

Interactive comment on “Technical Note: Weight approximation of single coccoliths inferred from retardation estimates using a light microscope equipped with a circular polariser – (the CPR Method)” by J. Bollmann

S. Meier

smeier@gpi.uni-kiel.de

Received and published: 12 September 2013

I have read the manuscript with great interest, as the idea of using a circular polariser to overcome uncertainties in weight measurements of coccoliths (due to the extinction cross) has been around for a couple of years, and it is good to see a first attempt. I am, however, not convinced that the methodology is sound, because of the calibration method.

There is a linear relationship between calcite weight and first order grey interference

C4983

colours up to a certain thickness of the calcite. Many coccoliths are thinner than this, and the possible error of the same grey levels occurring for thicker calcite (Fig. 1) does not apply. For these "thin" coccoliths, a simple factor converting grey level into weight can be used.

The author argues, that the factor for this conversion is wrong, as the calcite powder measured for this calibration has a random orientation, so that the individual crystals will have slightly different grey levels despite having the same size. I think that this statement needs testing. How big are the differences, and how much would this change the calibration factor? Coccoliths are built very regular with respect to the orientation of their calcite elements, which are aligned in a circle, and leads to the extinction cross. It could be argued that a randomly orientated calcite powder would have the same proportion of the powder in extinction as the elements in a coccolith. And if the powder is fine enough, also the slight differences due to different orientations could be minimised.

I think that a comparison of the two methods is needed before the empirical calibrations should be regarded as flawed.

Interactive comment on Biogeosciences Discuss., 10, 11155, 2013.

C4984