



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-490-RC1>, 2022
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Comment on egusphere-2022-490

Patricia Elizabeth Garcia (Referee)

Referee comment on "Soil organic matter diagenetic state informs boreal forest ecosystem feedbacks to climate change" by Allison Myers-Pigg et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-490-RC1>, 2022

"Soil organic matter diagenetic state informs boreal forest ecosystem feedbacks to climate change"

The manuscript deals with the fate of the soil organic carbon in a climatic gradient from a cold to a warm region. The authors used several metrics to assess the influence of climate change on the cycling of C and N in soils. They applied the lignin diagenetic index, and evaluated the variation of this index in different soils strata. In general, the manuscript is well organized and easy to follow. I recommend the manuscript for publication after some minor revision.

Minor comments:

Line 230 I did not find the AADI data in the original paper (Philben et al., 2016).

Figure 1, This figure is very interesting. Why do the authors think that in some parameters (e.g. $V_{ad}/A_{<l}$, S/V , %side chain alteration, $diOHBAVV$, S_{Ad}/A_l) there is a great variation in the deepest soil horizon? Does the H horizon reflect older and more variable long-term effect of climate?

Figure 2 The linear relationship is very strong, it may help the reader if the authors include a description for example "increase lignin degradation" to the right of the plot.

Figure 3, In previous figure, the y axes was "layer", and the factor analyzed was the "depth", please homogenized the figures.

Figure 4, the deepest soils layer (H) has a broad variation compare with surface, any possible explanation?

Line 436, Add "The" before SOC and SON.