2 Highest 24-hour Precipitation

Table 58: Climatological standard normals 1991-2020, highest 24-hour precipitation (mm) (climate element 602).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4220	29.5	18.0	15.0	12.0	17.8	27.0	27.0	38.5	41.0	25.0	23.7	25.0	29.5	17.8	38.5	41.0	41.0
4231	11.0	13.0	12.0	14.0	20.0	14.0	21.2	26.0	32.0	12.2	12.0	10.0	13.0	20.0	26.0	32.0	32.0
4250	38.9	53.5	36.0	49.8	67.0	59.0	80.6	68.9	51.0	52.0	55.5	59.7	59.7	67.0	80.6	55.5	80.6
4270	100.9	71.0	62.0	83.6	40.0	53.0	55.0	88.0	53.0	70.0	78.0	59.0	100.9	83.6	88.0	78.0	100.9
4272	56.0	80.0	55.0	55.0	105.0	72.0	109.0	106.0	91.1	118.0	67.0	55.6	80.0	105.0	109.0	118.0	118.0
4320	25.9	25.5	19.1	14.0	25.0	17.0	24.8	34.4	34.3	19.1	23.0	27.5	27.5	25.0	34.4	34.3	34.4
4360	94.0	47.0	54.0	80.0	42.7	52.0	41.0	65.0	64.0	47.0	70.1	69.0	94.0	80.0	65.0	70.1	94.0

Table 59: Extreme values, highest 24-hour precipitation (mm) (climate element 602).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	5.2	6.0	10.0	25.0	51.8	11.0	35.0	51.0	17.0	34.8	8.0	7.0	7.0	51.8	51.0	34.8	51.8
4234	2002	2020	27.8	23.7	29.7	33.1	30.4	36.0	49.3	31.4	37.0	46.7	37.0	24.0	27.8	33.1	49.3	46.7	49.3
4312	1992	2020	39.0	28.0	46.0	35.2	28.1	14.5	38.7	19.4	23.0	18.8	43.1	41.0	41.0	46.0	38.7	43.1	46.0
4339	1994	2020	65.0	70.0	24.0	34.0	19.5	21.0	69.0	32.0	56.5	37.2	32.9	45.0	70.0	34.0	69.0	56.5	70.0

12.3 Number of Days with Precipitation ≥ 0.1mm

Table 60: Climatological standard normals 1991-2020, number of days with precipitation ≥ 0.1mm (days) (climate element 604).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4220	19.7	15.2	15.1	14.5	11.3	9.0	9.6	13.0	14.2	17.0	18.7	20.6	55.5	40.9	31.6	49.9	177.9
4231	7.2	5.9	5.8	6.4	6.2	6.1	7.8	10.7	9.2	8.8	8.6	8.5	21.6	18.4	24.6	26.6	91.2
4250	19.0	16.4	17.3	15.0	12.9	12.2	11.8	14.8	17.1	16.0	16.2	19.2	54.6	45.2	38.8	49.3	187.9
4270	9.2	9.2	8.5	8.4	8.1	9.1	8.8	10.8	11.5	8.2	9.4	8.7	27.1	25.0	28.7	29.1	109.9
4272	14.5	13.5	13.3	12.0	11.3	12.0	12.4	14.3	14.7	12.1	13.3	13.5	41.5	36.6	38.7	40.1	156.9
4320	9.4	8.2	8.2	6.5	4.7	2.8	5.5	6.3	6.9	7.0	7.9	7.5	25.1	19.4	14.6	21.8	80.9
4360	17.9	16.6	17.4	15.7	13.4	9.4	9.1	11.3	13.8	14.1	15.3	15.9	50.4	46.5	29.8	43.2	169.9

