

Reply to the Reviewers comments

I would like to thank the Reviewers for valuable comments which helped enhance the form and substance of this paper. The majority of the suggestions were implemented in the manuscript. My reply to the comments and my explanations are listed below.

Reviewer: 1

Reply to GENERAL COMMENTS

This is a generally well written study on very early observations of meteorological parameters at Nuuk, Greenland. I do not have any major objections against the publication of this manuscript, but the clarity of some sentences and phrases can be improved and some additional pieces of information be added to improve the manuscript. I ask the authors to consider the detailed comments listed below.

Response:

Thank you very much for your recognition of the article's merits. We hope we have satisfactorily clarified and expanded on the issues that raised doubts.

Reply to Detailed Comments

1. Line 45: „though to present-day data” -> “through to present-day data” ?

Response:

On line 45, "though" has been corrected to "through".

2. Lines 50 – 53: this seems like an excessive citation of own papers?

Response:

The number of cited works has been reduced.

In addition, to present a broader collection of works on this topic, more works by other authors have been added by making changes to lines 50-52.

They have also been added to the References section.

"Wood, K.R. and Overland, J.E.: Accounts from 19th-century Canadian Arctic explorers' logs reflect present climate conditions, EOS, 84, 410–412, 2003."

"Wood, K.R. and Overland, J.E.: Climate lessons from the first International Polar Year, Bull. Am. Meteorol. Soc., 87, 1685–1697, doi: 10.1175/BAMS-87-12-1685, 2006."

"Wood, K.R. and Overland, J.E.: Early 20th century Arctic warming in retrospect, Int. J. Climatol, 30, 1269–1279, doi: 10.1002/joc.1973, 2010."

"Miller, G.H., Brigham-Grette, J., Alley, R.B., Anderson, L., Bauch, H.A., Douglas, M.S.V., Edwards, M.E., Elias, S.A., Finney, B.P., Fitzpatrick, J.J., Funder, S.V., Herbert, T.D., Hinzman, L.D., Kaufman, D.S., MacDonald, G.M., Polyak, L., Robock, A., Serreze, M.C., Smol, J.P., Spielhagen, R., White, J.W.C., Wolfe, A.P., and Wolff, E.W.: Temperature and precipitation history of the Arctic, Quat. Sci. Rev., 29, 1679–1715, doi: 10.1016/j.quascirev.2010.03.001, 2010."

3. Line 80: Please explain "ET"

Response:

At the reviewer's suggestion, the abbreviation was expanded, replacing the sentence "... the climate in this part of the island is polar tundra (ET)." with: "... the climate in this part of the island is of the polar tundra climate type (ET – Tundra climate)."

4. Lines 81 – 84: Is it not clear, whether the given temperature, pressure and wind speed values are monthly and daily averaged values. I suggest to state this explicitly.

Response:

Following the reviewer's suggestion, the paragraph has been revised. We have replaced: "In the contemporary period (1991–2020), the average annual air temperature is $-1.0\text{ }^{\circ}\text{C}$. The warmest month is July ($7.0\text{ }^{\circ}\text{C}$) and the coldest is February ($-8.3\text{ }^{\circ}\text{C}$). Atmospheric pressure is at an annual average of 1006.9 hPa and ranges from 998.4 hPa in January to 1013.8 hPa in May. The average wind speed during the year is $6.0\text{ m}\cdot\text{s}^{-1}$. The highest speeds are recorded in January ($7.1\text{ m}\cdot\text{s}^{-1}$) and the lowest in July ($4.9\text{ m}\cdot\text{s}^{-1}$). For most of the year, winds are northerly and north-easterly (Cappelen and Drost Jensen, 2021)." with: "As reported by Cappelen and Drost Jensen (2021) in their Greenland climate report, the mean annual air temperature for Nuuk in the contemporary period (1991–2020) is $-1.0\text{ }^{\circ}\text{C}$. The warmest month is July ($7.0\text{ }^{\circ}\text{C}$) and the coldest is February ($-8.3\text{ }^{\circ}\text{C}$). Atmospheric pressure is at an annual average of 1006.9 hPa and ranges from 998.4 hPa for January to 1013.8 hPa for May. The annual average wind speed is $6.0\text{ m}\cdot\text{s}^{-1}$. The monthly average speeds are highest for January ($7.1\text{ m}\cdot\text{s}^{-1}$) and lowest for July ($4.9\text{ m}\cdot\text{s}^{-1}$). For most of the year, winds are northerly and north-easterly. In this study (Cappelen and Drost Jensen, 2021), both annual and monthly values were calculated from daily averages based on 24 hourly measurements per day."

5. Line 117: “Measurements were taken using barometers with a scale in Paris inches and Paris lines.” A brief definition or description of the Paris inch and Paris line would be good here.

Response:

At the reviewer's suggestion, the following description has been added to lines 120-121: "One Paris inch is 27.07 mm long and corresponds to 12 Paris lines of 2.256 mm (Lamb, 1986)."

6. Line 120: “A gravity correction”. Does this consider the latitude dependence of the gravitational acceleration or something else? Please mention briefly.

Response:

At the reviewer's suggestion, the following explanation has been added to replace the text in lines 123-124: “A gravity correction ($P_{\phi\text{corr}}$) was applied, and the pressure was converted to sea-level altitude (SLP) using the formulas provided in Cappelan (2009).” with: “A normal gravity correction ($P_{\phi\text{corr}}$) (i.e., pressure reduction consistent with gravity values observed at an altitude of 0 m above sea level and a latitude of $\phi=45^\circ\text{N}$) was applied, and the pressure was converted to sea-level altitude (SLP) using the formulas provided in Cappelen (2009).”

7. Lines 149 and following, and Table 1: It is unclear, what the difference between P max and P max abs is. Please explain in detail how the values were determined. Is P max the monthly mean of the maximum daily pressure values? This should be stated explicitly.

