

Interactive comment on “Aromatic acids in a Eurasian Arctic ice core: a 3000-year proxy record of biomass burning” by Mackenzie M. Grieman et al.

Anonymous Referee #1

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The manuscript of Grieman et al describes the quantitative analysis of aromatic acids (particularly vanillic acid and para-hydroxybenzoic acid) from a Eurasian Arctic ice core, covering a span of >3000 years before present. These acids provide a tracer for biomass burning, due to their sourcing from lignin combustion. The analytical method used is unique, and the data generated are compared to an existing technique with good agreement (with the new method providing a lower limit of detection for the compounds being studied). Evidence of biomass burning events are presented and the record from this core is compared to other proxies (of the few available) with relatively good qualitative agreement. The data provide an important addition to the literature, particularly given the scant information available related to biomass burning in Siberia.

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This is a unique and valuable dataset and hopefully will be built upon by this group and others, using this method in other locations and with other cores. The manuscript is well written and organized, concise, and supported by good supporting figures and supplementary data. The analytical method is adequate to make the measurements and was thoroughly tested for this particular application. The authors are cautious in the interpretation of data close to the LOD, and also apply a conservative estimate of the LOD (based on blanks rather than instrumental sensitivity). Appropriate statistical analyses are applied to the datasets produced. The authors are also careful to present the various possibilities that could impact the measured ice core acid quantities, such as surface melting, revolatilization, or atmospheric oxidation, and couch their conclusions as the likely scenarios at play, but also suggest additional studies necessary to produce a quantitative (rather than qualitative) analysis of the available data. The study is certainly of interest to the journal readership, the conclusions are supported by the available data, and the study adds important new insights to the historical biomass burning literature. I recommend publication of the manuscript in its current form.

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