

Interactive comment on “A glaciochemical study of 120 m ice core from Mill Island, East Antarctica” by Mana Inoue et al.

E. Isaksson (Referee)

elisabeth.isaksson@npolar.no

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The paper present and discuss the data from a 120 m deep ice core drilled from the coastal site Mill Island on the- Shackleton ice shelf, in East Antarctica. This is an ice coring site situated further north than most (if not all) other coring sites, except the sites on the Antarctic Peninsula. The drill site was chosen because of its coastal position with high accumulation rates and thus a good position to date and compare annually resolved data with both instrumental- and model output data. There is generally a lack of high resolution ice core data from Antarctica and therefore this drill site is of very high interest. The most intriguing results from this cores is evidence of migration of sea salt, something that has not been described in the literature before as I am aware of. Thus, the scope of the paper is highly interesting and should be published. However, the results are not easily accessible for the reader for reasons listed below. Before

C1

the paper can be accepted there are some major reorganization and clarifications that are necessary. The paper is also too long and has far too many figures that are not necessary. Below I have tried to provide some guidance of how to re-organize the text and what to cut out so that the interesting results gets the visibility they deserve.

1. I suggest to combine “Results” and “Discussion” to get a better structure and save space (less repetition). Furthermore, try to eliminate the many short sub-chapters (there are now 3 levels) and integrate the text together with the longer sections. That makes the text more fluent for the reader.

2. Very little general glaciology and meteorology are provided-and the available information is not collected in one place so it makes it difficult for the reader. It would be good to collect the information that exists in a separate chapter - “area description”-in the beginning of the paper. For instance, the wind direction and wind speed information (chapter 5.3.1.) should be appearing in the general introduction because this is such fundamental information for all interpretation. Also, the text about the “Local ice shelf variability” (chapter 5.3.3) belongs in basic general description of the area rather than discussion.

3. Where is the firn-ice transition? Please provide information about the ice depth and calculation of the vertical strain rates used for correction of the annual layers

4. The accumulation record is not included or shown anywhere. It is a very crucial determining factor for the rest of the data interpretation that I absolutely need to be presented together with the ion data. At such a coastal site all the deposition can be assumed to be wet deposition and thus determined by the accumulation.

5. A follow-up questions to the previous comment: Could the variation in sea salt seasonality etc be related to accumulation and density variations?

6. The ice core site is rather specific from many points of view so a discussion in how representative the Mill Island record is for a wider area would be important to include.

C2

Local systems seem to be more important for at least the accumulation than large-scale atmospheric processes. That raises the question to if this is also true for the other records from this core- something that is natural to ask because wet deposition is dominating.

7. Tables: I do not see the need for Table 2, Table 3 and Table 4 but I miss a table including all the glaciochemical data!

8. Figures: Several of the figures are not necessary. Figures 10, 12, 13, 16, 17, 19, 20, 21, and 22 should be removed since they do not provide and crucial information that the reader cannot read/understand from the text. Furthermore, I suggest to combine Fig 4 and Fig 7 and then Fig 5 and Fig 6.

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