

Dear Dr Goto-Azuma,

On behalf of my co-authors, I would like to thank you for accepting our manuscript, “A glaciochemical study of 120 m ice core from Mill Island, East Antarctica”, pending technical corrections.

Please find below a response to each technical comment.

Kind Regards,

Mana Inoue

Responses to Editor’s comments:

1) A snow accumulation record would add to the manuscript.

Annual snow accumulation record has been added in Figure 2. Related text has been added in the Method and Ice core dating sections. The additional text is “The Mill Island annual snow accumulation record was obtained from the thickness of annual layers after ice core dating was completed. The thickness of annual layers was corrected using the density profile and vertical strain rate, assuming that ice thinning is only caused by vertical strain. According to the method and density profile in Roberts et al. (2013), the vertical strain rate was estimated by least squares fitting from the density-corrected thickness of each annual layer. The flow correction is broadly consistent with the estimated ice thickness and a uniform vertical strain rate.” And “Figure 2 presents annual snow accumulation, H_2O_2 , $\delta^{18}\text{O}$, δD and the D-ex records. The MI910 annual snow accumulation rate averages 1.35 mIE/yr for the period from 1913 to 2009, with a minimum of 0.79 mIE/yr in 1969 and a maximum of 2.04 mIE/yr in 1934 (Fig. 2 a)”.

2) The units for the snow accumulation record should be the same.

Thank you. The text has been changed from 1,312 $\text{kg/m}^2\text{yr}$ to 1.430 mIE/yr.

3) The full map in the Fig.1 needs to be larger.

Figure 1 has been fixed.

4) Ion data which are not discussed in the text (K, Mg and Ca) need to be removed or explained in the text.

K has been removed from text. Mg and Ca have been explained in text. “Similarly, MSA, SO_4^{2-} , Mg^{2+} , and Ca^{2+} show clear seasonality only for the period of 2009 to 2001.”

5) P. 4, L. 25. Pro-gram's. Is this correct?

Thank you. This is a typo. It has been corrected as "Program's".

6) P. 5, L. 1 – L. 2 and L. 24 – L. 26. State exactly which volcanic makers were used. Also mark them in Fig. 4.

The volcanic makers are Pinatubo (1991), El Chichon (1982), and Agung (1963). These have been added in text and Fig. 4. "Arrows A, B, and C in the nssSO_4^{2-} record correspond to major volcanic eruptions (Pinatubo [1991], El Chichon [1982], and Agung [1963], respectively)."

7) P. 5, L. 33. "e.g.. Na.... has a summer peak" needs references.

Thank you. A reference (Legrand and Mayewski [1997]) has been added.

8) P. 6, L. 6 – L. 8. State how the months were defined.

Months were computed by linearly dividing each year into 12 portions. This sentence has been added in text.

9) P. 6, L. 18 states that "the Na winter peak during regime A is not present in regime B", whilst L. 32 states that "Na and SO4 both show seasonality with a winter peak in Regimes A and B." Modify these sentences to avoid contradiction.

Thank you. The sentence "the Na winter peak during regime A is not present in regime B" has been modified "the Na winter peak during regime A is less pronounced in regime B."

10) References missing DOIs.

Thank you. All DOIs have been added in references.

11) Books should be more precisely referenced. n Fig. 6. Please correct the figure numbers.

Thank you, the chapters have been added in references.

12) P. 2, L. 21 and P. 16, L. 1. Wagenback et al., 1998a. should be Wagen bach et al., 1998.

Thank you, it has been fixed.

13) Supplement 1. L. 6, Fig. 7 should be Fig. S7.

Thank you, it has been fixed.

14) Supplementary Figs and Tables. Should be numbered as Fig. S# and Table S#.

Thank you. It has been fixed.