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Interactive comment on "A comparison of benthic foraminiferal Mn/Ca and sedimentary Mn/Al as proxies of relative bottom water oxygenation in the low latitude NE Atlantic upwelling system" *by* C. L. McKay et al.

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This well written manuscript describes an investigation of Mn/Ca in tests of the benthic foraminiferan Eubuliminella exilis, a species tolerant of low oxygen conditions. Measurements were made directly by two methods, SIMS and FT-ICP-OES. The latter method was developed to ensure good removal of contaminants, and the former permits direct measurements of micron-scale spots on a specimen. Once it was determined that the results of these methods were similar, the foraminiferan data were also compared to sediment bulk Mn/Al, and agreed somewhat on past oxygen conditions.

Cores with foraminifera were tested across five time periods from 35-11.5 ka, with highest levels of Mn/Ca occurring in the Younger Dryas. This corresponded to a time with high rates of diatom accumulation, suggesting that high primary productivity led to oxygen depletion.

As the other reviewer pointed out, Figure 4 is quite difficult to read. I suggest it be enlarged and placed on a separate page.

The authors' findings are consistent with recent work on fish otoliths, which demonstrates a strong correlation between Mn/Ca in otoliths and fishes' presence in hypoxic zones (Thorrold and Shuttleworth 2000, Can. J. Fish. Aquat. Sci. 57: 1232-1242; Limburg et al. 2011 PNAS doi:10.1073/pnas.1100684108; Limburg et al. 2015 Journal of Marine Systems 141: 167-178. DOI: 10.1016/j.jmarsys.2014.02.014). In addition, similar findings have been published for bivalve shell Mn/Ca (e.g., Freitas et al. 2006 Geochimica et Cosmochimica Acta 70: 5119-5133).

Perhaps eventually there will emerge a consensus about carbonate-based bio-proxies of hypoxia?

Interactive comment on Biogeosciences Discuss., 12, 7335, 2015.