We are grateful to the reviewers for their thorough reviews and valuable comments on our manuscript. Our responses and the planned changes for the revision are explained below. Our replies are in blue and reviewer comments are written in black.

Comments by Reviewer #2

This work represents a new time-series of snow mass balance for the last 5000 years in the vicinity of Dome Fuji (central East Antarctica). Since in this region there is a huge lack of such data, this work is a very important contribution to the understanding of the factors controlling the behavior of SMB in East Antarctica. The authors present in details the processes of obtaining the SMB data including the involved uncertainties. They also compare the newly obtained timeseries with the SMB data from the other Antarctic regions, as well as with other climatic records of the Southern Hemisphere.

General comment: in your manuscript you discuss the local air temperature as an important factor governing the SMB (e.g., section 4.1). In view of this, it would be useful to present in this paper the stable water isotopes records from the same cores, as temperature proxies. This would also allow to calculate the isotope-SMB sensitivity, which would be relevant to the other studies. Please consider this possibility.

There are 6 cores with stable water isotope data (MD364, DF1, DF2001, NDF2013, S79 and S80). We examined the correlation between the SMB and $\delta^{18}O$ after averaging the $\delta^{18}O$ data over the same time intervals of the SMB reconstruction for each core. We found significant correlations from relatively short cores from NDF2013 and S79, but the length of the NDF2013, S79 and S80 look too short to examine the relationship between the SMB and $\delta^{18}O$. The other cores do not show significant correlations.

We can expect that the relationships between the SMB and $\delta^{18}O$ in the DF1 and DF2001 are similar to each other because of their close proximity (both at the Dome Fuji station with a distance of only 43 m). However, the relationship between SMB and $\delta^{18}O$ looks rather different for the two cores. For example, while the $\delta^{18}O$ of both cores show an increasing trend over the last 200 years, only the DF2001 core shows an increasing trend in the reconstructed SMB. Possible reasons for the dissimilarity may be the low resolution of the SMB reconstruction as well as the difficulty in the precise SMB reconstructions for the shallowest part (due to the fragility of the samples). In addition, there is no significant correlation between SMB and $\delta^{18}O$ in both cores. We think it is difficult at this stage to show robust results, and further analyses would be necessary, which is beyond the scope of this study. Thus, we refrain from adding the stable water isotope records and discussion to the manuscript. We show the figures below for review purpose.

