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Interactive comment on "Amino acid racemization in Quaternary foraminifera from the Yermak Plateau" *by* Gabriel West et al.

Anonymous Referee #2

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The authors present an interesting study about the amino acid racemization extent in the planktic foraminifera Neogloboquadrina pachyderma and the benthic species Cassidulina neoteretis collected at some depths in 3 cores drilled in the Yermak Plateau, in the Artic Ocean. The results obtained here contribute to increase the knowledge of amino acid racemization in foraminifera species, especially for the establisment of a reliable chronological model for the Artic, and the processes that may affect D/L values. In my view, the this study is of general interest, and the data set is important. Therefore, it is suitable to be published in Geochronology after minor revision:

1.-In my view the authors should amplify the discussion regarding the influence of temperature and other factors in the D/L values that they observed. Planktic forams are subjected to marine currents and may remain in the water column for some time (hun-

dreds?). This may produce the accumulation of tests with different ages in the same layer (time-averaging) and that these tests may have been racemized at different rates depending on original location, the place of the water column, etc. In fact, the authors indicated that "Lougheed et al. (2018) recently highlighted the large heterogeneity in the age distribution of foraminifera obtained from discrete depth intervals using 14C dating of single foraminifera". Moreover, the cores were drilled at different positions with marked diverse depths. Also, it has to be considered that the Yerkman Plateau is located in an area with interaction between Artic and Atlantic waters. The dominant colder or warmer currents may have affected the racemization rates. Do they authors have information about temperature gradients or water currents in the area?

2.-The results reveal an good match with the age equations of Kaufman et al. (2013) calculated using diverse species from sites of the Artic, Atlantic and Pacific Oceans (with different environmental contidions, e.g. temperatures). However, the age model of Kaufman et al. (2008), calculated for N. pachyderma of the Artic Ocean was not applicable here. The authors indicated different possibilities to explain this but in my view, they should be amplified, mainly because amino acid racemization is genus-dependent.

Minor suggestions:

Line 41: spelling of lithostratigraphic Line 121. The forams were oven-dried (4 hours at 30 °C). This heating may have produce an increase in racemization. Line 124. Why Core PS92/39-2 was only sampled for N. pachyderma? Line 127. Some samples needed 4h of immersion in H2O2 (instead of 2h) for removing the organic matter. Did the authors find any differences between sub-samples of the same level with these two different immersion times? Lines 152-156. I understand that these subsamples came from the same level. Line 170. Do you have any explanation for the high percentage (53%) of rejected samples in core 39-2? Lines 197-199. The authors observed that the extent of racemization in N. pachyderma samples was lower in PS92/39-2 below 3 m than in the other two cores. This core was drilled at a higher depth than the

other two, and in a northeastern position. Do they have information about temperature conditions or water currents which may have produced such changes? Indeed, the sedimentation rate of core 39-2 differed from the other two below 3-4 m (Fig. 3) Lines 211-215. The authors indicate that they observe stratigraphically reversed D/L Asp values in C. neoteretis samples from levels 3.12 and 4.45 of core PS92/45-2. However, it seems that one of these levels falls out the covariace trend of Asp and Glu acid D/L values. Line 232. I would not say that “dissimilar AAR rates between samples of comparable ages from different cores may originate from differences in sedimentation rates between the cores”.

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