

***Interactive comment on “Relationships between low-temperature fires, climate and vegetation during the last 430 kyrs in northeastern Siberia reconstructed from monosaccharide anhydrides in Lake El’gygytgyn sediments” by Elisabeth Dietze et al.***

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Dietze et al.

This is a record of low -temperature fires during the last 430 kyr from NW Siberia. It is a well known and very well-time constrained record. It is an interesting record but needs a little work to get it in good shape.

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Actually, it does not cover all of the last 430 kyr and is really a record from MIS stages 5e to 12. Perhaps the title should reflect this. The manuscript and interpretations make a number of assumptions that could be better spelled out. Interpretation of the deeper time record is based on knowledge of contemporary ecosystems in Siberia. Hence assumption number one is that present ecology is a good analogue for the past. Yet we know from the pollen record that the boundary conditions may be different. I am not aware that the molecular proxies have been tested in the field or lab. So assumption 2 is that the only source of the key compounds is from low-temperature fires. The fire record could be readily strengthened if there was some accompanying micro-charcoal record from the sediments. Does such data exist?

An anonymous review asks the question about how mobile these compounds may be down a sediment profile. This is potentially a serious matter which could make the whole interpretation flawed. It may be ameliorated if the compounds become bound to say clay particles but it needs to be tested. One wonders whether these proxies may be affected by diagenesis. The authors allude to this in their discussion (lines 280-285, and 340+). Thus we assume any diagenetic effect is small compared to the magnitude of the changes in abundance of the key compounds. It would be useful if this was made more explicit. In lines 200-210 mention is made that the pollen records have been harmonized. What does this mean and how was it done?

There is an obvious question about how these ancient fire regimes relate to fire in the present day. There is potentially a lot to say here about any differences in natural and anthropogenic fires regimes.

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