Response:

Following the reviewer's suggestion, the paragraph on lines 148-154 was expanded, replacing the text: „The atmospheric pressure data for the sub-period 1784 to 1792 at Nuuk reveal significant seasonal and interannual variations. The highest single observed atmospheric pressures ($P_{\text{max abs}}$) generally occurred during the winter and spring months, with values often exceeding 1025 hPa (Table 1). Conversely, the lowest pressures were recorded during autumn and early winter, with values dropping below 975 hPa. The mean monthly maximum (P_{max}) and minimum (P_{min}) pressure values also showed their greatest fluctuations in winter and spring months.” with: “The atmospheric pressure data for the 1784–92 sub-period at Nuuk reveal significant seasonal and interannual variations. The highest individual observed atmospheric pressures ($P_{\text{max abs}}$) occurred in late winter and spring (Feb–May), with some values

exceeding 1030 hPa (Table 1). Conversely, the lowest pressures were recorded in autumn and early winter, falling below 975 hPa. The mean monthly maximum (P max) and minimum (P min) pressure values, calculated from the mean of the daily (respectively) maximum and minimum atmospheric pressures showed their greatest fluctuations in winter and spring months.”

We also added an explanation on lines 164-165: “The values P max abs and P min abs represent (respectively) the absolute highest and lowest individual atmospheric pressure values measured at a given station during the analysed period.”

8. Line 187: It would be good to briefly describe, how the day-to-day variations were determined. Probably simply by taking the difference between daily max and min values?

Response:

Following the reviewer’s suggestion, the description in lines 192-194 was corrected by replacing: “The day-to-day variations in atmospheric pressure in Nuuk for the historical period and for the contemporary period are categorised according to specific pressure thresholds in Fig. 3.” with: “The day-to-day atmospheric pressure variations were calculated based on the day-to-day difference between daily mean values. Nuuk’s historical and contemporary day-to-day variations in atmospheric pressure are categorised according to specific pressure thresholds in Fig. 3.”

9. Line 196: “there has been a lower frequency of the human sensation of changes in atmospheric pressure”. I’m not sure I understand this statement. How does one know that “human sensation” will be able to detect these relatively small differences?

Response:

In the methods section, the following explanation has been added: “Day-to-day changes in atmospheric pressure can be bothersome. Depending on the intensity of the changes, they can be felt as weak (≤ 4.0 hPa), moderate (4.1-8.0 hPa), strong (8.1-12.0 hPa) or very strong (> 12.0 hPa).”

10. Figure 4: It would be interesting to determine a FT or power spectrum of the historic time series. There seems to be a signature at 2-4 weeks or so?

Response:

As suggested by the reviewer, a Fourier Transform analysis was performed. Accordingly, it was found that there were no clear spectral peaks beyond the zero component, which corresponds to the average signal level. The lack of clear maxima at higher frequencies indicates the lack of dominant periodicities in the analysed time series. The signal variation is broadband and fluctuates irregularly.

The lack of clear spectral maxima may be due to several factors. First, the limited length of the time series impedes data analysis. In this case we are talking about the annual course of average daily values (only 366 data points).

Secondly, the variability of the parameter is probably dependent on short-term atmospheric dynamics.

Furthermore, the lack of clear cycles may reflect the actual absence of strong periodic forcing in the analysed climate system.

11. Section 3.2.1: How uncertain are the inferred historical wind speeds in m/s?

Response:

Wind speed over the historical period was assessed using numerical scales. For the years 1767–68, a numerical scale from 1 to 6 was used, whereas, for the years 1784–92 a scale from 0 to 4 was used. Uncertainty about actual wind speeds over the historical period is minimised by text descriptions of individual wind speed categories. These descriptions are consistent with the current characteristics used when applying the Beaufort scale, which made it possible to easily obtain quite precise information on the wind speed occurring in the historical period.

12. Table 2: As with pressure in Table 1, the different max and min quantities should be precisely defined.

Response:

Following the reviewer's suggestion, the paragraph on lines 223-231 was expanded, replacing the text: „The multi-year average monthly wind speeds at Nuuk station during the historical period (1767/68; 1786–92) ranged from $4.8 \text{ m}\cdot\text{s}^{-1}$ in August to $7.3 \text{ m}\cdot\text{s}^{-1}$ in September. During the years analysed, almost every month (except August) had a wind classified as the fastest ($30.5 \text{ m}\cdot\text{s}^{-1}$). In the case of seasonal values, the highest average speeds occurred in autumn. The highest average of daily maximums occurred in winter, while the lowest average of daily minimums was recorded in summer (Table 2).”

with:

“The multi-year average monthly wind speeds (V) at the Nuuk station were calculated from daily average wind speeds, based on the arithmetic mean of three measurements taken over the 24-hour period. During the historical period the mean monthly wind speed ranged from $4.8 \text{ m}\cdot\text{s}^{-1}$ in August to $7.3 \text{ m}\cdot\text{s}^{-1}$ in September. During the years analysed, in almost every month (except August), a wind speed of $30.5 \text{ m}\cdot\text{s}^{-1}$ was measured, as evidenced by $V \text{ max abs}$. This was the highest value that could be recorded. For seasonal values, the highest average speeds (V) occurred in autumn. The highest average of daily maximums ($V \text{ max}$) occurred in winter, whereas the lowest average of daily minimums ($V \text{ min}$) was recorded in summer (Table 2).”

13. Line 235: “For both periods, the annual mean values are 6.1 m/s ”. How meaningful is the finding that the historical and the modern wind speeds values agree well. Probably not very much. I suggest adding a corresponding disclaimer to the paper.

