

Supplement of Biogeosciences, 15, 2205–2218, 2018  
<https://doi.org/10.5194/bg-15-2205-2018-supplement>  
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*Supplement of*

## **Impact of salinity on element incorporation in two benthic foraminiferal species with contrasting magnesium contents**

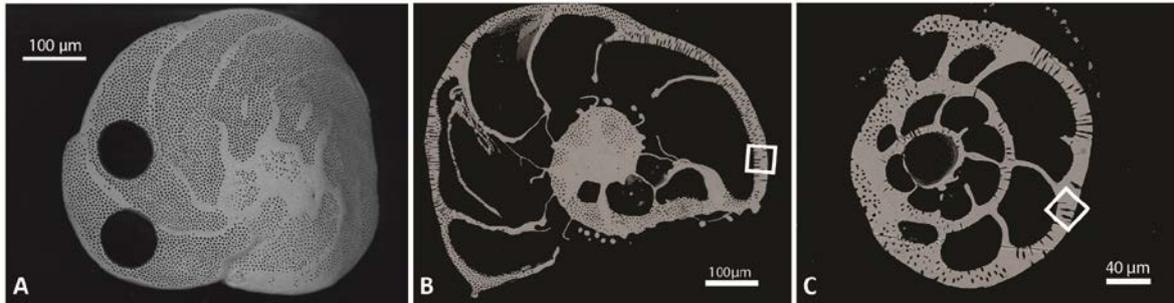
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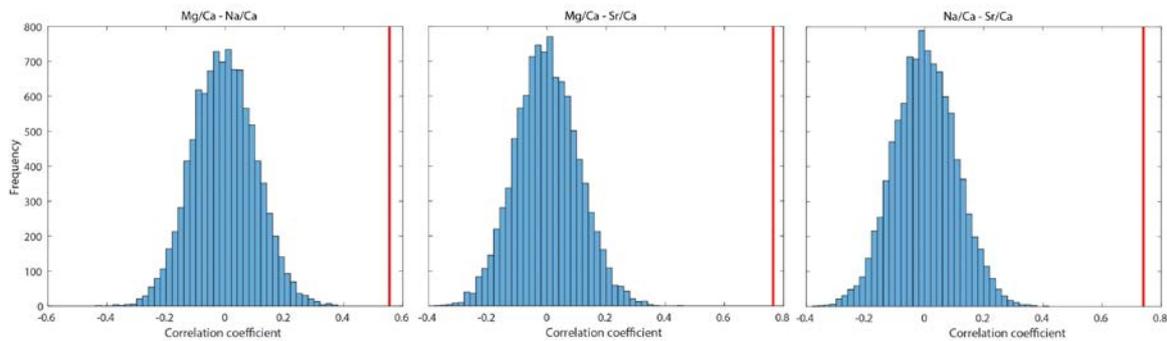
### Supplement S1.

SEM image of a specimen of *A. lessonii* showing LA-ICP-MS measurement spots (panel A) and SEM images of specimens of *A. lessonii* (panel B) and *A. tepida* (panel C) embedded in resin and polished for Electron Probe Micro Analysis, the mapping area is depicted with a white box.



### Supplement S2.

Results of the Monte Carlo analysis showing that the measured correlation coefficients for the inter-specimen correlations between the measured  $EI^1/Ca_{cc}$  and  $EI^2/Ca_{cc}$  are not caused by a spurious correlation due to the common denominator  $Ca_{cc}$ , showing that the measured correlation coefficient is significantly higher than the distribution of the correlation coefficients between 10,000 randomly drawn  $EI^1$  concentrations/measured  $Ca$  concentration and measured  $EI^2/Ca$  concentrations. This test is based on the concentration results from a single LA-ICP-MS session with specimens of *A. lessonii* cultured at a salinity of 35.



Supplement S3.

Results for the orthogonal regressions testing the correlations between single-spot  $El^1/Ca$  and  $El^2/Ca$ , within salinity conditions, for *A. lessonii* and *A. tepida*.

**Orthogonal regression results**

***A. lessonii***

**p-value**      **r**      **Slope**   **y-Intercept**  
**(x,y)**

**(Mg/Ca, Na/Ca)**

p<0.001      0,71    0,21      2,21  
p<0.001      0,52    0,17      3,89  
p<0.001      0,57    0,17      4,06  
p<0.001      0,89    0,14      5,44  
p<0.001      0,69    0,16      5,12

**(Mg/Ca, Sr/Ca)**

p<0.001      0,63    0,02      1,19  
p<0.001      0,64    0,02      1,18  
p<0.001      0,76    0,02      1,19  
p<0.001      0,90    0,01      1,22  
p<0.001      0,73    0,02      1,14

**(Na/Ca, Sr/Ca)**

p<0.001      0,58    0,09      1,00  
p<0.001      0,47    0,10      0,78  
p<0.001      0,72    0,10      0,77  
p<0.001      0,94    0,11      0,62  
p<0.001      0,80    0,12      0,53

