

Interactive comment on “Mg / Ca and $\delta^{18}\text{O}$ in living planktic foraminifers from the Caribbean, Gulf of Mexico and Florida Straits” by Anna Jentzen et al.

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In this study, eight planktonic foraminifera are collected from water mass or sediment, and the authors investigate how Mg / Ca and $\delta^{18}\text{O}$ of the shell reflects the water mass property. Eight species are big numbers. The reviewer has considered it is ambitious project to comprehensively study Mg / Ca and $\delta^{18}\text{O}$ of planktonic foraminifera in the Caribbean waters. This theme is a very interesting result for paleoceanographers who commit paleoenvironmental analysis using planktonic foraminifers and micropaleontologists/geochemists who study trace elements and isotopic composition of foraminiferal calcite. In recent years, laboratory cultures have revealed how trace elements and isotope compositions of planktonic foraminifera are distributed by growing environments. This study can also be read as an answer paper from field studies for laboratory cul-

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ture trials. Reviewer could conclude it is a suitable manuscript to publish on Biogeosciences.

According to recent molecular phylogenetic studies have revealed that morphological species can be divided into sub groups. Even no genomic analysis is necessary in this study, but materials to identify the morphological species used in this study are necessary. By showing the SEM plate as a supplement, compatibility with other studies is maintained. Measurement methods and their limitations are clearly shown and this reviewer could not find any problems. Further, manuscripts are well prepared and high quality.

Question

The authors pointed out the importance of carbonate ion concentration in the introduction section (P1L33) and show the vertical profile of carbonate ion concentration (Fig. 4), although the influence of carbonate ion concentration on neither oxygen/carbon isotopic ratio nor Mg/Ca has not been discussed. The carbonate ion concentration profile shows the most steep change in the surface layer from 0-400m, but perhaps this variability did not affect the paleoenvironmental analysis with core-top samples? In fact, the authors compare between living samples and fossil samples, which are in good agreement. Perhaps, in the field samples, fluctuations by carbonate ion concentration have already been incorporated, so does that mean it will work well without consideration about carbonate ion concentration? Since reviewers are worked through laboratory culture experiments, the factors that pH, carbonate ion concentration fluctuations, etc. in addition to water temperature and salinity influence the shell element / isotope composition can not be ignored. Under what conditions does carbonate ion concentration need not be taken into consideration?

Minor comment

The authors can include Zeebe, Richard E. *Geochimica et Cosmochimica Acta* 63.13-14 (1999): 2001-2007 was good because it is an important literature as well as Spero

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et al. (1997) and Bijma et al. (1999).

Definition of Vital effects In this research, the reviewer highly appreciated that the vital effect is finely verified. Is it possible to explicitly specify the Vital effect assumed by this research in an introduction or section 3.2 by dividing it into elements (eg ontogenic effect, symbiotic effect, calcification depth, ecology including optimal season / annual cycle etc)? The authors discuss about the influence of each of these factors, but it is rather enumerative.

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