Table 61: Averages, number of days with precipitation ≥ 0.1mm (days) (climate element 604).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	8.2	5.3	6.9	5.3	4.3	4.1	7.5	8.1	7.0	10.1	8.1	8.9	22.4	16.5	19.7	25.2	83.8
4234	2002	2020	16.1	13.3	13.2	11.4	9.6	8.7	9.5	11.8	14.3	13.4	16.0	17.5	46.9	34.2	30.0	43.7	154.8
4312	1992	2020	12.1	10.1	10.9	9.1	7.7	5.2	6.4	7.2	10.6	11.3	11.6	12.4	34.6	27.7	18.8	33.5	114.6
4339	1994	2020	14.3	14.6	14.9	9.7	10.0	5.3	7.9	8.1	10.5	13.0	11.8	12.9	41.8	34.6	21.3	35.3	133.0

12.4 Number of Days with Precipitation ≥ 1.0mm

Table 62: Climatological standard normals 1991-2020, number of days with precipitation ≥ 1.0mm (days) (climate element 605).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4220	8.4	4.8	5.0	5.2	4.4	4.6	4.8	7.2	7.3	8.8	9.6	10.0	23.2	14.6	16.6	25.7	80.1
4231	2.9	2.0	1.7	2.3	2.8	3.4	5.2	6.9	5.2	3.8	3.9	3.2	8.1	6.8	15.5	12.9	43.3
4250	12.8	9.6	10.1	8.4	7.7	8.1	8.3	9.9	12.1	10.8	12.0	13.2	35.6	26.2	26.3	34.9	123.0
4270	6.6	6.5	5.8	5.9	5.6	6.2	6.7	8.5	9.3	6.0	7.5	6.4	19.5	17.3	21.4	22.8	81.0
4272	10.2	9.5	8.3	7.2	7.3	8.4	8.4	9.9	11.1	8.7	9.6	9.3	29.0	22.8	26.7	29.4	107.9
4320	5.1	4.3	4.6	3.2	1.9	1.1	3.0	3.5	3.6	3.8	4.2	4.3	13.7	9.7	7.6	11.6	42.6
4360	13.2	12.8	12.0	9.9	8.7	5.7	5.2	7.0	9.6	9.1	10.2	11.0	37.0	30.6	17.9	28.9	114.4

Table 63: Averages, number of days with precipitation ≥ 1.0mm (days) (climate element 605).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	2.2	1.6	2.2	2.3	1.4	2.2	4.6	4.3	3.0	4.3	3.2	3.2	7.0	5.9	11.1	10.5	34.5
4234	2002	2020	10.3	7.0	6.4	5.6	6.2	6.1	7.0	8.1	9.8	8.9	11.5	12.5	29.8	18.2	21.2	30.2	99.4
4312	1992	2020	6.8	5.0	5.7	5.7	4.5	2.7	4.8	5.3	7.0	7.6	6.9	6.4	18.2	15.9	12.8	21.5	68.4
4339	1994	2020	9.3	8.5	9.3	6.0	3.9	2.6	4.5	5.6	7.1	8.1	7.2	8.4	26.2	19.2	12.7	22.4	80.5

12.5 Number of Days with Precipitation ≥ 10.0mm

Table 64: Climatological standard normals 1991-2020, number of days with precipitation ≥ 10.0mm (days) (climate element 606).

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4220	0.3	0.2	0.1	0.1	0.2	0.5	0.7	1.3	0.6	0.6	0.5	0.2	0.7	0.4	2.5	1.7	5.3
4231	0.0	0.0	0.0	0.0	0.2	0.2	0.6	0.8	0.3	0.0	0.0	0.0	0.0	0.2	1.6	0.3	2.1
4250	1.8	1.4	1.5	1.6	1.8	1.8	2.2	2.8	3.6	2.3	2.2	1.9	5.1	4.9	6.8	8.1	24.9
4270	0.8	1.0	1.0	1.3	0.7	1.6	1.6	2.2	2.8	1.8	2.1	1.0	2.8	3.0	5.4	6.7	17.9
4272	2.3	2.3	1.6	2.0	1.7	2.0	2.7	3.5	3.9	2.6	3.3	2.0	6.6	5.3	8.2	9.8	29.9
4320	0.7	0.5	0.4	0.1	0.1	0.0	0.3	0.5	0.5	0.4	0.3	0.3	1.5	0.6	0.8	1.2	4.1
4360	3.3	3.4	3.4	2.2	1.8	0.8	1.3	1.5	2.9	2.3	2.9	2.7	9.4	7.4	3.6	8.1	28.5

Table 65: Averages, number of days with precipitation ≥ 10.0mm (days) (climate element 606).

