Dear Editor,

Thank you very much for your comments and suggestions. We have now made the changes and added references in all places you required it. Please see below the answers to your comments.

Page 2, line 60: We have deleted “West Spitzbergen Current”, however, we think that it is necessary to keep “RAC”, as we use this abbreviation several times in the manuscript, in some cases also two times in one sentence. However, if the Editor wishes so, we will write out Return Atlantic Current at every occasion throughout the paper.

Page 3:
Where do you refer to when you say northern North Atlantic? Her it sounds like you refer to the impact of fresh water in teh the North Atlantic (south of teh ridge) - but in teh sentence above it sounds like the northern North Atlantic is used for the eastern Nordic Seas. Be precice to avoid confusion.
Thank you for your comment; we have now changed the location names to more precise terms.

Unclear; what do you mean by dynamics of the Arctic Ocean? Add reference.
Noted. We have now changed it to “ocean-atmosphere dynamics”, have added an example of what we mean by it, and have added two references to the sentence.

The part related to NAO/AO would benefit from a rewriting:
Complex - rather use mode of variability
redistribution of air masses - be more concrete; these modes of variability is defined with respect to the fluctuations in atmospheric preassure at sea level (for NAO SLP between the Azores high and Icelandic low).
Positive NAO - stronger southwesterlies rather than straight westerlies (that are more the case during negative NAO phases)
As suggested, we have changed “complex” to “mode of variability”, and we added information about the fluctuations of atmospheric pressure at sea level. We have also exchanged “westerlies” to “south-westerlies”.

Page 10
Confusing; in the text the dark blue species are linked to permanent sea ice conditions. Here they are linked to Arctic water. Please clarity. Arctic water is not permanently sea ice covered.
You are correct; the explanation in the figure caption was too simplified. We have now added “often living beneath perennial to near-perennial sea-ice” to the description of the Arctic Water species. Further details, i.e. that *S. horvathi* is linked to perennial sea ice, while *E. arctica* is rather found in connection to open water areas within the sea ice we only explain in the actual text, not the figure caption in order to not repeat text and make the caption too long and complicated. However, we have expanded this explanation and the comparison to *S. feylingi* in the text. We also added specified that the light blue species (*Stainforthia feylingi*) is linked to the sea-ice edge in the figure caption.

Page 15
The fresh melt water will normally forma lid at the surface. By what mechanism do you get an impact of the fresh meltwater on the d18O values of the bottom water? Please specify.
Thank you for your comment. We added the information to the sentence that the melt water might sink with melt water plumes to the bottom.

What do you mean by heavy sea ice cover? Permanent sea ice?
In the next paragraph you pulll support for this interpretation from the Zehnich et al., 2020 paper; however, whiel they do argue for more sea ice at this time than earlier, this interpretations is linked to the contemporary low phytoplancton growth. And if you look at their results in respect of sea ice coverage it transfer from reduced/variable to marginal/seasonal during this interval, not permanent.
If you are closer to marginal/seasonal than permanent sea ice, your high productivity is more logical.
Clarify your interpretation and your discussion, so that it is clear in the end what your prefered interpretation is, and why, not only based on your records but seen in context of available regional information.
In addition to the records already mentioned, Maffezzoli et al., 2021 QSR present a new sea ice information from the RECAP ice core at Renland.

Unfortunately, with our methods we are not able to produce a quantitative sea-ice reconstruction. Thus we cannot with certainty differentiate between perennial and extensive (near-perennial) sea-ice cover, thus, we prefer not to name it “perennial” or “near-perennial” and just use the broader term “extensive”. However, as suggested, we have deleted the part that states high bioproductivity referred by Zehnich et al., 2020.

Page 16

Pure speculation; do you have any evidence/support for this statement? If not I would delete this sentence.

We have reformulated the sentence and supported the statement with reference to previous studies.

Use the information from other studies actively as part of the discussion above. E.g. Our interpretation of a stronger inflIuence of AEW at our site is supported by ...

Same as above and check throughout - make sure to link the information from existing studies to the interpretation of your data. Here you provide statements on what they find, but do not discuss.

We have reformulated several sentences in the discussion to link our interpretation better to existing studies.

Page 17

How do you get reduced stratification by freshening? Normally a fresher water mass will have a lower density and hence enhance the stratification.

We see that this could seem strange. We have thus added reduction of “warmer waters” to the sentence, in order to make it clear that parallel to the colder surface waters the subsurface waters also got cooler with the reduction of RAC.

Page 18

This section reads more like a review of litterature than a discussion of your results in context of knowledge from the litterature.

I tenk to agree with the referees that it would strengthen the paper if you integrate the information of section 5.4 and 5.5 at the relevant places in the previous sections.

Thank you for your comment. We have now integrated chapter 5.4 into chapter 5.3. However, we would like to keep chapter 5.5 (now 5.4) separated, as this part describes a mechanism that stretches over the whole time period discussed and while the previous chapters of the discussion primarily discuss the general development, this chapter is more focused on processes.

Resolution is also a key factor here - its a very short event so to be able to detect it you need better resolution than what you have in your foraminifera data.

Thank you for your comment, however it is already mentioned earlier, in chapter 5.3.2: “It is not recognizable in the foraminiferal assemblage changes/stable isotope results, although the lower temporal resolution of the latter may also not allow us to identify any changes.” As we have now integrated the part that you are referring to into chapter 5.3, we think that it is not necessary to repeat this statement.

Add reference.

We have deleted this sentence, because after the integration of the two chapters it became redundant.

Delete.

Or clarify the relation to your results / how the change in the Irminger Current is physically conected to the suggested change in the EGC.

The first part of the sentence may be kept if you rephrase it, relating the downstream warming to the increased influence of Atlantic Water at your site.

Thank you for your comment. We have now reformulated the sentence to make it more clear the connection between the EGC and the northern flow of Atlantic water.

Page 19

how do you know that the fresh water forcing commes from the Arctic Ocean?

We see that this was unclear. We have now added references to this sentence.

Specify the changes and add reference for the covariance statement.

The term HTM is used in many different ways and the timng may change depending on definition used and where you are, please add information about when this happened.
Same bellow with mid Holocene - you define it previously, but its easuer to follow for the reader if you use ages, and its more specific.
Thank you for your comment. The sentence you are referring to, was meant as an introduction to this section; the changes are specified following this sentence. However, now we have reformulated a bit and added a reference to make our intention clear. We have also added ages to HTM and mid Holocene.

Depending on an assumption that the fraction of AW entering the Arctic Ocean and the RAC staying constant.
We have now added this information to the sentence.

The NAO/AO statement comes out of the blue. It is not clear from the above why this coolingis associated with a transition from a positive to a negative NAO. Please rephrase to clarify.
We have rewritten this part to make the statement more clear.

Page 20
Andreas Born have several newer papers investigating the dynamics of the SPG
We have added reference to a paper from Born.