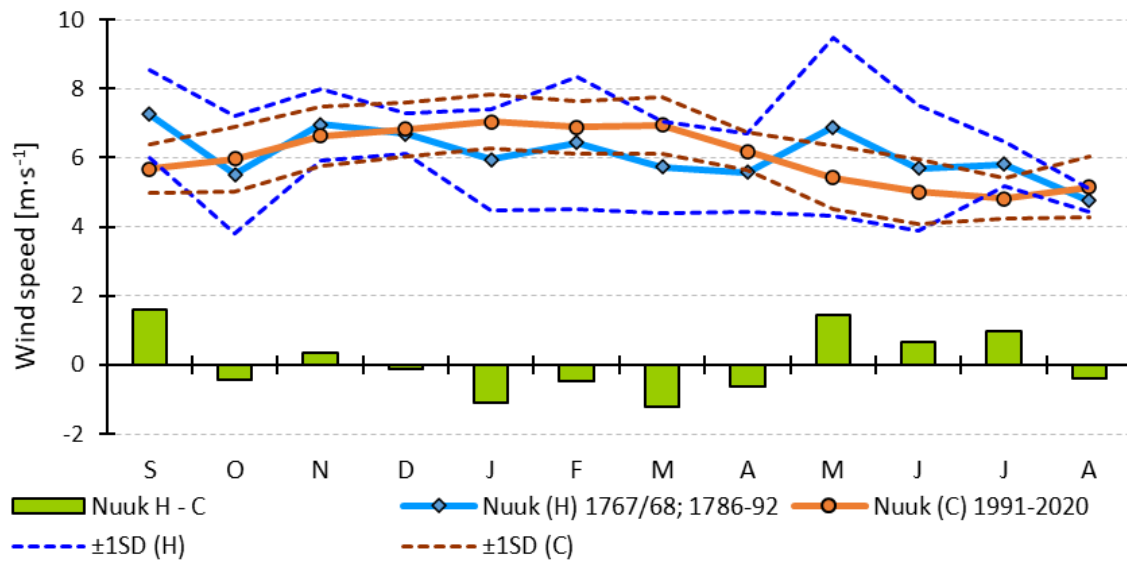
Response:

As suggested by the reviewer, paragraph expansion has been added on line 236: “This does not mean, however, that, over the annual cycle, wind speeds fluctuated the same in the historical period as in the contemporary period. The two periods both exhibited their lowest mean monthly speeds ($V \text{ min}$) in summer, reaching $4.8 \text{ m}\cdot\text{s}^{-1}$. However, in the 18th century, the month with the weakest winds was July, whereas in the contemporary period it was August. An even greater difference is evident in the highest speeds ($V \text{ max}$), which were recorded in September during the historical period and in January during the comparative period.”

14. Figure 5: The SD is the one for the contemporary period, right? It would be good to show the one for the historic period as well.

Response:

As suggested by the reviewer, Figure 5 has been amended to include a new graphic:

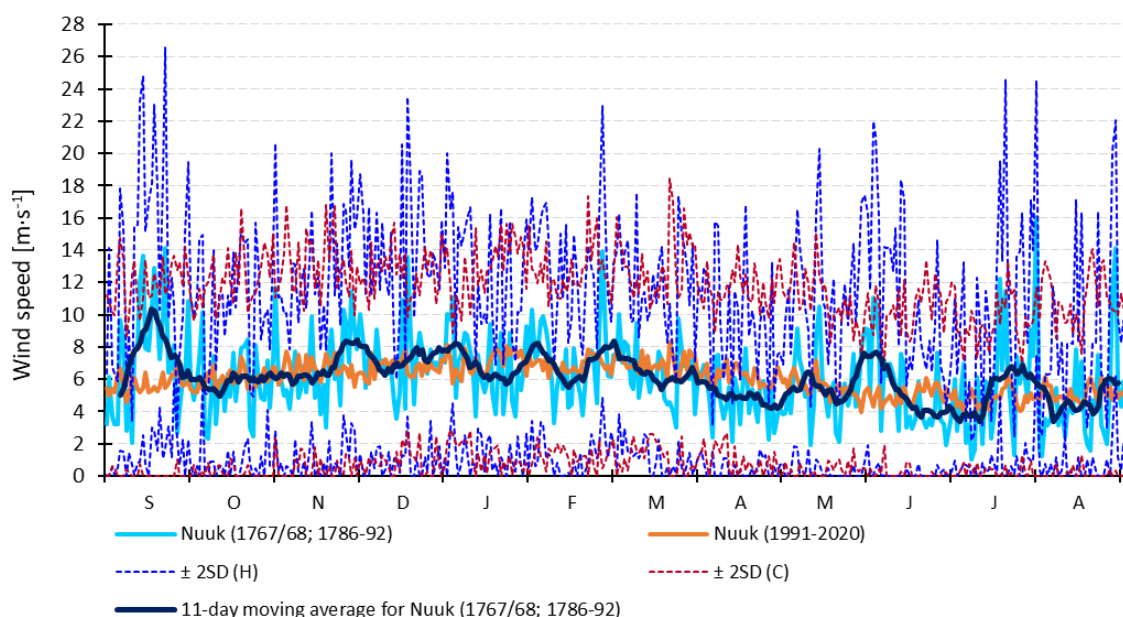


The caption under the figure in lines 254-255 has also been changed, replacing: "Explanations: bars - differences in monthly mean values between stations from the historical and contemporary periods, SD - standard deviation" with: "Explanations: bars - differences in monthly mean values between stations from the historical and contemporary periods, $\pm 1\text{SD}$ (H) - standard deviation for the historical period, $\pm 1\text{SD}$ (C) - standard deviation for the contemporary period"

15. Figure 6: Is SD for the contemporary period? Would be good to show both here as well.

Response:

As suggested, Figure 6 has been amended to include a new graphic:



The caption under the figure in lines 266-267 has also been changed, replacing: "Explanations: SD – standard deviation ($\pm 2SD$)" with: "Explanations: $\pm 2SD$ (H) – 2 standard deviation for the historical period, $\pm 2SD$ (C) – 2 standard deviation for the contemporary period".

