

Interactive comment on “Calibrated cryo-cell UV-LA-ICPMS elemental concentrations from NGRIP ice core reveal abrupt, sub-annual variability in dust across the interstadial period GI-21.2” by Damiano Della Lunga et al.

Anonymous Referee #2

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This is an interesting MS showing the powerful application of LA-ICPMS for high resolution (200 μm) ice core analysis. This may have a lot of implication especially for low accumulation sites and/or abrupt changes.

There are some novelties in this paper on the way the authors prepared the standards to convert the count per seconds (intensities) into concentrations. However they use standard riverine waters (SLRS) and a suspension of NIST648 leached with ultrapure HNO_3 , which resulted in an ice matrix standard which is far from the real ice matrix. We know that the slopes of the calibration curves are highly dependent from the matrix itself

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and I think therefore that the results may be strongly biased by the different ionization of the ice matrix compared to the standard ones. The authors should comment on this and clearly demonstrate how they obtain real concentration and not just relative changes that can be easily seen just looking at the variation of intensities.

In addition, the authors claim to use ^{24}Mg , ^{27}Al , ^{40}Ca , ^{56}Fe . All these masses are highly interfered by spectral and matrix interferences in ICPMS. Despite I think they used a SF-ICP-MS or a collision-cell instrument to reduce the interferences, I think that a better description of the methodology should be given. I know that most of the details are given in Della Lunga (2014), but a minimal description of the methodology is compulsory.

Then, I do not fully understand the objective of the MS, since most of the findings are not new at all. I would have rather focussed the MS into a comparison between LA-ICPMS vs CFA, but this would have required a more robust statistical tool.

I would therefore suggest the authors to readdress the MS to a specific target: i) analytical (in this case the paper lacks of many details), describing in detail the new advancement of this powerful technique and duly comparing the data with CFA results; in this case the reproducibility of the analysis on different sections is a key parameter, but as far as I can see there are no evidence of this in the paper; ii) more oriented toward a climatic/environmental interpretation; in this case the real benefit of the LA-ICP-MS approach should have been better explained.

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