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High frequency variability of *Ruditapes philippinarum* fluids and shell in the Auray River

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Calcareous organisms are useful for paleoclimatic studies. However, calibration between the recorded message in biocarbonate and the environmental parameters is often difficult because the metabolism of the organisms may influence element incorporation. These biological processes are called vital effects. A mechanistic understanding of the transfer processes and the incorporation of elements from seawater into biogenic carbonate is necessary to improve the use of most proxies.

For this purpose, bivalves are ideal model-organisms: their high growth rates and large size allow high spacial and temporal resolution studies. This study focusses on the euryhalin Manila clam, *Ruditapes philippinarum*, which lives buried a few centimeters into sandy and muddy sediments of intertidal and subtidal areas. Bivalve biomineralization takes place in extra-pallial fluids located between the shell and the mantle. In order to better understand how elements are transfered to the different compartments of the clam (i.e. haemolymph, tissues, extra-pallial fluids and shell carbonate), the elemental composition of these compartments and the surrounding water were simultaneously monitored in a changing environment.

A monitoring study was performed at a high temporal resolution in the Auray River estuary (Gulf of Morbihan, France). Seawater and Manila clams (n=90) were sampled in the subtidal zone by scuba diving every two hours during this 48 hours experiment.

At this location, tidally driven variations of environmental parameters (i.e. salinity, turbidity, dissolved oxygen, $\delta^{18}O_{water}$, $\delta^{13}C_{DIC}$ ...) were observed. Salinity varied between 20 (low tide) and 32 (high tide). The first results indicate that the osmolarity in seawater equals that in the haemolymph and extra-pallial fluids, except at low tide when osmolarity is higher in these fluids. These results show that *Ruditapes philippinarum* is an osmoconformer. However, we can hypothesize that at low tide, when salinity decreases beneath a threshold, our clams could close their valves to protect themselves from low salinity. Trace elements analyses of the shells with an electronic microprobe and the fluids by ICP-MS are also investigated. Variations in the commonly used strontium and magnesium proxies in the different compartments allow us to test if at high temporal resolution their incorporation is regulated by the organism or only by the environment.