The Cryosphere Discuss.,
https://doi.org/10.5194/tc-2017-265-RC2, 2018
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The Cryosphere Discussions
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Interactive comment on "Mercury in arctic tundra snowpack: temporal and spatial concentration patterns and trace–gas exchanges" *by* Yannick Agnan et al.

Anonymous Referee #2

Received and published: 7 March 2018

1 General Comments

The manuscript describes a detailed study of Hg in air, snow and soil at an Arctic site, which unlike almost all previous studies is a significant distance from the coast. Given that vast amounts of tundra are inland this study begins to fill in some of the gaps in our knowledge of Hg cycling in these remote regions. Of particular interest are the differences seen between the processes seen at this site when compared to coastal sites. The fact that tundra soils are a sink for atmospheric elemental Hg has important repercussions for future multimedia modelling studies and hints at the potential remobilisation of large amounts of Hg from Arctic soils in a warming climate. This should be

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emphasised more in the Abstract and the Conclusions, in the Abstract particularly the comment on this is brief and hidden in the middle.

The manuscript is however rather long-winded. I think that both the Results and the Discussion section could be shortened significantly, and quite usefully (from the reader's point of view) combined. Just as an example, the discussion of the major ions and the O and H isotope signatures, repeats parts of the pertinent results section. Conversely the results section rather leaves the reader with a sense of 'and what do these results imply?', which is only answered six pages later. I would recommend combing these sections as it will most likely lead naturally to a more concise and less prolix article.

If some of the detail in the methods section has already been published perhaps it could be shortened by including more references, if not maybe some of the detail could be moved to the Supplementary material.

The previous reviewer has comprehensively addressed a number of technical issues, and for me only a few real problems remain.
1. The issue of blowing snow, and where the snow that is being sampled at Toolik comes from.
2. The fact that the paper is interesting and adds an important contribution to polar Hg research but is unfortunately not very well presented and at times rather heavy going.
3. The importance of atmospheric elemental Hg effectively being sequestered (for the moment) by tundra soils, is not emphasised sufficiently from my point of view.

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