Station	First yr	Last yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DJF	MAM	JJA	SON	Annual
4202	1991	2006	0.0	0.0	0.1	0.1	0.1	0.1	0.6	0.7	0.1	0.1	0.0	0.0	0.0	0.3	1.4	0.2	1.9
4234	2002	2020	0.9	0.6	0.6	0.3	0.5	0.7	1.4	1.8	1.7	1.5	1.2	1.0	2.5	1.4	3.9	4.4	12.2
4312	1992	2020	0.4	0.4	0.5	0.6	0.5	0.2	0.8	0.9	1.3	0.5	0.6	0.5	1.3	1.6	1.9	2.4	7.2
4339	1994	2020	2.1	1.9	0.9	0.3	0.5	0.2	0.7	1.2	2.2	1.7	1.1	1.4	5.4	1.7	2.1	5.0	14.2

13 Appendix

13.1 Station Details

Table 66: Overview of the beginning and end of the stations' operation time in Greenland.

Station	Time of operation	
	Start	Stop
4201 Qaanaaq	10-08-1995	13-10-2004
4202 Pituffik	01-01-1974	27-11-2006
4203 Kitsissut	02-06-1980	
4205 Qaanaaq	02-01-1964	30-06-1980
4205 Mitt. Qaanaaq	30-08-2001	
4207 Hall Land	30-08-1982	06-09-2007
4208 Kitsissorsuit	10-09-1981	
4209 Upernavik AWS	30-08-1984	26-09-1995
4210 Upernavik	01-01-1958	28-01-1987
4210 Upernavik	08-09-1995	16-08-2004
4211 Mitt. Upernavik	25-10-2000	
4213 Mitt. Qaarsut	23-11-2000	23-10-2005
	01-02-2006	
4214 Qullitsat	01-01-1961	31-08-1972
4214 Nuussuaq	18-09-1982	
4220 Aasiaat	01-01-1958	
4221 Mitt. Ilulissat	15-08-1991	
4224 Mitt. Aasiaat	02-11-2000	
4228 Kitsissut/Attu	18-08-1983	
4230 Sisimiut	01-01-1961	22-06-2001
4231 Mitt. Kangerlussuaq	01-05-1973	31-12-1989
	01-01-1990	
4234 Mitt. Sisimiut	28-11-2000	
4241 Mitt. Maniitsoq	06-12-2000	
4242 Sioralik	16-06-1983	
4250 Nuuk	01-01-1958	31-08-1991
	01-09-1991	
4253 Ukiivik	20-06-1982	
4254 Qeqertarsuatsiaat	17-01-1967	30-12-1969
4254 Mitt. Nuuk	01-11-2000	
4260 Paamiut	01-01-1958	21-09-1992
4260 Paamiut Heliport	22-09-1992	06-12-2007
4260 Mitt. Paamiut	07-12-2007	
4266 Nunarsuit	22-07-1981	
4270 Mitt. Narsarsuaq	01-01-1961	
4271 Narsarsuaq Radisonde	25-09-2012	

