

Interactive comment on “Seasonal variations of triple oxygen isotopic compositions of atmospheric sulfate, nitrate and ozone at Dumont d’Urville, coastal Antarctica” by Sakiko Ishino et al.

Anonymous Referee #1

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This is the first simultaneous measurements of concentration as well as triple oxygen isotope composition of atmospheric sulfate, nitrate, and ozone in an air-shed. I am impressed by the quality of the dataset, especially its capability in revealing the role of ozone/RO_x ratio, HOX, and the sulfate or nitrate precursor chemistry as demonstrated by the authors.

A couple of general comments:

1. It seems to me that the variation seen in the $\Delta^{17}\text{O}$ of nitrate and sulfate are due more to changes in oxidation pathways and less to the oxidative capacity of the atmo-

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Discussion paper



sphere. The use of “oxidative capacity” to me is less accurate or at least poorly defined. I think the current atmosphere has plenty of “oxidative capacity” and is unlikely running below some kind of oxidative threshold. It’s the oxidation pathway, being different for different species, that changes spatially and temporarily. And that “pathway” is what this study is going after.

2. A positive correlation between $\Delta^{17}\text{O}$ and $\delta^{18}\text{O}$ for nss sulfate is expected. Thus, the $\delta^{18}\text{O}$ -nss SO_4 would be a line of independent evidence for the conclusions. However, the $\delta^{18}\text{O}$ data is never mentioned, which needs some explanation.

3. Some apparent observational discrepancies are presented in Introduction but a clearer working hypothesis would improve the presentation. In other words, a recommended approach is to predict a potential seasonal pattern based on previous observational data and atmospheric chemistry models, and then go on to say that there are a couple of key parameters that we have not yet monitored in coastal Antarctica. In the end, parameters can only make sense when they are incorporated into a comprehensive atmospheric chemistry-transport model.

Specifics:

Abstract and the rest: I suggest when it’s the first time mention “summer”, add that it is the warm months or the austral summer.

Page 3 line 1: “This” is ambiguous.

Page 3 line 12-13: The final sentence can be deleted.

2.1.1.: Can you offer quantitative data instead of saying that “. . . the atmosphere is highly oxidative”?

Page 6 line 28: Cited reference “Bhattacharya et al 2008” is not found in the reference list.

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