

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.

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O_____ When you say that diffusion and condensation ‘only smooth and compress the original signal’, you should precise that you are talking about vapor diffusion against isotopic gradients. AC: It is indeed a good point to precise to which diffusion process we refer here. However, to our knowledge the term “against isotopic gradients” is not common in the literature. Diffusion rather acts “down” the (concentration) gradients. We will change the sentence to “The isotope ratios of buried snow are affected by firn densification (...) and by diffusion of interstitial water vapour driven by gradients in the isotopic composition (...)”.

EC: Sorry but I don’t understand the statement "by diffusion of interstitial water vapour

driven by gradients in the isotopic composition (...)" It appear to me that the sentence is claiming that isotopic gradient is a driving force of change. Vapour diffusion in snow is driven by T gradients not by isotopic composition. The isotopic gradient will drive the diffusion only if the system under consideration was isothermal, purely diffusional. In the present situation, the change of enthalpy induced by the T gradient is orders of magnitude greater than the change of enthalpy induced by the isotopic gradient. Isotopic composition change is thus a result, not a driving force. Please rephrase so that the reader is not confused by which process is responsible for the change in the isotopic composition.

EC: Regarding the shift of the curves in fig4. I will suggest to keep the original plot. Eventually, the curves can be x-axis shifted for taking into account the accumulation between the two samplings but no superposition is required in my view.

Please submit your revised MS for approval.

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