Station	Time of operation	
	Start	Stop
4272 Qaqortoq	01-01-1961	
4273 Qaqortoq Heliport	17-03-2004	
4274 Qassimiut	08-04-1964	30-12-1969
4280 Narsaq	01-01-1958	31-12-1969
4280 Narsaq Heliport	10-03-2005	
4285 Angissoq	01-01-1964	28-12-1973
	22-07-1981	
4301 Kap Morris Jesup	16-07-1980	
4310 Station Nord	01-01-1961	09-07-2007
4312 Station Nord AWS	26-07-1985	
4320 Danmarkshavn	01-01-1958	
4330 Daneborg	01-01-1958	31-07-1975
	04-01-1979	
4339 Ittoqqortoormiit	01-11-1980	16-08-2005
	17-08-2005	
4341 Mitt. Nerlerit Inaat	26-05-2002	
4351 Aputiteeq	31-01-1987	
4360 Tasiilaq	01-01-1958	31-03-1982
	01-04-1982	14-08-2005
	15-08-2005	
4361 Mitt. Kulusuk	28-11-2000	
4373 Ikermit	01-11-1986	
4382 Ikermiuarsuk	18-06-1980	
4390 Ikerasassuaq	01-01-1958	09-10-1980
	14-05-1981	30-06-1992
	01-07-1992	
4415 Summit	02-01-1991	15-06-1994
4416 Summit	04-11-1997	08-12-2020
4419 Summit		
34231 Mitt. Kangerlussuaq	01-01-2017	
34234 Mitt. Sisimiut	01-12-2004	
34250 Nuuk	02-02-1999	01-09-2012
34270 Narsarsuaq	22-01-2009	
34310 Station Nord	01-02-2008	
34320 Danmarkshavn	01-01-2009	
34339 Ittoqqortoormiit	01-09-2014	

13.2 Combined Data Series from Different Stations

Table 67: Overview of stations that have been combined to enable the calculation of climatological standard normals or averages.

Station no.	Station name	Combined stations	Priority
4205	Qaanaaq Airport	4201	For all climate elements 4201 is prioritized up until and including 2004-09. Thereafter date from 4205 is prioritized.
4211	Upernavik Airport	4209, 4210	For all climate elements 4209 is prioritized up until and including 1995-09. Thereafter 4210 is prioritized up until and including 2001-01. Thereafter data from 4211 is prioritized.
4221	Ilulissat Airport	4216	All climate elements are prioritized from 4216 up until and including 1992-08 Thereafter data from 4221 is prioritized.
4234	Sisimiut Airport	4230, 34234	601,602,604,605,606 are prioritized for 4230 up until and including 2001-05. Thereafter 4234 is prioritized up until and including 2004-11. Thereafter data from 34234 is prioritized. All other climate elements are calculated for 4230 up until and including 2001-01. Thereafter data from 4234 is prioritized.
4231	Kangerlussuaq Airport	34231	601,602,604,605,606 are prioritized for 4231 up until and including 2016-12. Thereafter 34231 is prioritized. All other climate elements are calculated using data from 4231.
4250	Nuuk	34250	601,602,604,605,606 are prioritized for 4250 up until and including 1999-01. Thereafter 34250 is prioritized up until and including 2012-08. Thereafter 4250 is prioritized. All other climate elements are calculated using data from 4250.
4270	Narsarsuaq Airport	34270	601,602,604,605,606 are prioritized for 4270 up until and including 2008-12. Thereafter data from 34270 is prioritized. All other climate elements are calculated using data from 4270.
4312	Station Nord	4310, 34310	601,602,604,605,606 are prioritized for 4310 up until and including 2007-07. Thereafter data from 34310 is prioritized. All other climate elements are calculated using data from 4312.
4320	Danmarkshavn	34320	601,602,604,605,606 are prioritized for 4320 up until and including 2008-12. Thereafter data from 34320 is prioritized. All other climate elements are calculated using data from 4320.
4339	Ittoqqortoormiit	34339	601,602,604,605,606 are prioritized for 4339 up until and including 2014-08. Thereafter data from 34339 is prioritized. All other climate elements are calculated using data from 4339.
4419	Summit	4415, 4416, 4419	For all climate elements 4415 is prioritized up until and including 1994-06. Thereafter 4416 is prioritized up until and including 2018-12. Thereafter data from 4419 is prioritized.

