

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

Anonymous Referee #1

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This paper is an interesting and important contribution for understanding the environmental record of an ice core from a coastal site in East Antarctic. On the other hand, due to its low altitude and the number of thin crust/ice layers, I would suggest adding the following information in the text (to increase the confidence on the representativeness of the record):

(1) Ice core site mean temperature

It would be useful to know if the authors have measured the 10-15 deep temperatures in the snow pack, or at least have estimated the mean temperature at the ice core site.

The ice core site does not show evidences for strong post-depositional processes (i.e., partial melting, percolation and refreezing), but in the ionic ones (Na⁺ and SO₄²⁻) the seasonal variations seem to have been damped in some sections of the core (e.g.,

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around 1980 and 1955 A.D. - Fig. 5 and 10). Further, some sections also show reduction in the excess-deuterium (excess-d), this may be a further evidence of post-depositional melting and fractionation.

An examination of the Na⁺/Cl⁻ relationship would give further evidence about the preservation of the original snow record.

By the way, what is the mean temperature at the near Mirny Station during January and February? Does it reach temperatures above 0°C, even only in some days?

Does any part of the core show signal of ionic preferential melting?

(2) Snow/ice density profile - ice stratigraphy

Considering the points above, and that the highest ionic amplitudes are found in the upper layers (after 1995), it would be useful to have a density profile in this paper.

It is quite common in cores of sites that suffer sporadic surface melting to have the original seasonal variations only in the upper layers (as it happens in the Mill Island core). Further down, melting, followed by percolation and refreezing, damp the signal.

The authors should at least report the thickness range of the observed crust/ice layers.

(3) Ice core dating

The authors tell that dating was confirmed by well-known volcanic eruptions (1991, 1984, and 1963, etc.). Please identify these eruptions in the SO₄-2 profile (In Figure 2 and 6a).

(4) Figures

Figure 12 is redundant, please consider removing it.

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