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Biogeosciences Discussions

Interactive comment on "The export flux of particulate organic carbon derived from ^{210}Po / ^{210}Pb disequilibria along the North Atlantic GEOTRACES GA01 (GEOVIDE) transect" *by* Yi Tang et al.

Anonymous Referee #2

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This manuscript studies the export of POC from 10Po/210Pb disequilibria using a new data set acquired in the subpolar North Atlantic in 2014 during the GEOVIDE cruise. The manuscript is clearly written and could eventually be published once the authors have adequately responded to the following major comments.

The authors used the time-averaged vertical velocity from ECCO to study vertical advection effects on 210Po export fluxes. It should be made clear in the text that it is indeed the time-averaged vertical velocity that was used. The time period when the vertical velocity was averaged should be mentioned as well. My main problem here

is that, as mentioned by the authors, circulation is highly variable in the region. What is the rational for using a time-averaged vertical velocity and not the vertical velocity at the time of the cruise. What is the variance of the vertical velocity field ? How does this variance translate into a variance of the 210 Po export flux ? How robust are the conclusions on the effects of vertical advection on 210Po export fluxes, given this variance?

While recognizing that horizontal advection contribution can be as large as vertical advection, the authors neglects horizontal advection because they do not have the data to compute it. What I understand is that results might have been significantly different if horizontal advection could have been estimated. So what is the point of publishing results from a 1D model that everyone knows it is flawed ?

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