

Interactive comment on “Ice-shelf damming in the glacial Arctic Ocean: dynamical regimes of a basin-covering kilometre thick ice shelf” by Johan Nilsson et al.

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Main points This is a very well-written manuscript making an important advance on understanding Arctic [and indirectly Antarctic] ice sheet growth and decay. The topic of Arctic-wide ice shelves is receiving much attention due to new discoveries from various expeditions. The ages of past ice shelves is however debated.

The text is long and highly technical, aimed at glaciologists [which I am not], but highly relevant to glacial geologists and paleoclimatologists [which I am]. Needless to say the “Mediterranean” configuration of the Arctic Ocean, with the narrow Fram Strait con-

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nection to the Nordic Seas, make is a very unique system for ice shelf behavior. The Discussion section comparing the Ross Ice Shelf to the Arctic Ice Shelf seems especially important for the future of the former, and the history of the latter. So is the unresolved question of MIS 6 versus LGM MIS 2 Arctic Ice shelves and the larger extent of the former. Conceptually Snowball Earth reconstructions are interesting but gee, that was a different world from the Quaternary and much less empirical data on the actual extent of glaciations.

The Mercer-Hughes-Grosswald studies were made in the context of CLIMAP reconstructions and the large vs small LGM ice sheet debates. Questions: What are the implications for global sea level as many authors using stable oxygen isotopes plot LMG sea level lower than that during MIS 6? What are the implications if any for the calibration of deep sea [and Red Sea] oxygen isotopic records, used to address so many other paleoclimate topics, to sea level – any thoughts on what such ice shelves might have on global ocean O18 ratios? Do the glaciological constraints described here reconcile issues in global se level [matching marine terraces to O18 to ice sheet glacial geology]?

Minor points

Throughout: Should kilometer-thick ice sheet have a hyphen ? Also be consistent citing equations in the text Abst line 5 has not have Line 16 page 38 “is assumed to be...” Figure 1 caption & text has lower case a, b, c but the figure itself has upper case A, B, C Page 6 line 21 “further HINDER...” p. 12 line 24 it is worth noting... Page 18 line 16. Something is missing here Page 25 line 30 ice shelf HAS [not have?]

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