16. Section 3.2.2: How is calm defined in the contemporary period?

Response:

Thank you for the comment. On line 134, there is the following information: "In the contemporary period, "calm" was defined as wind speeds below $0.3 \text{ m}\cdot\text{s}^{-1}$."

17. Line 293: "during which, air temperatures". Annual mean temperatures?

Response:

Yes, annual mean. A correction was made on line 293, replacing: "during which, air temperatures" with: "during which, the annual mean air temperatures".

18. Line 298: "The highest temperatures were measured". Annual mean temperatures?

Response:

Yes, annual averages. Corrections were made in lines 296 and 298, replacing: "The lowest temperatures" with: "The lowest annual mean air temperatures" and: "The highest temperatures" with: "The highest annual mean air temperatures".

19. Line 322: "The mean atmospheric pressure during the historical period was 1000.0 hPa." Is this because 1000.0 hPa was used as a reference in some way or is this a coincidence?

Response:

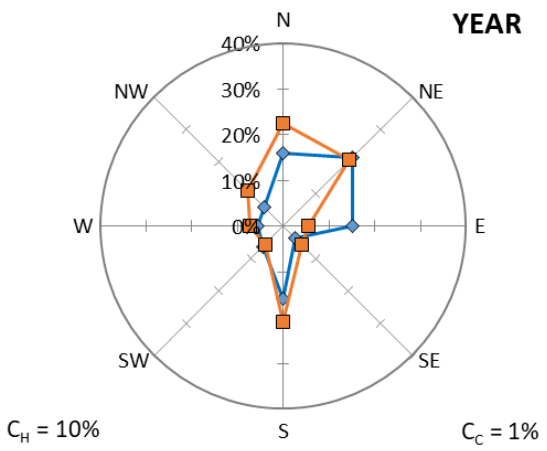
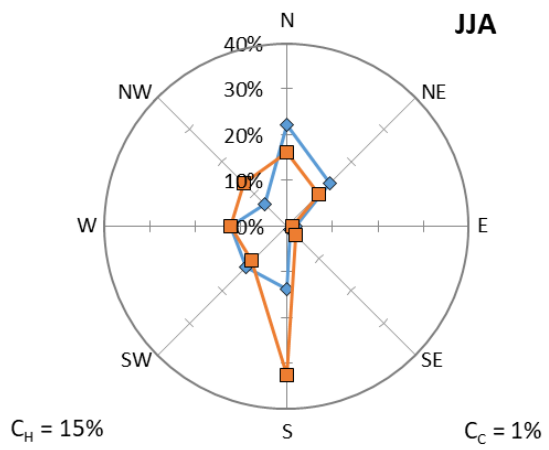
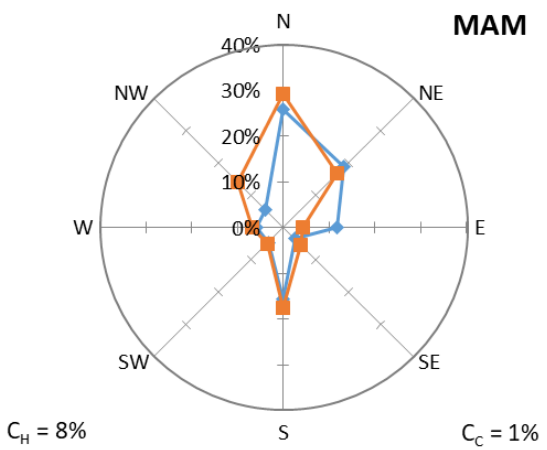
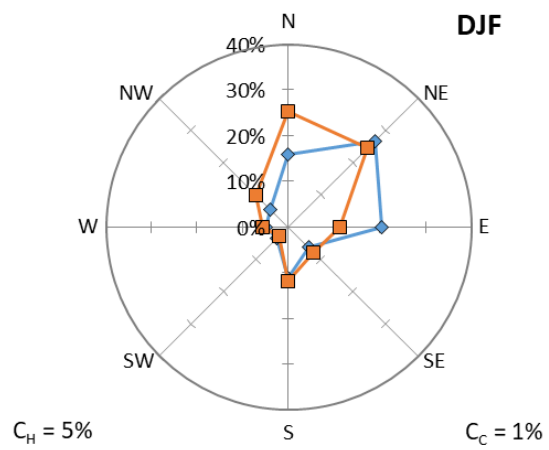
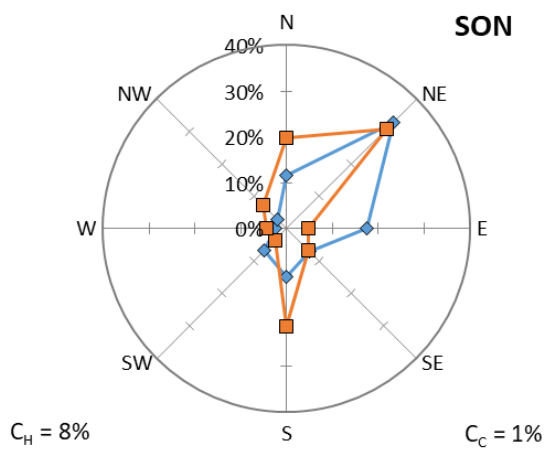
This is purely a coincidence.

20. Figure 9: The pressure labels are a bit misleading, particularly 995 and 990 hPa. Please describe explicitly how to read them, i.e. what point/line of the plot they correspond to.