13.3 Data File Formats

Monthly data series (csv format):
Station,Year,Month,Name,Lattitude,Longitude,Height,101,antDays101,111,antDays111,112,antDays112,attr112,114,antDays114,115,antDays115,121,antDays121,122,antDays122,attr122,124,antDays124,125,antDays125,149,antDays149,201,antDays201,205,antDays205,207,antDays207,210,antDays210,301,antDays301,302,antDays302,attr302,305,antDays305,attr305,311,antDays311,321,antDays321,326,antDays326,331,antDays331,371,antDays371,401,antDays401,410,antDays410,attr410,420,antDays420,attr420,550,antDays550,601,antDays601,602,antDays602,attr602,604,antDays604,605,antDays605,606,antDays606,801,antDays801,802,antDays802,803,antDays803

Annual data series (csv format):

Station,Year,Name,Lattitude,Longitude,Height,101,antDays101,111,antDays111,112,antDays112,attr112,114,antDays114,115,antDays115,121,antDays121,122,antDays122,attr122,124,antDays124,125,antDays125,149,antDays149,201,antDays201,205,antDays205,207,antDays207,210,antDays210,301,antDays301,302,antDays302,attr302,305,antDays305,attr305,311,antDays311,321,antDays321,326,antDays326,331,antDays331,371,antDays371,401,antDays401,410,antDays410,attr410,420,antDays420,attr420,550,antDays550,601,antDays601,602,antDays602,attr602,604,antDays604,605,antDays605,606,antDays606,801,antDays801,802,antDays802,803,antDays803

antDays<element number> – number of days behind the calculations
attr<element number> - the date on which the extreme has occurred

Climatological standard normals or averages (csv format):

Each file contains all climatological standard normals or averages for each climate element. E.g. the file named ‘GR_normals_101.csv’ contains all climatological standard normals or averages for climate element 101. Each file has the following format:

Station,First yr,Last yr,Elem_no,Jan,Feb,Mar,Apr,May,Jun,Jul,Aug,Sep,Oct,Nov,Dec,DJF,MAM,JJA,SON,Annual

For a description of the climate element see Table 2 in section 5.4.

13.4 Calculation of mean wind direction

13.4.1 Daily Values of Mean Wind Direction

The mean wind direction is calculated using the hourly values of wind direction (dd) and wind speed (ff).
For every hourly value in which the wind direction (dd) and the wind speed (ff) exist, the component is calculated using the following equation:

If ff > 0 then ff = 1
xsum = ff * cos(dd *π/180)
ysum = ff * sin(dd * π/180)
If at least 12 valid hourly values (ff and dd) exist, the hourly values of xsum and sxsum are summarized and the hourly values of ysum and sysum are also summarized.

Then the daily values of the mean wind direction are calculated using the following equation:
atan2(sysum, sxsum) * 180/π
If the value < 0, then do an addition with 360

13.4.2 Monthly and Yearly Values of Mean Wind Direction

For the days during the month/year in which a daily value of the mean wind direction (d371) can be found, two mean values are formed:

meanSinWindDir = sin(d371 * π/180)
and
meanCosWindDir = cos(d371 * π/180)

Then the mean wind direction is calculated using the following equation:

If atan2(meanSinWindDir, meanCosWindDir) < 0:
middelvindretning = atan2(meanSinWindDir, meanCosWindDir) * 180/π + 360
or
middelvindretning = atan2(meanSinWindDir, meanCosWindDir) * 180/π

13.5 Calculation of Climatological Standard Normals and Averages – script

If no specific rules are written (see Table and script below) with regards to the different climate elements, then the WMO-rules for the calculation of climatological standard normals or averages have been followed.

Table 68: Explanation of calculation abbreviations*. For an overview of mean, count and extreme parameters, see Section 5.7.

