

## ***Interactive comment on “Constraints on post-depositional isotope modifications in East Antarctic firn from analysing temporal changes of isotope profiles” by Thomas Münch et al.***

### **Anonymous Referee #2**

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The manuscript “Constraints on post-depositional isotope modifications in East Antarctic firn from analysing temporal changes of isotope profiles” by Thomas Münch and co-authors is devoted to the study of post-depositional changes of snow isotope composition in central Antarctica using the huge dataset of recently obtained data. The authors clearly demonstrated, using robust statistical methods, that the observed evolution of the vertical profiles of snow isotopic composition can be explained without significant influence of the post-depositional processes. In general, I enjoyed reading the manuscript and suggest that it may be published as it is, or with minor corrections.

I think the authors could slightly modify the main idea of the conclusion of the manuscript. In the current version they state “no evidence for substantial additional

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post-depositional modification”, meaning that they do not expect post-depositional modifications stronger than 1 per mil for oxygen 18. Indeed, 1 per mil is a very small value comparing to the spatial variability due to the stratigraphic noise. But on other hand, if considering the post-depositional modifications of the whole annual snow layer, 1 per mil is rather big value – it’s an equivalent of about 1.25 °C of air temperature change! Thus, the obtained results still give some room for the post-depositional modifications of the snow isotopic composition, although they are less than 3 per mil as expected from the modeling (Page 14). Other comments or corrections: Figure 1 would be more informative if you add a wind rose, or just an arrow showing the prevailing wind direction. Page 14, line 11, “Sublimation led in lab studies...” – the sentence looks somewhat awkward, please consider revision. Page 16, line 8: averaging Page 16, line 10: did you want to say that the spatial separation should be well above the spatial decorrelation length?

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[Interactive comment on The Cryosphere Discuss.](#), doi:10.5194/tc-2017-35, 2017.

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