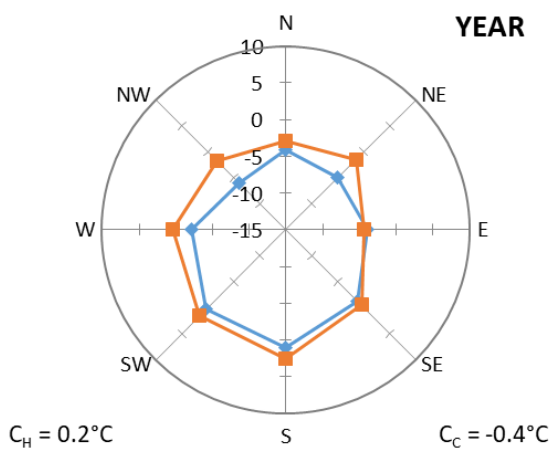
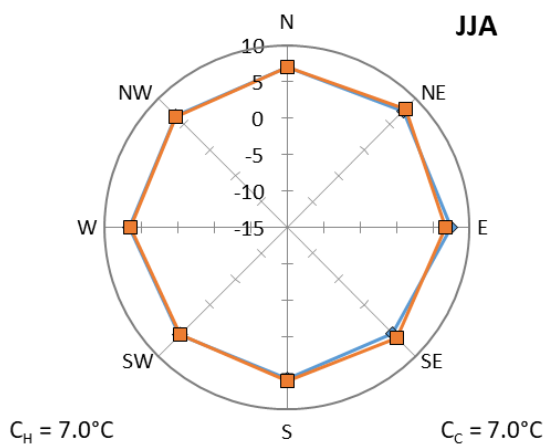
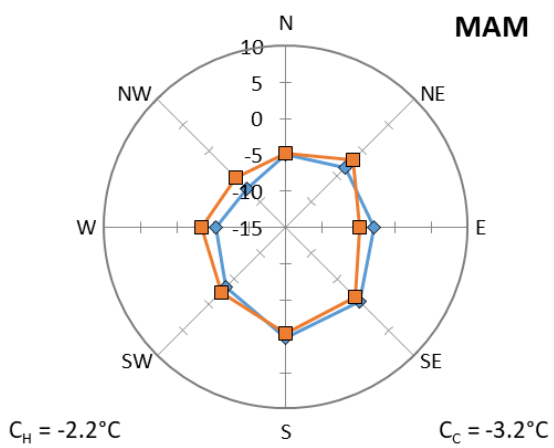
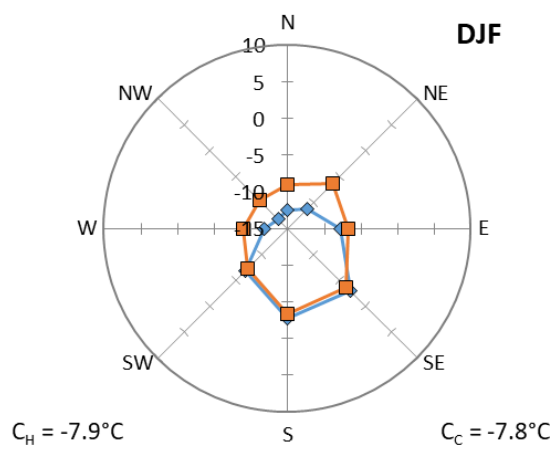
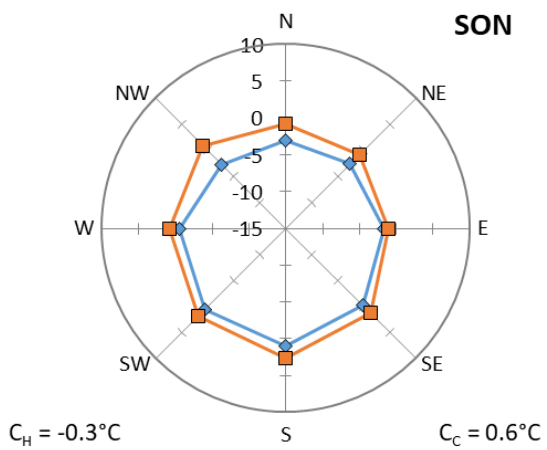
Response:

As suggested, Figure 9 has been amended to include a new graphic: Similar corrections were also applied to Figure 7 and Figure 8.

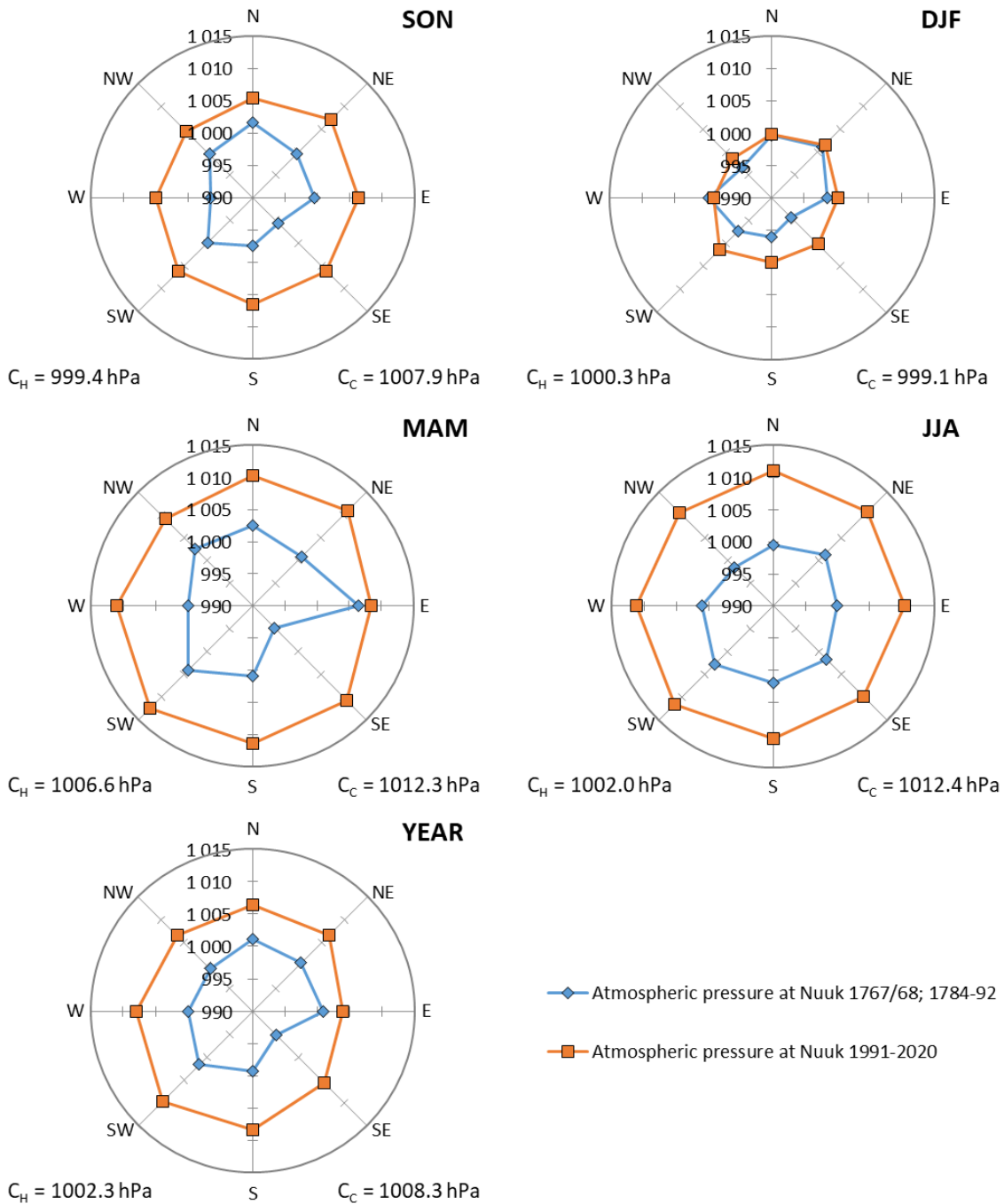
The new graphics from 7 to 9 are as follows:



