

Interactive comment on “Age stratigraphy in the East Antarctic Ice Sheet inferred from radio echo sounding horizons” by Anna Winter et al.

Siegert (Referee)

m.siegert@imperial.ac.uk

Received and published: 1 January 2019

I really like this paper. It is about time that East Antarctic internal layers were made available through an open access database; the authors should be congratulated on doing it. I know from first hand how challenging this can be, and don't underestimate how much effort has gone into the product. I don't have any major issues with it. There are, however, a few things I might recommend to capture previous relevant work. I will leave it to the authors to respond, if they wish, to these suggestions. 1. The database of internal layers from West Antarctica should be mentioned. Siegert, M.J., Pokar, M., Dowdeswell, J.A. & Benham, T. Radio-echo layering in West Antarctica: a spreadsheet database. *Earth Surface Processes and Landforms*, 30, 1583-1591 (2005). 2. Use of internal layers in calculating past accumulation rates is included in several references,

C1

but a these from East and West Antarctica are missing:

Siegert, M.J., Payne, A.J. Past rates of accumulation in central West Antarctica. *Geophysical Research Letters*, 31, (12), L12403 10.1029/2004GL020290 30 June 2004.

Siegert, M.J. Glacial-interglacial variations in central East Antarctic ice accumulation rates. *Quaternary Science Reviews*, 22, 741-750 (2003).

3. Use of internal layers in identifying interior ice-flow change. Whillans (1976) is mentioned, but this isn't: Siegert, M.J., Welch, B., Morse, D., Vieli, A., Blankenship, D.D., Joughin, I., King E.C., Leysinger Vieli, G.J.M.C., Payne, A.J., Jacobel, R. Ice flow direction change in interior West Antarctica. *Science*, 305, 1948-1951. 10.1126/science.1101072 (2004).

4. Exposure of blue ice from internal layers. This paper shows how internal layers can 'outcrop' revealing areas of negative mass balance (sublimation zones) creating blue ice: Siegert, M.J. Hindmarsh, R.C.A. & Hamilton, G.S. Evidence for a large region of surface ablation in central East Antarctica during the last ice age. *Quaternary Research*, 59, 114-121. (2003).

5. Early work on internal layers, which should be mentioned as we owe much to these early researchers: Clough, J.W. 1977. Radio-echo sounding: reflections from internal layers in ice sheets. *Journal of Glaciology*, 18, 3-14. Harrison, C.H., 1973. Radio echo sounding of horizontal layers in ice. *Journal of Glaciology*, 12, 383-397. Millar, D.H.M., 1981. Radio-echo layering in polar ice sheets and past volcanic activity. *Nature*, 292: 441-443. While some of this uncited work relates to my own, I feel the paper would benefit from including this earlier work in terms of the science behind layers and their usefulness. If the authors would like to include the SPRI layers from EAIS in the database, I'd be pleased to offer them.

Martin Siegert

2018.

C3