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Proton Management of Foraminiferal Calcification

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Marine calcification plays an important role in the global carbon cycle. Currently, approximately half of all carbon buried in the seafloor is the result of biogenic calcium carbonate production. Perforate foraminifera are a prime example of marine carbonate producers and responsible for a large portion of today's production. The physiological processes involved in calcification, however, are still unclear. Here we present some results on the intra- and extracellular pH changes in benthic perforate foraminifera during calcification. These observations allow for calculating the budgets of ion fluxes that are taken up and removed from the calcification space, which are placed in the context of previously obtained results and published calcification models to construct a unifying model for perforate foraminiferal calcification. This model also accounts for general patterns in observed fractionation factors of various elements.

Keywords: foraminifera