—◆— Wind direction at Nuuk 1767/68; 1784-92
 —■— Wind direction at Nuuk 1991-2020



 Air temperature at Nuuk 1767/68; 1784-92
 Air temperature at Nuuk 1991-2020



21. Line 364: “In the Arctic (defined as the area north of the 62nd parallel in the Northern Hemisphere)”. The Arctic is usually defined as the area north of the Arctic circle, i.e. 66.5 deg N.

Response:

It is true that the Arctic is often defined as the area north of the 66.5°N parallel, but this is not the only criterion (. In many works this area is defined in different ways, using as its boundary the parallels of 60°N, 65°N or 70°N as well as the parallel of 62°N mentioned in my work. The July isotherm of 10°C is also often taken as the boundary

of the Arctic. I decided on the parallel of 62°N because this is the criterion also adopted in the works I refer to in the paragraph, lines 380-385 (Polyakov et al., 2003; Przybylak, 2007).

The Atlas Arktyki (1985) can also serve as an example of the diversity in the ways the Arctic boundary is defined.

Atlas Arktyki, 1985, Glavnoye Upravlenye Geodeziy I Kartografiy, Moscow, 204 pp.

22. Line 382: “while in the northern part these values are higher”. Higher than in the southern part or higher compared to other areas at this latitude?

Response:

The values are higher compared to other areas at this latitude. Explanations in the text on lines 379-383 were clarified by replacing the text with: “Atmospheric pressure in the southern part of the island reaches comparable values to neighboring areas at this latitude, while in the northern part of the island these values are higher in other regions at this latitude (Putnins, 1970; Wang and Iokeda, 2000; Cassou, 2004).”

23. Line 386: “The winter maximum was 10 hPa, and the summer minimum was 3.7–4.3 hPa”. Are these monthly averaged or seasonal averages?

Response:

These are seasonal averages.

24. Line 398: “whereas over the sea, winds flow parallel to the coast, blowing clockwise”. Parallel to the coast or clockwise? This is not 100% precise, please explain.

The following sentence partly contradicts the previous sentence. Please correct.

Response:

Corrections were made by removing unnecessary text on lines 398-399.

25. Line 405: “Putnins provides”. Year of publication missing.

Response:

On line 405, the missing publication date was added, “(1970)”.

26. Line 412: “Putnins (1970) also analysed wind direction for Greenland”. For which period of time?

Response:

The explanations were clarified by correcting the text fragment in lines 412-413 to: "Putnins (1970) also analysed wind direction for Greenland. One station was Godthaab (now Nuuk) for the years 1931–56. From his work we learn that, in Nuuk, from October ...".

27. Line 450: "A study by Putnins" -> "The study by Putnins", because it has been mentioned several times already.

Response:

On line 450, I corrected: "A study by Putnins" to: "The study by Putnins".

28. Line 457: "These data cover the period from August 1882 to August 1883". Were these wind speeds "measured" in this period or also converted from a scale?

Response:

The wind speed during this time period was measured using an anemometer.

29. Line 483: "In the summer season, they". Context not clear. "they" can correspond to "very strong changes" or to something else. Same bullet point: it would be good to quantify "weak", "moderate" etc. here.

Response:

As suggested by the reviewer, corrections were made in the point on lines 481-485, replacing: "In both historical and modern periods, day-to-day changes in atmospheric pressure have been weak or moderate. Very strong changes dominated during the autumn and winter seasons. In the summer season, they almost never occurred in the historical period, whereas in the contemporary period this minimum shifted to the transition from spring to summer." with: "In both the historical (long-term average) and the modern period, day-to-day changes in atmospheric pressure of "weak" (≤ 4.0 hPa) strength accounted for over 50% in autumn and winter and for over 80% in summer. The highest frequency of strong (8.1–12.0 hPa) and very strong (>12.0 hPa) changes occurred in the autumn and winter seasons. In the historical period, very strong changes almost never occurred in the summer season, whereas, in the modern period, this minimum has shifted to the transition of spring to summer."

