

Referee comments on the article: egusphere-2023-1135:

Influences of sources and weather dynamics on atmospheric deposition of Se species and other trace elements

By Esther S. Breuninger, Julie Tolu, Iris Thurnherr, Franziska Aemisegger, Aryeh Feinberg, Sylvain Bouchet, Jeroen E. Sonke, Véronique Pont, Heini Wernli, and Lenny H. E. Winkel

General comment

In the paper, the authors present a comprehensive study of the main factors describing the atmospheric deposition of Se. For this purpose, the authors present experimental measurements that are correlated with model results. It is important to highlight the large number of samples collected for the analysis (weekly samples during 5 years), as well as the precipitation samples obtained. Another interesting aspect of this work is the analysis performed at the high-altitude atmospheric observatory (Pic du Midi (French Pyrenees; 2877 m a.s.l.), which allows the analysis of the synoptic transport of Se. I consider that this article can be accepted in its present form because it is well-written and presents very interesting results.

Here are some minor details and suggestions.

Specific comments

- I recommend the authors write a shorter abstract. Please, introduce a more summarized writing where you highlight the main findings of the article. I think this paper presents a very complete analysis, but if the authors abbreviate this section, it makes it more appealing to the reader.
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- Line 37 The authors state that trace elements and isotopes in water are decoupled from clouds during precipitation. Can the authors indicate the specific result where this effect is observed?

- This is a very long article, as it presents different subsections. I recommend introducing a table of contents at the beginning of the manuscript.
- Methods section: the reviewer strongly recommends the authors extend the description of the study region, specifically to detail the Pic du Midi Observatory monitoring station site. It would be interesting to know the height of the mixing layer in the region. Since this study deals with a synoptic transport of Se, it would be interesting to know if the authors discarded the local influence (convective transport in the mixed layer).
- From your results: ¿it is possible to assess if Se concentrations decline with precipitation amount?
- What about the solubility of Se species: your study, only measures dilute Se species?
- In the conclusions, you state that: "for the first time we were able to identify an organic Se species as a biomarker of marine biogenic sources". Could you describe the specific result that allows you to conclude this?
- Line 365: Se can be released to the atmosphere from a variety of sources (e.g., natural sources such as soil, water, and vegetation, as well as anthropogenic sources). Are the terrestrial contributions of Se at Pic du Midi only due to synoptic transport or to local sources?