Abbreviation	Explanation
-cmdc	contiguous missing days count, i.e. maximum number of contiguous missing days allowed when calculating climatological standard normals/averages (for count parameters)
-cmdm	contiguous missing days mean, i.e. maximum number of contiguous missing days allowed when calculating climatological standard normals/averages (for mean parameters)
-e	climate element, e.g. 101
-fd	first date, i.e. first year, e.g. 2010
-ld	last date, i.e. last year, e.g. 2020
-mdc	missing days count, i.e. maximum number of missing days allowed when calculating climatological standard normals/averages (for count parameters)
-mdm	missing days mean, i.e. maximum number of missing days allowed when calculating climatological standard normals/averages (for mean parameters)
-mdpl	missing data percentage limit, i.e. maximum percentage of missing monthly values allowed when calculating monthly climatological standard normals or averages
-no rules	calculation of climatological standard normal/average has been carried out with no WMO rules
-pb	print basic information, i.e. information about the program that calculate the climatological standard normals or averages. Not important for the understanding the calculation of climatological standard normals or averages
-prim	print primary normals only, e.g. mean calculation of 101 or count calculation of 601
-s	station number, stations included in the calculation of climatological standard normals or averages

* The command "*java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal*" is not important for the understanding of calculation of climatological standard normals or averages.

Script used to calculate Climatological standard normals and averages for stations in Greenland:

```
# 420200 Pituffik
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,601 -s 420200 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2006 -e 111,112,114,115,121,122,124,125,201,205,207,210,301,302,311,321,326,331,401,410,420,602,604,605,606,801,802,803 -s 420200 -prim -pb
```

java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2006 -e 371 -s 420200 -prim -mdpl 75 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2006 -e 149 -s 420200 -prim -mdc 1 -cmdc 1 -mdpl 75 -pb

420300 Kitsissut
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 101,111,112,114,115,121,122,124,125,149 -s 420300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2011 -ld 2020 -e 201,205,207,210,301,302,311,321,326,331,371 -s 420300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 420300 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 401,410,420 -s 420300 -prim -pb

420500 Mittarfik Qaanaaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1995 -ld 2020 -e 101,111,112,114,115,121,122,124,125,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 420500 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1995 -ld 2020 -e 149 -s 420500 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 420500 -prim -norules -pb

420700 Hall Land
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 1996 -e 101,111,114,115,121,124,125,149,210,371 -s 420700 -prim -mdpl 66 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 1996 -e 112,122,201,205,207,301,302,311,321,326,331 -s 420700 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2006 -e 401,410,420 -s 420700 -prim -pb

420800 Kitsissorsuit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,201,205,207,210,401,410,420 -s 420800 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2015 -e 301,302,311,321,326,331 -s 420800 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2015 -e 371 -s 420800 -prim -mdpl 68 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 420800 -prim -norules -pb

421100 Mittarfik Upernavik
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,401,410,420 -s 421100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 149 -s 421100 -mdc 1 -cmdc 1 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 205,207,301,302,311,321,326,331,371 -s 421100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 201 -s 421100 -prim -cmdm 7 -mdpl 75 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 210 -s 421100 -prim -mdpl 62 -pb

#java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 210 -s 421100 -prim -cmm 7 -mdpl 68 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 421100 -prim -norules -pb

421300 Mittarfik Uummannaq-Qaarsut
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2000 -ld 2020 -e 101,111,112,114,115,121,122,124,125,149,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 421300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 421300 -prim -norules -pb

421400 Nuussuaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 421400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 205,207 -s 421400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 201,210 -s 421400 -prim -mdpl 72 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 421400 -prim -norules -pb

422000 Aasiaat
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420,601,602,604,605,606 -s 422000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2003 -ld 2020 -e 201,205,207 -s 422000 -prim -mdm 11 -cmdm 5 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2003 -ld 2020 -e 210 -s 422000 -prim -mdpl 68 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305,550 -s 422000 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 801,802,803 -s 422000 -prim -pb

422100 Mittarfik Ilulissat
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,301,302,311,321,326,331,371,401,410,420 -s 422100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 149 -s 422100 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 201,205,207,210 -s 422100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 422100 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2004 -e 801,802,803 -s 422100 -prim -pb

