

Calcium concentration controls on shell Na/Ca in cultured planktonic foraminifera (*Globigerina siphonifera*)

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We investigated the effect of the seawater calcium concentration on the Na/Ca ratio in the shells of planktonic foraminiferal calcite cultured under laboratory conditions. Whereas elemental/Ca ratios in foraminifer's shells are used to assess several seawater parameters (e.g. paleo-temperature, paleo-pH, paleo-salinity and more), evaluation of past seawater calcium concentration remains challenging. Because Na in seawater has a long residence time (~100Ma), much longer than Ca (~1Ma), the Na/Ca ratio may become a potential proxy for reconstructing the seawater Ca concentration at least over the Cenozoic. By assuming the Na is incorporated into foraminiferal shells proportionally to that ratio in seawater, Na/Ca in foraminifera shell offers a new proxy to study and reconstruct the oceanic Ca budget at high resolution throughout the Cenozoic.

Here we report on attempts to calibrate the Na/Ca proxy on cultured planktonic foraminifera (*G. Siphonifera*) collected from the Gulf of Eilat (Red Sea) and grown in variable Ca from $[Ca]_{sw} = 12.5$ to 21.5 mM at constant temperature (25°C) and salinity (37‰).

We demonstrate here the existence of a positive correlation between the Na/Ca ratio in the shells and the Na/Ca ratio of the seawater. This calibration shows undoubtedly the strong potential for the foraminiferal Na/Ca ratio to be used as a proxy for reconstructing the ancient Ca seawater concentrations.