

Interactive comment on “Deglacial abrupt climate changes: not simply a freshwater problem” by Jorge Alvarez-Solas et al.

Anders Carlson

acarlson@coas.oregonstate.edu

Received and published: 28 October 2019

So, it is good for the authors to raise this issue, which was first noted in 1987/1989 in the publication of Boyle & Keigwin and Fairbanks, both in *Nature*. Sea level rise occurred during warm North Atlantic periods with fast AMOC. Clark et al. (1996, *Paleoceanography*) pointed this out in detail and built on the idea of meltwater routing, not meltwater amount, as being a controlling factor on whether AMOC was slow or fast during the last deglaciation. The references for the routing idea are Johnson & McClure (1976, *QR*), Rooth (1982, *Prog. Ocean*) and Broecker et al. (1989, *Nature*). Basically, it states that where the water goes into the ocean is more important in controlling the AMOC strength than the amount of overall melting of ice sheets. Clark et al. (2001, *Science*) laid out the routing hypothesis in full building on Licciardi et al. (1999, *AGU*

[Printer-friendly version](#)

[Discussion paper](#)



Monograph). Carlson et al. (2007, PNAS) confirmed the routing hypothesis for the Younger Dryas cold event, which was later strengthened by the terrestrial chronology in Leydet et al. (2018, Geology). Obbink et al. (2010, Geology) also investigated the routing hypothesis during the Oldest Dryas and the Bolling/Allerod while Carlson et al. (2009, GRL) and Hoffman et al. (2012, GRL) looked at routing during the last stages of the deglaciation and the 8.2 ka event. With the exception of the Leydet study, these papers and the whole relationship between meltwater discharge, ice sheet melting, sea level rise, and AMOC was extensively discussed in Carlson & Clark (2012, Rev. Geophys.). I believe this paper should reflect this 40+ years of research on an alternative hypothesis that addresses the issue raised by the authors, which it currently does not.

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2019-96>, 2019.

Printer-friendly version

Discussion paper