422400 Mittarfik Aasiaat
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2000 -ld 2020 -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 422400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 422400 -prim -norules -pb

```
# 422800 Kitsissut/Attu
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,149,401,410,420 -s 422800 -prim -mdc 3 -cmdc 2 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 302 -s 422800 -prim
-pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
301,311,321,326,331 -s 422800 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 371 -s 422800 -prim
-mdpl 63 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2008 -ld 2020 -e
205,207 -s 422800 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2008 -ld 2020 -e
201,210 -s 422800 -prim -mdpl 69 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 422800 -prim -norules -pb

# 423100 Mittarfik Kangerlussuaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420,601,602,604,605,606,801,802,8
03 -s 423100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2002 -ld 2020 -e
201,205,207,210 -s 423100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 423100 -prim -norules -pb

# 423400 Mittarfik Sisimiut
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 423400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1995 -ld 2020 -e
201,205,207,210 -s 423400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 423400 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2002 -ld 2020 -e
601,602,604,605,606 -s 423400 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 1999 -e
801,802,803 -s 423400 -prim -mdpl 77 -pb

# 424100 Mittarfik Maniitsoq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2001 -ld 2020 -e
101,111,112,114,115,121,122,124,125,149,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 424100 -
prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 424100 -prim -norules -pb

# 424200 Sioralik
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,401,410,420 -s 424200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 371 -s 424200 -prim
-mdpl 73 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e
201,205,207,210 -s 424200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 424200 -prim -norules -pb
```

425000 Nuuk
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 425000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 149 -s 425000 -prim -mdc 3 -cmdc 2 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 601,602,604,605,606 -s 425000 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 801,802,803 -s 425000 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 425000 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 550 -s 425000 -prim -mdc 5 -cmdc 4 -mdpl 71 -pb

425300 Ukiiviit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 425300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 201,205,207,210 -s 425300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 425300 -prim -norules -pb

425400 Mittarfik Nuuk
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2000 -ld 2020 -e 101,111,112,114,115,121,122,124,125,149,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 425400 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 425400 -prim -norules -pb

#426000 Mittarfik Paamiut
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420 -s 426000 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2008 -ld 2020 -e 201,205,207,210,301,302,311,321,326,331,371 -s 426000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 426000 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2001 -e 801,802,803 -s 426000 -prim -pb

426600 Nunarssuit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 426600 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 426600 -prim -norules -pb

427000 Mittarfik Narsarsuaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420,601,602,604,605,606 -s 427000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1994 -ld 2020 -e 201,205,207,210 -s 427000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 427000 -prim -norules -pb

java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2008 -e 801,802,803 -s 427000 -prim -pb

427100 Narsarsuaq Radiosonde
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 427100 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 550 -s 427100 -prim -mdc 3 -cmdc 2 -mdpl 71 -pb

427200 Qaqortoq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,401,410,420,601,602,604,605,606 -s 427200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 149 -s 427200 -prim -mdc 2 -cmdc 2 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2004 -ld 2017 -e 201,205,207,210 -s 427200 -prim -mdm 11 -cmdm 5 -mdpl 71 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2013 -e 302 -s 427200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2013 -e 301,311,321,326,331,371 -s 427200 -prim -mdpl 78 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2017 -e 801,802,803 -s 427200 -prim -pb

427300 Qaqortoq Heliport
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2004 -ld 2020 -e 101,111,112,114,115,121,122,124,125,201,205,207,210,301,302,311,321,326,331,371,401,410,420 -s 427300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 149 -s 427300 -prim -mdc 3 -cmdc 2 -mdpl 75 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 427300 -prim -norules -pb

428000 Narsaq Heliport
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 101,111,112,114,115,121,122,124,125,201,205,207,210,302,401,410,420 -s 428000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 301,311,321,326,331,371 -s 428000 -prim -mdpl 75 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 149 -s 428000 -prim -mdc 3 -cmdc 2 -mdpl 75 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 428000 -prim -norules -pb

428500 Angissoq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 428500 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2009 -ld 2020 -e 201,205,207,210 -s 428500 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 428500 -prim -norules -pb

430100 Kap Morris Jesup
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 101,111,112,114,115,121,122,124,125,201,205,207,210,401,410,420 -s 430100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 149 -s 430100 -prim -mdc 3 -cmdc 2 -mdpl 72 -pb

