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Interactive comment on "Morphology of *Emiliania huxleyi* coccoliths on the North West European shelf – is there an influence of carbonate chemistry?" *by* J. R. Young et al.

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The manuscript is an excellent contribution to the research on the effect of ocean acidification on coccolithophore morphology. It is particularly interesting, as it is from a series of papers that investigate the same samples and experiments conducted during a cruise around the British Isles. In summary, coccolithophore morphology was studied in a series of natural samples over the natural gradient in carbonate chemistry encountered in the samples, and in several few-day experiments in which the carbonate chemistry was adjusted to three different settings that are within levels than can be expected to be reached in the future. A new method to measure coccolith morphology

is used. It makes use of the geometric nature of coccoliths, so that every coccolith can be measured semi-automatically by a macro in a the free imaging software Fiji. By this, the authors are able to document coccolith morphology changes within Type A of Emiliania huxleyi between different geographic settings and over the course of the bioassay experiments. However, these are mostly unrelated to the natural and experimental carbonate chemistry gradients. Still, there seems to be a different in the degree of calcification between oceanic and neritic assemblages.

The paper is very well-written and easy to follow. I have only very few comments that may further improve the paper:

1) It would be good to see some more images with different relative tube width ratios in order to document the "subjective" variation in degree of calcification that the authors refer to. Also, it would be very interesting, how the different relative tube width values would translate into coccolith weight, as this is widely used in other studies as an indicator for coccolith calcification. In this respect, also ray width would be of interest for the degree of calcification as well. Was this measured as well, and is this something the authors would suggest to investigate in the future?

2) On page 4543/4544 the authors state: "The neritic populations tend to be larger (Fig. 9a) and to show a decrease in calcification with size in contrast to the oceanic populations which tend to be smaller and show an increase in degree of calcification with size."

Does this mean that there is an optimum in the degree of calcification in mid-sized E. huxleyi coccoliths, and the difference between the two populations then just would be in size? Again, it would be very interesting how this translates into coccolith weight/the amount of $CaCO_3$ per coccolith.

Minor comment:

Introduction:

P4533 L 18-26: I think a short note on how these field studies can be compared to laboratory experiments could be useful, i.e. significance of single strain observations vs. natural assemblage studies with multiple morpho-/genotypes could be useful at this point. There is also a recent study on the Holocene variability in coccolithophore weight in the North Atlantic that might be useful:

Berger, C., Meier, K.J.S., Kinkel, H., Baumann, K.H., 2014. Changes in calcification of coccoliths under stable atmospheric CO2. Biogeosciences 11, 929–944.

Interactive comment on Biogeosciences Discuss., 11, 4531, 2014.