

## ***Interactive comment on “Blocking induced by the strengthened Siberian High led to drying in west Asia during the 4.2 ka BP event — a hypothesis” by Aurel Perşoiu et al.***

### **Anonymous Referee #2**

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The study focuses on the boreal winter season in Eurasia during the 4.2 cal BP event, where climate variability is a function of the spatio-temporal dynamics of the westerly winds. The authors present a multi-proxy reconstruction of winter climate conditions in Europe, west Asia and northern Africa between 4.3 and 3.8 ka BP. The authors hypothesise that in the extratropical Northern Hemisphere, the 4.2 ka BP event was caused by the strengthening and expansion of the Siberian High, which effectively blocked the moisture-carrying westerlies from reaching W Asia, and enhanced outbreaks of cold and dry winds in that region. The authors further hypothesise that in extratropical regions of Eurasia the 4.2 ka BP event was a century-scale winter phenomenon, whereas in the monsoon-dominated regions it may have been a feature of summer

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climate conditions.

Generally, the introduction is well written, the aim and hypothesis of the current study are clear.

Methodological approach: the method chapter clearly documents the methodological steps and criteria.

Results and discussion: the authors create a convincing concept for the large-scale atmospheric conditions around 4.2 cal ka BP. I like the deduction of probable negative NAO-like conditions at 4.2 cal ka BP although the Olsen record (Olsen et al. 2012) does not indicate a clear negative NAO-like stage at that time.

Overall, the manuscript is well organised and I recommend publication in *Climate of the Past* with minor revisions.

Detailed comments: Line 15: delete "using"

Line 22: What do you mean exactly with "antiphase behaviour"?

Line 34: This is not clear for the Western Mediterranean. There are also indications for wet conditions at 4.2 cal ka BP in the W Mediterranean (e.g. Fletcher et al. 2013).

Line 90: "Our analysis has shown that the results are not sensitive to the exact threshold value used for our composite analysis". What does it mean? Explain the consequences for your data interpretation.

Fletcher, W.J., Debret, M., Sanchez Goñi, M.F.: Mid-Holocene emergence of a low-frequency millennial oscillation in western Mediterranean climate: implications for past dynamics of the North Atlantic atmospheric westerlies. *The Holocene* 23, 153-166, 2013.

Olsen, J., Anderson, N. J., and Knudsen, M. F.: Variability of the North Atlantic Oscillation over the past 5,200 years, *Nature Geosci*, 5, 808-812, 2012.

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