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# Decoupling the impact of different carbonate system parameters from controlled growth experiments with deep-sea benthic foraminifera

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Insights into past marine carbon cycling and water mass properties can be obtained with reconstructions of the seawater carbonate system (C-system) through controlled experiments with accurate C-system manipulations. Benthic foraminifera (marine calcifying microorganisms) incorporate various elements into their biogenic calcium carbonate shells as a function of specific environmental parameters. We explore the use of Sr/Ca ratio of the calcite shells as a potential sea water C-system proxy after a controlled growth experiment with two deep-sea foraminiferal species (*Bulimina marginata* and *Cassidulina carinata*) and one intertidal species (*Ammonia* T6). To this aim, we decoupled carbonate chemistry in controlled growth experiments, i.e., changing pH at constant dissolved inorganic carbon (DIC) and changing DIC at constant pH. These experiments were performed for the first time with a new generation of environmental ecological experiment simulators (Ecolab system) allowing a precise control and monitoring of $pCO_2$, temperature and humidity. Four climatic chambers were used with different concentrations of atmospheric $pCO_2$ (180 ppm, 410 ppm, 1000 ppm, 1500 ppm). Preliminary results describe a positive correlation between Sr/Ca and the C-system (DIC/bicarbonate ion concentration) for *Ammonia* T6 and *B. marginata,* whereas no correlation with any of the C-system parameters was observed for *C. carinata*. We hypothesize that Sr/Ca ratios may serve as reliable proxy for the C-system for selected benthic foraminifera species.