431200 Station Nord
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420 -s 431200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2011 -ld 2020 -e 201,205,207,210 -s 431200 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1992 -ld 2020 -e 601 -s 431200 -prim -mdc 3 -cmdc 2 -mdpl 79 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1992 -ld 2020 -e 602,604,605,606 -s 431200 -prim -pb

432000 Danmarkshavn
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420,601,602,604,605,606,801,802,803 -s 432000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2011 -ld 2020 -e 201,205,207,210 -s 432000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2001 -ld 2020 -e 301,302,311,321,326,331,371 -s 432000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 432000 -prim -norules -pb

433000 Daneborg
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420 -s 433000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 201,205,207,210,301,302,311,321,326,331,371 -s 433000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 433000 -prim -norules -pb

433900 Ittoqqortoormiit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,301,302,311,321,326,331,371,401,410,420 -s 433900 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2001 -ld 2020 -e 201,205,207,210 -s 433900 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1994 -ld 2020 -e 601,604,605,606 -s 433900 -prim -mdc 2 -cmdc 2 -mdpl 77 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1994 -ld 2020 -e 602 -s 433900 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2010 -e 801,802,803 -s 433900 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 433900 -prim -norules -pb

434100 Mittarfik Nelerit Inaat
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2002 -ld 2020 -e 101,111,112,114,115,121,122,124,125,401,410,420 -s 434100 -prim -mdpl 78 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2006 -ld 2020 -e 301,302,311,321,326,331 -s 434100 -prim -pb

java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 434100 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2008 -ld 2020 -e 371 -s 434100 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2007 -ld 2020 -e 149 -s 434100 -prim -mdpl 78 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2011 -ld 2020 -e 201,205,207,210 -s 434100 -prim -pb

435100 Aputiteeq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1993 -ld 2020 -e 101,111,112,114,115,121,122,124,125 -s 435100 -prim -mdpl 78 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2005 -ld 2020 -e 149 -s 435100 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 401,410,420 -s 435100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 201,205,207,210,301,302,311,321,326,331,371 -s 435100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 435100 -prim -norules -pb

436000 Tasiilaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420,602,604,605,606,801,802,803 -s 436000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 601 -s 436000 -prim -mdc 1 -cmdc 1 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2004 -ld 2020 -e 201,205,207,210 -s 436000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2018 -e 301,302,311,321,326,331,371 -s 436000 -prim -mdpl 78 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 436000 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2015 -ld 2020 -e 550 -s 436000 -prim -mdpl 66 -pb

436100 Mittarfik Kulusuk
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2000 -ld 2020 -e 101,111,112,114,115,121,122,124,125,401,410,420 -s 436100 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2011 -ld 2020 -e 201,205,207,210 -s 436100 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2006 -ld 2020 -e 301,302,311,321,326,331,371 -s 436100 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 436100 -prim -norules -pb

437300 Ikermiit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e 101,111,112,114,115,121,122,124,125,149,401,410,420 -s 437300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2010 -ld 2020 -e 201,205,207,210,301,302,311,321,326,331,371 -s 437300 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e 305 -s 437300 -prim -norules -pb

```
# 438200 Ikermiuarssuk
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,401,410,420 -s 438200 -prim -pb

# 439000 Ikerasassuaq
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -e
101,111,112,114,115,121,122,124,125,149,401,410,420 -s 439000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2004 -ld 2020 -e
205,207 -s 439000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2004 -ld 2020 -e
201,210 -s 439000 -prim -mdpl 76 -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1993 -ld 2020 -e
301,302,311,321,326,331,371 -s 439000 -prim -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 2014 -ld 2020 -e
305 -s 439000 -prim -norules -pb
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1992 -ld 2012 -e
801,802,803 -s 439000 -prim -pb

# 441900 Summit
java -cp /opt/TKBasisNAClimateNormals/lib/'*' tkbasisnaclimatenormal.TKBasisNAClimateNormal -fd 1991 -ld 2020 -e
101,111,112,114,115,121,122,124,125,149 -s 441900 -prim -mdc 2 -cmdc 2 -pb
```

14 References

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