

Comment 1:

This paper is mainly introducing a statistical method to explore climate mechanisms, which is a good idea. Generally speaking, this paper is well organized with 1) a presentation of the model simulations, 2) a discussion and comparison of the regional proxies, 3) a summary of the model implications.

Comment 2:

The conclusion is rather long. The middle paragraph should be removed from there, and possibly merged in the discussion.

Comment 3:

Line 26: “Yet, the exact timing of drought conditions based on different proxy varies spatially and temporally” needs more details. For example, what are the main causes for the spatial and temporal variations?

Comment 4:

P9-line 5: Need a brief introduction to “Bond event 3”.

Additional comments.

1. You use the modern 5-anomaly dry years as representation to discuss the 4200 years climate mechanism. Does it mean that you can draw the same conclusion for the other drought events in your sedimentary core if there is any?
2. How do you deal with the fact that while around 4200 the vegetation is dominated by Populus, and that now it is dominated by conifers. That means the climatic conditions are very different, yet your reconstruction of the 4.2 dry event is based on pollen.