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Climate of the Past Discussions

Interactive comment on "Extreme lowering of deglacial seawater radiocarbon content is recorded by both epifaunal and infaunal benthic foraminifera" *by* Patrick A. Rafter et al.

Anonymous Referee #3

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Rafter et al present a very useful new deglacial 14C data set from the Gulf of California, which investigates species offsets in benthic forams. It provides new insight into the possible causes for and processes that could adversely impact 14C records in this region and globally. I concur with the points raised by Tom Marchitto in his thorough review and welcome the updated figures that enable a clearer picture of the raw data to be gained. I think the discussion is appropriate and although it doesn't solve the problem of the cause of the deglacial (and in some cases glacial) low D14C events, it certainly provides enough useful evidence to warrant publication. Other than points already raised by other reviewers, I only have a couple of minor suggestions:

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Discussion paper

In reference to line 10, referring to existing glacial-interglacial mono-specific epibenthic 14C dates: perhaps worth noting that some epibenthic 14C dates were published by Voelker et al 1998 (Radiocarbon) although these are only for the glacial; and Thornalley et al 2015 (Science) published monospecific C. wuellerstorfi 14C dates from the deep Norwegian Sea for both the (de)glacial and Holocene.

Building on this point and in reference to page 6, line 11, I think the wording could be changed because, as currently stated, the reader might take away the impression that the old ages reported in the subpolar North Atlantic are only related to samples including pyrgo. Yet this would be an incorrect impression because old deglacial ages are also reported in the deep Nordic Seas (strictly speaking, part of the North Atlantic) on monospecific C. wuellerstorfi samples. This is a useful point to incorporate in the work here because it suggests that extreme 14C depletions are not limited to just pyrgo or infaunal species, but have also been reported for C. wuellerstorfi - the benthic foram of choice for stable carbon isotope analysis, and which in this case (supported by pyrgo d13C) do not indicate the presence of low d13C waters causing the D14C depletions.

I agree with Marchitto that the text should be altered so that the records from around the globe are not necessarily conflated as representing one common signal. Although it is possible that a similar phenomena such as hydrothermal-volcanic fluids may be causing these signals (notwithstanding the issues of the d13C signature and the required seawater buffering needed), the different regions also have different oceanographic histories. For example the timing of old ages reported in the deep Southern Ocean and Pacific (Skinner et al 2010; Sykes et al 2000) and deep Nordic Seas (Thornalley et al 2015) is different to the intermediate depth sites and plausibly are consistent with the concept of isolated deep ocean reservoirs releasing their aged water in the deglacial (of course volcanic degassing/hydrothermal fluids may have helped contribute to the the extreme aging recorded).

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