Climate of the Past Discussions

Clim. Past Discuss., author comment AC2
https://doi.org/10.5194/cp-2021-26-AC2, 2021

Reply on RC2

Delia Segato et al.

Author comment on "Five thousand years of fire history in the high North Atlantic region: natural variability and ancient human forcing" by Delia Segato et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-26-AC2, 2021

This manuscript entitled 5 kyr of Fire history in the High North Atlantic Region: natural variability and ancient human forcing by Segato and colleagues, is a timely executed study of past biomass burning reconstructed from levoglucosan, BC, and ammonium and associated drivers, in the Nord Atlantic Region based on an ice core record from Greenland. The manuscript is based on quality data and statistical analysis, generally clearly written, and well referenced.

We thank the referee for the time dedicated to reading and commenting our manuscript.

General comments

Although the manuscript reads well, there are many typos and unclear sentences, therefore I ask the authors to carefully check the English. The authors described in detail the association of biomass burning with climate and humans, but they do a less good job at linking biomass burning with the vegetation more systematically. For example, vegetation is not just vegetation, but it is composed of various species /assemblages that burn differently. At the minimum, the authors should work on the comparison of this record with the pollen records from Greenland and Iceland. Results and methods are also mixed in chapter 3.3.

The entire text has been checked by a native English speaker. We included a reconstruction of vegetation types since mid-Holocene for Eastern Greenland and Iceland in the discussions. We thank the referee for the suggestion of including a discussion of the link between biomass burning and fuel load/vegetation type since it improved the quality of the manuscript. We also divided methods and results in sections 2.3 and 3.3.

Specific comments

A fine suggestion, but where is the link with biomass burning?

Newline 13-14: Rephrased sentence. Modified "forest fires" to "wildfires", as to include fire of different types of vegetation.

L43 the increase in what?

Newline 43: "pyrogenic methane" added in the sentence.

L53, l.250, l.319 regarding Siberia please see a recent paper covering this region https://www.sciencedirect.com/science/article/abs/pii/S0277379120304571

Newline 23-25, 256-260 and 337: Siberia charcoal concentration from Feurdean et al., 2020 included in the discussion.

l.174 ff. This chapter is a mix of methods and results. Please have a similar chapter i.e, statistical analysis at the Methods, where you describe what you did and why and leave here (3.3) only the text that belongs to Results. For example l. 175-182 read like methods.

We divided methods and results in sections 2.3 and 3.3.

223 5-4.5 kyr is not exactly early Holocene

Newline 228: corrected to "mid-Holocene" only.

239, 254, and many other places, please report the age in a consistent manner not mixed.

Age scale corrected to kyr or years BP (before 2000 AD) in the entire text.

287 here is the only place you mention the role of vegetation on biomass burning and then a bit in the next chapter 4.1.3. If you know that Island may have been the main source of levoglucosan, and surely also Greenland, why not checking the pollen /plant macrofossils literature from the two regions and discuss a bit more on the potential influence of the amount of biomass, the type (composition) and fuel moisture on biomass burning during the past 5 kyrs and not only snapshots in time. It would make your paper more complete. Look how nicely this comes on 4.1.3, so why not also before Viking colonisation.

Newline 292-315 and 334-336: Discussion of pollen records from Eastern Greenland and Iceland included in sections 4.1.2 and 4.1.4.

L 299 typos

Newline 318: We corrected the typo.

l.303 and l. 306 what do you mean by 25 % vegetation? Tree cover? Or completely loss of all vegetation types i.e, including shrub and grasslands.

Newline 323: corrected to "25% of total vegetation cover"

303-305 sentence unclear, please rephrase

Newline 322-323: sentence rephrased to "The early settlers cleared land mainly through tree-felling, as inferred from the absence of charcoal layers which would indicate the use of fire either through forest clearance or application of slash-and-burn techniques".

L314 could you be more specific on the land cover conversion?

Newline 334-335: Sentences rephrased. "land cover conversion" modified to "land cover conversion for agricultural purposes".