The advantage of laboratory experiments is the possibility to control all physico-chemical parameters of the culture medium. Thereby, it becomes possible to produce paleoceanographic proxy calibrations by studying the influence of a single parameter on the geochemical composition of foraminiferal shells entirely calcified in controlled conditions.

### Calibration of $\delta^{18}O$ of cultured benthic foraminiferal calcite as a function of temperature (Barras et al., 2010)

Experiments were performed at 6, 10 and 13°C under stable physico-chemical conditions, in order to study the influence of temperature on the Mg/Ca ratio of newly formed chambers of *Hyalinea balthica*. The Calcium tagging method was used to identify chambers that were calcified under our controlled conditions. The composition of these chambers was analysed using laser ablation ICP-MS.

**Fig. 2:** Effect of temperature on the $\delta^{18}O$ composition, for inorganic calcite (Kim and O'Neil, 1997) and for cultured *B. marginata*.

### Calibration of Mg/Ca of cultured *Hyalinea balthica* shells as a function of temperature (Rosenthal et al., 2011)

Experiments were performed at 6, 10 and 13°C, for newly formed chambers of *Hyalinea balthica*. Sensitivity—4 times higher than observed in other benthic foraminifera.

**Fig. 3:** Calibration of cultured *H. balthica* shells obtained by multiple LA-ICP-MS analyses of individual specimens.

### Effect of salinity and ontogeny on isotopic and trace metal composition of *Ammonia tepida* (Diz et al., 2012)

The aim of these experiments was to study the effect of salinity (29.8, 32.2, 35.5) on the geochemical composition (trace metals and isotopes) of cultured *Ammonia tepida* shells entirely calcified in controlled conditions.

**Fig. 4:** Example of shell size effect on Sr/Ca incorporation in cultured *A. tepida* at 35.5 salinity.

### Linking foraminiferal diets and shell chemistry: an experimental approach (Mojtahid et al., 2011)

The figure shows the synthetic figure of the main results. Very little of the C ingested by adult foraminifera is incorporated into the shell. However, we cannot conclude that diet has no influence since none of our calcareous specimens grow new chambers.

These studies demonstrate the value of performing proxy calibrations under laboratory controlled conditions. We plan to perseve this work by developing a new proxy of paleo-oxygenation through the regional (Pays de la Loire) research program MADONA (Micro-Analyse Des Organismes marins Nantes Angers).