***A. tepida***

**p-value**      **r**      **Slope**   **y-Intercept**  
**(x,y)**

**(Mg/Ca, Na/Ca)**

p<0.001      0,35    1,64      1,63  
p>0.05      0,24    2,14      0,41  
p<0.001      0,62    0,86      3,14  
p<0.001      0,53    1,19      2,35  
p<0.001      0,84    1,34      1,89

**(Mg/Ca, Sr/Ca)**

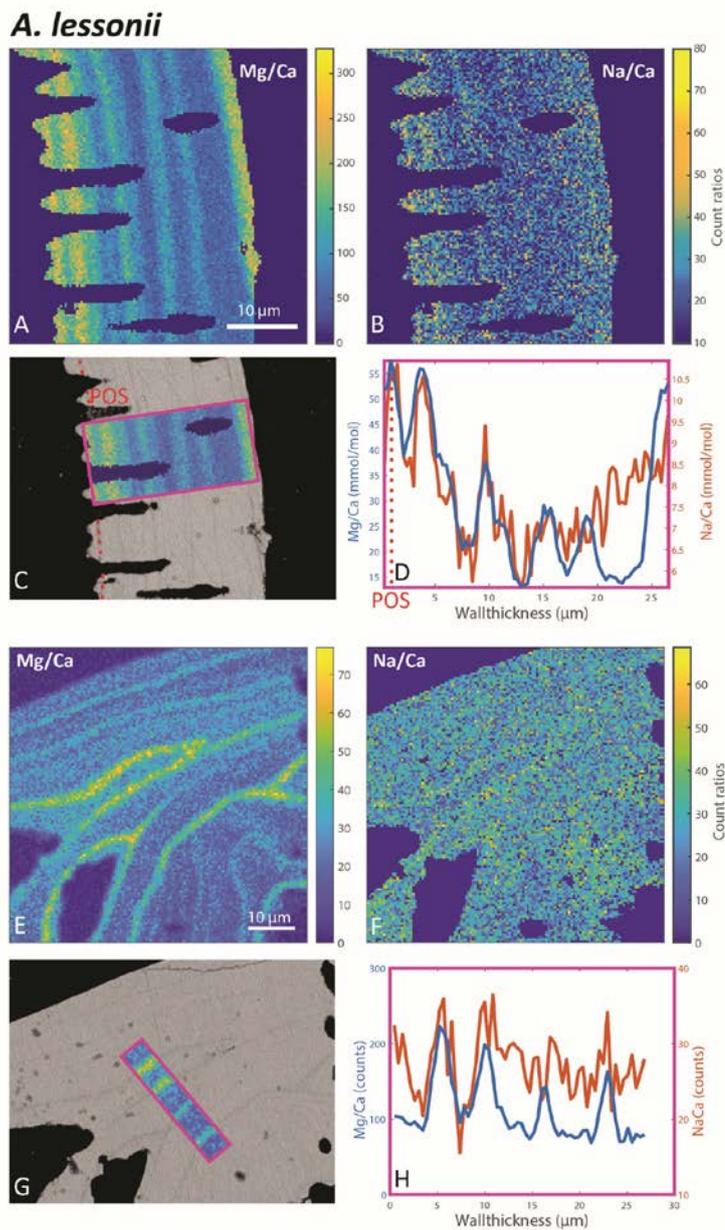
p<0.01      0,28    0,23      0,89  
p>0.05      0,20    0,13      1,13  
p>0.05      0,18    0,06      1,33  
p>0.05      0,17    0,13      1,19  
p>0.05      -0,28   -0,16      2,12

**(Na/Ca, Sr/Ca)**

p<0.01      0,29    0,14      0,66  
p>0.05      0,10    0,06      1,10  
p>0.05      0,23    0,07      1,10  
p>0.05      0,18    0,11      0,94  
p>0.05      -0,32   -0,12      2,34

Supplement S4.

Foraminiferal  $Mg/Ca_{acc}$  and  $Na/Ca_{acc}$  (A and B, E and F) intensity ratio maps, obtained with EPMA, for two specimens of *A. lessonii* grown at a salinity of 30 (A-D) and 35 (E-H). Panel D and H show profiles for  $Mg/Ca$  (blue) and  $Na/Ca$  (red), based on averaged EPMA ratios scaled to LA-ICP-MS measurements in D and on EPMA count ratios in H (no LA-ICP-MS data available for this specimen), of an averaged transect area through the chamber wall perpendicular to the POS. The transect areas (purple rectangles) are indicated on top of backscatter SEM images (C and G), showing that the high  $El/Ca$  bands overlap with the primary organic sheet (POS, in dashed red line in C, not clear in G)) and subsequent organic linings.



Supplement S5.

Figure showing the relationship between the salinity uncertainty and number of measured specimens for the Na/Ca<sub>cc</sub> - salinity calibration of *A. lessonii*, calculated following Eq. (1):

$$\text{Salinity uncertainty} = (2 \times \text{RSD} \times \text{Number of specimens}^{-0.5}) / \text{Sensitivity}, \quad (1)$$

whereby sensitivity is the slope of the calibration.

