The Cryosphere

Discussions

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Interactive comment on "Brief communication: Analysis of organic matter in surface snow by PTR-MS – implications for dry deposition dynamics in the Alps" *by* Dušan Materić et al.

Anonymous Referee #2

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The manuscript "Brief communication: Analysis of organic matter in surface snow by PTR-MS-implications for dry deposition dynamics in the Alps" by Materic et al., describes organic matter composition in Alpine snow samples during 12 days in spring 2017. A simple mass balance model is discussed and used to determine atmospheric deposition of VOCs on snow. A grouping method for the PTR-MS mass ions based on Pearson correlations is then used in order to highlight specific emission sources or atmospheric events that influenced the sampling site. I find the manuscript interesting, novel, and nice at reading. Specifically, it is promising the novel approach of using a state-of-the-art technique as PTR-MS, commonly used in atmospheric chemistry to monitor air samples, in the field of cryosphere. I find the manuscript suitable

to the journal and I recommend its publication after some minor comments have been addressed.

L. 85: As the approach of analysis used by the authors is quite novel it would be nice to have more details about the TD method and the PTR-MS conditions of analysis.

L. 88: How much is the percentage of recovery with the TD method for 20-500 amu? Why the maximum temperature used is 250 °C?

L. 177: Which threshold of the Pearson correlation was used to group the mass ions? Why the authors have not considered to try a more robust approach for sources apportionment as for example, the positive matrix factorization analysis?

L. 182: These numbers seem higher compared to atmospheric concentrations of a remote site. Could you include a short discussion with comparisons with reported values in literature of concentrations found in snow samples for similar compounds?

L. 210: Was any compound associated to "group 4" identified? In general, was also any other method applied simultaneously to PTR-MS analysis to cross-validate some information?

Figure 1: on 29/03/2017

Figure 3: a, b, d show a general increase. Is this due to any specific atmospheric event or driver?

Table A1: This table should be moved from the appendix to the main body of the manuscript. Here a few adjustments are needed: the text refers to Pearson coefficients but the table shows the R2. The labels of the table do not correspond to what the grouping described in the text. It is not clear which ion correlate with which. Would it be possible to the authors to re draw the table to see the correlation of each pairs of ions? Is there any of this ion identified with a compound or previously reported in literature? If yes, please mention it. How were the fragments/clusters excluded from the correlation analysis? Could you shortly discuss the possibility of having fragments

or water clusters included in the analysis?

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2018-203, 2018.