

Impact of an *in situ* acidification experiment on benthic foraminifera ecology and their calcite geochemistry

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Benthic foraminifera are often used for reconstructing ocean paleo-pH or paleo-chemistry, using assemblage composition or the geochemical composition of their calcite. Transfer functions for most geochemical proxies are based on laboratory experiments performed under controlled conditions, often on isolated species and short duration times. It is therefore important to assess whether they are representative of natural environments where multiple physico-chemical parameters may interfere in the incorporation of trace elements and light isotopes. An *in situ* ocean acidification experiment (eFOCE) has been performed in the Bay of Villefranche (NW Mediterranean): an offset of ambient pH of -0.3 unit was imposed over 5 months into a semi-opened enclosure lying on the sea bottom over a seagrass bed (12m depth). This long-term experiment provides a unique opportunity to check geochemical and isotope proxies under natural conditions.

The ecology of living foraminifera and geochemistry of their tests were studied at time t=0 and after 4 months. Li, Na, Mg, Ca, Sr, Ba and Zn concentrations were measured by LA-ICP-MS. $\delta^7\text{Li}$ and $\delta^{11}\text{B}$ are determined using an ion microprobe. Ecological investigations highlight no significant impact of the pH decrease, the duration of the experiment being probably too short compared to their generation time. There is a strong "species effect" on Li/Ca that is correlated to Na/Ca and Sr/Ca. For a few species, the correlation between Na/Ca and Mg/Ca is different in the acidified and in the control enclosures, suggesting that the carbonate chemistry impacts significantly these proxies, independantly of salinity and temperature. $\delta^7\text{Li}$ in the Li-rich *Rosalina bradyi* tests are fractionated by 5‰ vs seawater, indicating the need to take into account vital effects when reconstructing ocean $\delta^7\text{Li}$ paleovariations from foraminifera or bulk carbonates. We now intend to check whether the combination of B/Ca, $\delta^7\text{Li}$ and $\delta^{11}\text{B}$ allows us to recalculate the seawater pH and pCO₂.