

Interactive comment on “Ventilation changes in the western North Pacific since the last glacial period” by Y. Okazaki et al.

Anonymous Referee #1

Received and published: 16 September 2011

This submission presents new radiocarbon data from planktonic and benthic foraminifera in order better constrain ventilation of the North Pacific interior since the last glacial period. The ventilation of the North Pacific is highly relevant to the global carbon cycle, since the deep Pacific is a large carbon reservoir. A small change in the reservoir can change the atmospheric CO₂ as well as radiocarbon content. This submission is therefore appropriate for CP and of interest to its readership.

This is a short, generally well written manuscript. It is so concise that there is not much to criticize, especially given the new data that will be of interest to many in the paleoceanographic community. I have two substantive comments to make and a few minor issues to raise, before recommending this for publication.

My two substantive comments have to do with the interpretation of Figure 5 and the C1407

assertion that D14C between MD01-2420 and Galbraith's ODP Site 887 increased to 142 permil during H1 compared to 76 permil during earlier LGM. This is based on a single new data point at around 17 ka. My first comment is that when I look at Figure 4 and view the new data, including the one at 17 ka, in the context of the available western N Pacific data, I do not get the sense that D14C actually increase at 17 ka. The grey symbols are rather flat and there is no clear upward trend. So I would ask the authors to soften their assertion (section 3.3 first paragraph). This does not change the major thrust of the paper, which is that N Pacific was more strongly stratified during glacial period than interglacial period.

My second substantive comment is that the difference between MD01-2420 and ODP Site 887 is interpreted in terms of vertical stratification, which seems quite natural to me. However, the authors make the point that the eastern N Pacific, as suggested by Marchitto for example, was quite different from the western part. So, it seems fair to ask the authors to discuss the D14C difference in terms of horizontal gradient as well. The two sites are quite apart: one's in the Gulf of Alaska and the other offshore Japan.

A few minor comments: 1) Replace “likely” with “possibly” in line 26 of page 2724. 2) Top paragraph of 2725 in two places refers to “~2500-3000 m”. Why? This does not seem warranted as the two data points constraining the whole discussion are at 2101 m and 3647 m. 3) Sentence starting “In the western North Pacific...”, lines 19-22, page 2725 is botched. Simplify and possibly split to multiple sentences.

Overall the authors could expand the discussion a bit more, as the manuscript is quite concise. I do find that quite refreshing. But there could be a bit more on where the field now stands after these new data.

Interactive comment on Clim. Past Discuss., 7, 2719, 2011.