30. Line 486: "The multi-year average monthly wind speed values in the historical and contemporary periods have similar values,". This is probably not really a robust result, is it? I suggest stating this explicitly.

Response:

As suggested by the reviewer, the paragraph on lines 486-487 has been expanded, replacing: "The multi-year average monthly wind speed values in the historical and contemporary periods have similar values, and the annual average for both data series reached $6.1 \text{ m}\cdot\text{s}^{-1}$." na: "The multi-year average annual wind speed in the historical and contemporary periods was $6.1 \text{ m}\cdot\text{s}^{-1}$. However, a difference was visible in their annual courses. In the historical period, compared to the contemporary, wind speeds were lower in the winter months and early spring, and higher in the latter part of spring and in the summer."

31. Line 499: "which is still possible TO BE INVESTIGATED"

Response:

Thank you for the comment. At the reviewer's suggestion, the text fragment in lines 497-499 has been corrected to: "However, this may be the result of the device's incorrect calibration. In this work, however, the relationship between wind direction and atmospheric pressure difference is of greater importance and can still be investigated."

Reviewer: 2

Reply to GENERAL COMMENTS

The manuscript presents an interesting contribution that is clearly relevant to the readership of "Climate of the Past". The topic is well aligned with the journal's scope, and the study has the potential to provide valuable insights into historical climate variability. For these reasons, I would like to see this work eventually published in "Climate of the Past". However, in its current form, the manuscript has several substantial shortcomings that preclude publication at this stage. These issues relate to (1) the insufficient description of the historical sources used, (2) the lack of essential metadata on the instruments and their installation, (3) an overly superficial discussion of the data-conversion methodologies, and (4) significant problems concerning style, clarity, and overall presentation. I elaborate on these points below.

Response:

Thank you very much for your recognition of the article's merits. We hope we have satisfactorily clarified and expanded on the issues that raised doubts.

Reply to DETAILED COMMENTS

1. Description of Historical Sources

The information provided on the historical documentary materials is insufficient. The manuscript must include a complete and precise description of all primary sources, explicitly indicating whether they are printed or manuscript documents. Moreover, the exact archival locations (including repository names, call numbers, and shelf marks) must be stated. This level of detail is crucial both for reproducibility and to avoid duplication with previous research already conducted on the same materials. Without full transparency regarding the provenance and nature of the sources, it is difficult for readers to evaluate the robustness of the dataset.

Response:

Thank you for this comment. As suggested, I have changed the paragraph at lines 87-95. Below is the corrected text.

"The climatic conditions in SW Greenland were characterised using data from handwritten diaries containing records of meteorological measurements taken during the historical period. These materials were prepared by the Moravian missionaries, who were conducting missions at that time, including in Arctic areas. The aforementioned materials are kept in European archives: 1) Moravian Archives in Herrnhut (Germany), catalogue number MH R.15 J.a.13.9; 2) Det Kgl. Bibliotek in Copenhagen (Denmark), manuscript title Astronomiske og meteorologisk lagttagelser, anstillede i Godthaab i Grønland 1782–1792. The records present two periods: 1) September 1767 – July 1768; 2) September 1784 – June 1792. This second period consisted of four shorter series: September 1784 – June 1785, October 1786 – June 1787, November – December 1788, January 1790 – June 1792 (hereinafter, all series are often referred to collectively as those of the "historical period")."

2. Instrumentation and Installation Details A clear understanding of the measurement setup is essential for interpreting the results presented in this study. Unfortunately, the manuscript provides insufficient information on the type of instruments used and the conditions under which the observations were

taken. Details such as the model of the instruments, their exposure, installation height, and any known calibration procedures are necessary to assess data quality. For example, the 5.9 hPa offset reported between the historical and modern barometric measurements could plausibly arise from an unaccounted-for error in the historical barometer's installation height. Similarly, the methodology used to derive the wind-force index is only briefly mentioned, yet it may be crucial for validating the resulting series and their comparability with modern observations. A substantial expansion of this section is needed.

Response:

Thank you for this comment. As suggested, I have expanded the necessary information by adding lines 98-105:

*“The meteorological observations conducted by the Moravian brothers in Nuuk in 1767/68 were based on meteorological instruments (a thermometer and a barometer) provided by Christian Gottlieb Kratzenstein (1723–95), Rector of the University of Copenhagen (Borm et al., 2021). Unfortunately, no information on the methods of these observations (e.g., location, exposition) has been found. The measurements in 1782–92 used instruments provided by the Palatine Meteorological Society. The Society prepared instructions for conducting meteorological observations, which were also included in the publication *Societas Meteorologica Palatina: Ephemerides Societatis Meteorologicae Palatinae 1781* (1783).”*

Unfortunately, we do not have precise descriptions of the meteorological instruments that were used to conduct measurements at that time. The information was restricted to the device type, i.e. thermometer, barometer.

For atmospheric pressure measurements, corrections to altitude, latitude and air temperature were applied as described in lines 116-128.

Comments regarding wind speed are commented upon in the next point.

3. Methodologies of Data Conversion

The procedures used to convert historical scales and units into modern equivalents are described only superficially. This topic warrants much more detail, including references to the relevant literature and established best practices. I strongly recommend that the authors incorporate additional citations to guide readers and to justify their methodological choices. Examples of particularly relevant sources include:

A more explicit and transparent description of conversion procedures, unit transformations, corrections, and assumptions is necessary to ensure scientific soundness and reproducibility.

Response:

Thank you for this comment. As suggested, I expanded upon the topic of unit conversion and transformation methods. Accordingly, I have revised the entire subsection 2.3. Methods:

„This work uses data on air temperature, atmospheric pressure, wind direction and wind force from Nuuk (Greenland) from 1767/68 and 1784–92. They were quality controlled and then converted to modern units.

