

Interactive comment on “Surface and subsurface Labrador Shelf water mass conditions during the last 6,000 years” by Annalena A. Lochte et al.

Anonymous Referee #3

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This paper presents a high-quality multiproxy record of surface and bottom water conditions at a climate-sensitive location in the subpolar North Atlantic, showing variations in the latter half of the Holocene. The record is very high-resolution, and well-dated, and for that alone is a worthwhile contribution to the field. The discussion and interpretation of the various proxy records are carefully considered and uncertainties and complications are well communicated. I appreciated the discussion of the different alkenone indices and the connection to modern oceanographic data to pick a preferred index, and the caution due to the high concentrations of C37:4 in parts of the record. Overall I think the authors have done an excellent job of situating their record in the context of other records from the subpolar North Atlantic, both in terms of similarities to existing records and in dissimilarities and potential interpretations of those differences.

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About the only question I have about the data and interpretation relates to the impact of sedimentation rate changes on the alkenone concentration (e.g. page 4, line 28). It looks to me like the sed rate can vary by up to a factor of 3 based on figure 3 - does this have any effect on the alkenone concentration, can the alkenone concentration be diluted by higher sed rates? I don't think this will change any interpretations - looks to me like the low concentrations at 4-5 ka correspond to low sed rates, so the concentrations aren't low because of dilution, but it might be interesting to calculate some average alkenone fluxes between dated horizons, see how that average flux changes over the course of the record. I don't think it's necessary before the manuscript is accepted, just that I think it would be interesting.

Minor notes:

page 2 last line the current's potential

page 3 line 13 where are these strong north-westerly winds? over the Labrador Sea I assume?

page 3 line 23 itself is formed from the cold...

page 7 line 26 that peaks at 75 ng/g

Figures 5 and 6: mention what the gray bars are in the captions

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