

Interactive comment on “Trace elements in South America aerosol during 20th century inferred from a Nevado Illimani ice core, Eastern Bolivian Andes (6350 m a.s.l.)” by A. Correia et al.

Anonymous Referee #2

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In general the manuscript by Correia et al. is a valuable contribution to the field of ice core research. There are limited studies concerning the trace element composition of ice cores, which is not surprising given the analytical challenges associated with accurately measuring such low concentrations.

I have some minor concerns regarding the analytical methodology. 1. My first concern is with the sampling of the core. It is important to sample the center of the ice core, or as close to the center of the core as possible to obtain uncontaminated samples for trace element and isotopic analysis, particularly if fluid was used during drilling. Additionally, it might have been better to remove the external layer of the sample using a Teflon scraper, or a stainless steel plane coated in Teflon.

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2. Although many blanks were analyzed and found to be uncontaminated, it is not clear to me how sample handling and decontamination methods were tested by these blanks.

3. I also am concerned about the fact that sub-samples of a larger sample were used for different analyses. I realize that this might be considered to provide a more uniform sample, but I would be very concerned that pouring off an aliquot would cause fractionation of particles. Furthermore, it is mentioned that some samples were refrozen after sub-sampling, and this is not ideal because of chemical changes that can take place while samples sit out on a counter even for short periods.

4. It might be useful to provide a few more details about the ICP-MS analysis in Table 1, such as typical sensitivity per ppb of a tuning solution and total scan time per sample.

5. Is there any assessment of long-term reproducibility of data through the repeated use of specific standards?

6. The large number of elements being analyzed makes accurate quantification especially challenging. The use of In and Re as internal standards probably only works best for elements that have similar atomic weights. Since a number of lighter elements are analyzed, precision might be improved by quantifying the lighter elements differently. Sc is an element that might work, although there is a small amount of Sc in the ice core.

One additional comment: Although isotopes are not the subject of this paper, it might be useful to show the oxygen isotope record, or a portion of the record to show the dating and seasonality.

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