As mentioned earlier, we did not have information on the calibration required for the thermometers. Therefore, we decided to simply convert the historical thermometer's units to modern units. For the first stage of the historical period (1767/68), temperature was converted from °F to °C, whereas for the second period (1784–92) it was converted from °R to °C. For atmospheric pressure, measurements were taken using barometers with a scale in Paris inches and Paris lines. One Paris inch is 27.07 mm long and corresponds to 12 Paris lines of 2.256 mm (Lamb, 1986). The results were converted to mmHg and then to hPa. Corrections were applied to the resulting data, enabling comparison between historical and contemporary data. A normal gravity correction ($P_{\phi\text{corr}}$) (i.e., pressure reduction consistent with gravity values observed at an altitude of 0 m above sea level and a latitude of $\phi=45^\circ\text{N}$) was applied, and the pressure was converted to sea-level altitude (SLP) using the formulas provided in Cappelen (2009). For more details, see Przybylak et al. (2013).

Temperature and pressure records taken from a barometer equipped with a thermometer are also available for Nuuk for the period from November 1788 to June 1792. These measurements allowed the correction of atmospheric pressure to a temperature value of 0 °C. For this purpose, the Kämtz formula provided in Können et al. (2003) was applied. For more details, see Przybylak et al. (2013). The obtained correction values averaged for individual months (Table S1) were used to correct the remaining atmospheric pressure data at Nuuk.

Wind speed and direction measurements were used to analyse anemological conditions in Nuuk. Wind direction did not require conversion because it was recorded using wind rose directions. The greatest challenge in meteorological observations was measuring wind force, which was recorded using numerical scales. The sources do not provide information on which speed corresponds to a given scale value, but they

do describe the conditions around the stations that should occur for each wind category. These historical categories were then compared with descriptions of conditions for each Beaufort scale category (García-Herrera et al., 2003). This allowed for the conversion of wind force from numerical scales of 1–6 and 0–4 to $\text{m}\cdot\text{s}^{-1}$. The obtained results provide information about wind speed at a height of 10 m above ground level. In the contemporary period, “calm” was defined as wind speeds below $0.3 \text{ m}\cdot\text{s}^{-1}$.

Based on available data, an analysis of atmospheric pressure values and anemological conditions was conducted for the historical period (1767/68; 1784–92) and the contemporary period (1991–2020). For atmospheric pressure, the course of daily and monthly mean and extreme values were examined. Furthermore, the monthly frequency and day-to-day variation of individual atmospheric pressure events were presented for each year and for the entire periods (historical and contemporary). Day-to-day changes in atmospheric pressure can be bothersome. Depending on the intensity of the changes, they can be felt as weak ($\leq 4.0 \text{ hPa}$), moderate ($4.1\text{--}8.0 \text{ hPa}$), strong ($8.1\text{--}12.0 \text{ hPa}$) or very strong ($> 12.0 \text{ hPa}$).

Wind speeds (as with atmospheric pressure) were examined in terms of daily and monthly averages and extreme values. Observed wind directions were compared against contemporary measurements, with the analyses covering individual months, entire seasons and multi-year periods. The article also presents how observed wind direction correlates with air temperature and with atmospheric pressure.”

This also involved adding two items to the literature between lines 562–563 and 577–578, respectively:

”García-Herrera, R., Prieto, L., Gallego, D., Hernández, E., Gimeno, L., Können, G.P., Koek, F.B., Wheeler, D.A., Wilkinson, C., Prieto, M.R., Báez, C., and Woodruff, S.: CLIWOC multilingual meteorological dictionary, EU contract EVK2-CT-2000-00090, 2003.”

“Lamb, H.H.: Ancient units used by the pioneers of meteorological measurements, Weather, 41, 230–233, 1986.”

4. Style and Editing In several parts, the manuscript reads more like a collection of notes than a cohesive scientific article. Explanations are often too brief, and many sentences (particularly in figure captions and other descriptive sections) are excessively short or even lack verbs. The text needs a thorough stylistic

revision to ensure clarity, coherence, and consistency. The manuscript should be self-contained, well structured, and homogeneous in tone and format. At present, significant work is required to meet the editorial standards expected by “Climate of the Past”.

Response:

Thank you for your general comment regarding the readability of the manuscript. We have had the article re-examined by a professional language editor and have made various changes to make the article more self-contained and explicit, to remove ambiguities and to improve the consistency in tone. However, the article was prepared following the recommended structure and conventions regarding the organisation of the sections, the presentation of results. Similarly, the narrative style and tone were consciously chosen to ensure conciseness and precision, though occasional lapses did indeed occur that have now been addressed.

The decision to caption figures using short sentences in places and non-sentential notation forms and extended noun phrases was a deliberate and conventional approach that describes the content clearly and without excessive repetition. We believe that the explanations provided are thus sufficient to understand the presented results.

If you have any further comments on specific phrases or sentences, we are open to introducing stylistic corrections to improve the clarity of the message.

Recommendations

In summary, while the study has promising scientific value and fits well within the journal’s scope, it requires major revisions before it can be considered for publication. Substantial improvements in the documentation of sources, description of instruments and metadata, methodological transparency, and overall writing quality are necessary. I therefore recommend major revisions.

Response:

We appreciate the Reviewer’s positive assessment of the potential scientific value of the study and for confirming that the subject of the work fits within the scope of Climate of the Past. We also appreciate the detailed highlighting of areas requiring clarification and improvement.

In response to the recommendation for thorough revisions, we have made significant changes to the manuscript. In particular, the documentation of data sources, the description of measurement instruments and related metadata have been expanded

and clarified. The methodology has been described more transparently and in greater detail to enable assessment of the procedures used and improve the reproducibility of the analyses.

*We hope that the above responses fully address the comments made and that the revised manuscript meets the editorial standards required for further consideration for publication in *Climate of the Past*.*

Thank you once again for all the remarks and comments

On behalf of the authors,

Konrad Chmist