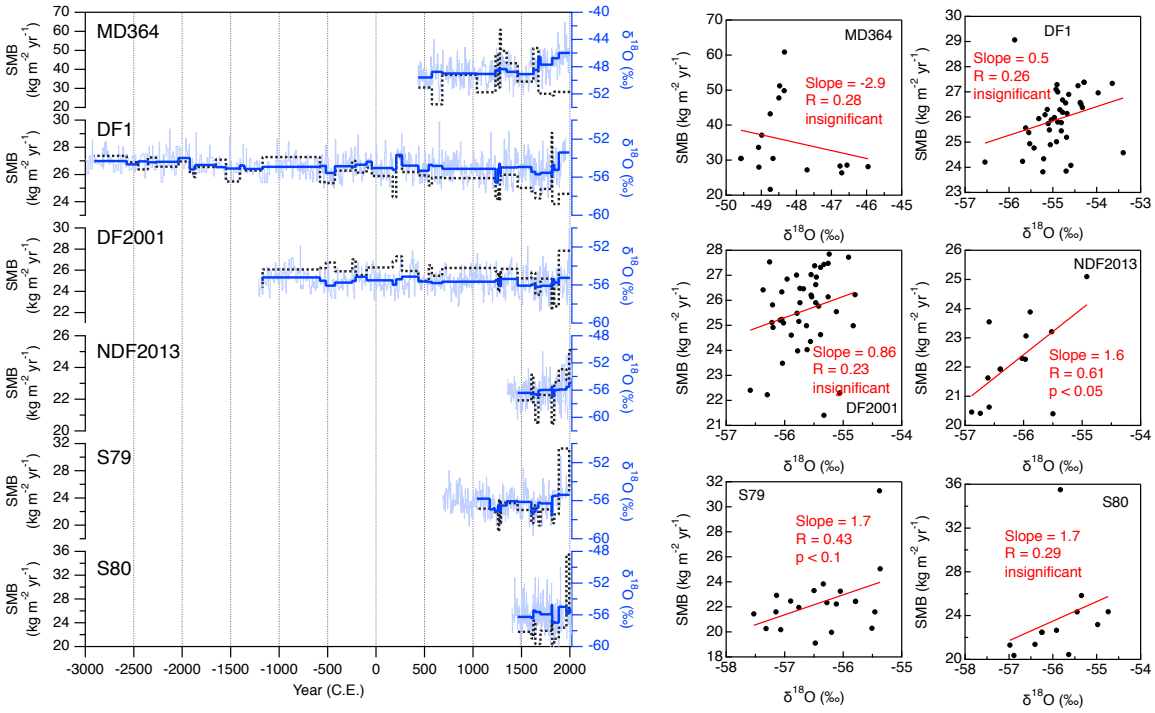

Figure: (left) Time series of the SMB (black dotted line) and $\delta^{18}O$ (blue) records of the MD364, DF1, DF2001, NDF2013, S79 and S80 cores. Solid lines with pale blue indicate all $\delta^{18}O$ data and the lines with blue indicate the $\delta^{18}O$ data averaged over the same intervals of the SMB reconstruction. (right) Scatter plot of $\delta^{18}O$ vs. SMB.

Minor comments:

Table 1: I am not sure if the last column is really necessary. The number of JARE campaign really tells nothing to a reader. The observation date is enough.

Some international readers would find the information useful to quickly recognize which cores are from which campaign (also, the year/date is sometimes confusing for Austral summer to recognize the same sampling campaign), so we would like to keep them in the table.

Lines 158-160: it should be possible to evaluate the error of the bulk density by comparing the density values measured in the same depth intervals in different (but closely located, e.g., in the vicinity of the DF station) cores. If we assume that the density-depth profiles are constant in time (Sorge's law), then the density at the same depths should be the same in different neighboring cores, and the difference between them would be explained by the measurement errors and the spatial variability.

Thank you for your suggestion. There are two bulk density data from the DF1993 and DF2001 cores drilled at Dome Fuji station. The distance between the two boreholes is 43 m at the surface. We resampled the density data at 0.5 m intervals from 10 to 112 m where both data are available (191 intervals), and evaluated the variability of densities by calculating the pooled standard deviation (S_p) as the square root of the summed squared deviations of the DF1993 and DF2001 density data from the respective means for the 0.5-m intervals, divided by the number of depth intervals:

$$S_p = \sqrt{\frac{\sum_{i=1}^{382}(\rho-\overline{\rho})^2}{191}},$$

where ρ is density for the 382 individual data, and $\overline{\rho}$ is the mean of DF1993 and DF2001 for the 191 depth intervals.

We found that S_p is 16 kg m^{-3}, which is comparable to the independently estimated error of 15 kg m^{-3}. Thus, we will keep the original uncertainty estimate for the bulk density and add the above description as a validation at the DF site

Line 217: d is depth in m.

We will correct this in the revised manuscript.

Line 654: to my knowledge, the 1458 eruption that was previously interpreted as Kuwae, now is rather interpreted as unknown event (Hartman, L.H., Kurbatov, A.V., Winski, D.A., Cruz-Uribe, A.M., Davies, S.M., Dunbar, N.W., Iverson, N.A., Aydin, M., Fegyveresi, J.M., Ferris, D.G., Fudge, T.J., Osterberg, E.C., Hargreaves, G.M. and Yates, M.G. (2019). Volcanic glass properties from 1459 C.E. volcanic event in South Pole ice core dismiss Kuwae caldera as a potential source. Nature Scientific Reports 9(14437), 1-7. doi: 10.1038/s41598-019-50939-x).

Thank you for the information. We will replace Kuwae with unknown in the revised manuscript with the reference. The volcanic forcing of Sigl et al. (2022) (used in this study) may be weaker for this eruption, so maybe the negative SMB anomaly in this period should not be caused by the volcanic forcing.