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Climate of the Past Discussions

Interactive comment on "Pleistocene glacial history of the New Zealand subantarctic islands" *by* Eleanor Rainsley et al.

Anonymous Referee #1

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Review Rainsley et al.

This paper "Pleistocene glacial history of the New Zealand subantarctic islands" by E. Rainsley et al. presents new data, from the subantarctic Islands Auckland and Campbell, and a flowline modelling of a large U-shaped valley if the Campbell Island. The paper is well written and the results concerning the flowline simulations implying a large seasonal temperature amplitude during the last glacial maxim highlights the necessity of reconstructing not only mean annual temperature trends but also the seasonal amplitude. While this paper deserves publication in Climate of the Past, I have some concerns regarding the lack of modern reference for other subantarctic Islands glaciation, local subtropical front shifts, westerlies migration. For exemple, the changes in position of the Subtropical front in this area are detailed in Bostock et al. 2015 and Bostock et

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Discussion paper

al. 2013 presents a review of the climate changes in the Australian-New Zealand sector of the Southern Ocean. Jomelli et al., 2017 a, 2018, discuss the evolution of glacier on the subantarctic Kerguelen Archipelago since 50kyrs and Boex et al., and others, in Patagonia. The role of the Westerlies latitudinal migration for glacier evolution is discussed but with no reference to the different published papers (in Patagonia: Moreno et al, Montade et al., Lamy et al.,..., in Kerguelen: Van der Putten all, 2015...) Other minor comments/corrections are listed: Chronology: would it be possible to date (14C) the peat cores with plant remains instead of bulk organic matter, to increase the robustness of the age model? Concerning the Enderby formation, I'm confused: page 4 the authors explain that pollen and spores are present in the laminated silt that has been sampled and that separate the two layers of glacial till. On page 7, 2.3.2 the authors explain that no organic material was present to provide an age constraint for the Enderby Formation. Concerning the dating results, I wonder how the authors obtained an onset of peat growth at ∼17,23-16,11 cal age with the Oxcal Phase age calibration as, in Table 1, dating of basal peat, the oldest cal age is 15,47 cal age. It would be nice to indicate the oxcal parameters chosen in the supplementary material. Concerning the Enderby formation, I suppose the authors did a weighted average of the different IRSL ages, but then they should get 378±26 ky ? As those dates are from the laminated silt in between the two glacial till, could the glacial till be from the isotopic stage 12 and 10 respectively? Page 12, line 25 correct Table 1 instead of Table 2. As the sub-tropical front is considered to have shifted latitudinally during the last glacial cycle, is it really robust to consider the temperature difference between Auckland and Campbell Islands and EDC or ODP584 constant? Page 14, Line 1-2, replace "Fig.6 and Fig.S8" by Fig. 8 Page 15, line 5, Classically Mid-Pleistocene is associated with the Mid-Pleistocene transition (∼1.3 to 0.9 Ma) Maybe it would be easier to call it the Mid Bruhnes?

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