

Clim. Past Discuss., referee comment RC2  
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## Comment on cp-2022-68

Anonymous Referee #2

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Referee comment on "Temporal variations of surface mass balance over the last 5000 years around Dome Fuji, Dronning Maud Land, East Antarctica" by Ikumi Oyabu et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-68-RC2>, 2022

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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.

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.

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.

Line 217: d is depth in m.

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).