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### **Finalized version of revised manuscript cp-2023-73**

Dear Prof. Dr. Piotrowska,  
dear Reviewers,

Thank you for accepting our paper on “North Atlantic Oscillation polarity during the past 3000 years derived from sediments of large lowland lake Schweriner See, NE-Germany” by Adolph et al. in *Climate of the Past*. We added minor corrections according to the reviewers' suggestions to the final version of this manuscript. Please find detailed responses to the reviewer's suggestions below.

Sincerely,

Dr. Marie-Luise Adolph

## Responses to Reviewer 1

Dear Authors,

Congratulations on revising your manuscript! The manuscript entitled "North Atlantic Oscillation Polarity During the Past 3000 Years Derived from Sediments of Large Lowland Lake Schweriner See, NE-Germany" has significantly improved since the last round of review. It is now a comprehensive and relevant contribution to the topic of hydrological changes. This version is well-structured and reads smoothly.

There are some final mostly technical suggestions:

Please provide depths in order from shallower to deeper. For example, in line 224, it should be 844.5-878.5, not the other way around.

"When a geologist interprets the Earth's history, the story is read from bottom to top." Geological structures are usually described from bottom to top, i.e., from the older to the younger lithological units. Therefore, we would like to keep this traditional concept in geology.

When providing ranges, such as in line 240 ("Grain size means range from 11.56-56.98"), the word "to" should be included. It should read "from 11.56 to 56.98." The same applies to "between," as in line 247 ("ranging between 6.2-21.6"); it should be "between 6.2 and 21.6."

Done

Lines 353-355 largely repeat the first sentence of this paragraph. Please consider rewriting these lines for clarity and conciseness.

Done

## Responses to Reviewer 2

The structure of the revised manuscript by Adolph et al. titled 'North Atlantic Oscillation polarity during the past 3000 years derived from sediments of large lowland lake Schweriner See, NE Germany' improved significantly and I support publication of the work in *Climate of the Past*. Some minor modifications should be included before the final publication (see the list below).

Minor comments:

!Line numbers are from the author's tracked changes version!

Abstract:

Line 23: Add 'wind' between 'Westerly' and 'strength'.

Done

Main text:

Line 34: Replace 'i.e.' with 'e.g.'.

Done

Line 45: Delete 'sea-level' and the associated abbreviation. Azores High and Iceland Low are not just sea-level phenomena.

Done

Line 53: Add 'pressure' between 'weaker' and 'gradient'.

Done

Line 54: Add 'and dryer' between 'colder' and 'air'. Delete the following sentence.

Done

Lines 82-84: (from the manuscript)...we hypothesize that the lake is less susceptible to anthropogenic biases that may be experienced when investigating small lacustrine systems and sediments from Schweriner See reflects (supra)regional hydroclimatic variations.

Anthropogenic influences on Ti variability since the 12th century and a human induced eutrophication since AD 1850 that overprints the climate signal are considerable human impacts on sedimentation in Schweriner See. Please modify or delete the above sentence.

This sentence is a hypothesis which is revisited and checked in the conclusions. Therefore, we would like to keep the hypothesis as it is.

Lines 112-113: Delete the sentence about the studied sediment core in the study area chapter. This information is provided a bit later in Chapter 3.1 (Coring and composite profile).

Done

Lines 198-199: Reading that sentence I understand that the pooled 2 cm thick samples result in a 100 to 150-year resolution of the leaf wax time-series. I think you forgot to mention the gaps between the samples.

We revised this section entirely: "For this, one-centimetre-thick samples were taken and pooled with 0.5 cm of sediment above and below the sampling depth. Sample depths were based on significant changes observed in the XRF-scanning results. This resulted in a **sampling distance of 6 to 63.5 cm (equivalent to a 29-195 year temporal sampling resolution, with samples covering 5-10 years)**." (Lines 167-170)

Lines 218-219: Same as above. You do not mention the gaps between the samples (step-size).

We added the step-size.

Lines 231-234: Same as above. Please add a number for the step-size.

We added the step-size.

Line 244: 'boundaries' instead of 'boundary': (Unit C1 to C2 as well as D1, D2 and D3)

Done

Lines 249-257: Provide % values for carbonate and organic matter contents in this result section, when applicable.

We added percentage value when applicable.

Line 258: Add 'radiocarbon' between 'bottommost' and 'sample'.

Done

Line 266: Add a cm value specifying 'Above'.

Done

Line 273: 'sand' not 'Sand'.

We use  $Sand_{>125\mu m}$  as an individual proxy, which is also shown in e.g. Fig. 3 and 4. This parameter is also named " $Sand_{>125\mu m}$ " in the discussion section. For consistency, we refrain from changing it.

Lines 375-379: Maybe replace the 'hyphens' between the dates with 'to' to improve the readability?

Done

Lines 705-739: The same applies for the time-spans in the conclusions.

Done