Rocky tidal pools: carbonate chemistry, diurnal variability and calcifying organisms in future high-CO2 conditions

Narimane Dorey, Sophie Martin, Lester Kwiatkowski

Rocky tidal pools: carbonate chemistry, diurnal variability and calcifying organisms in future high-CO$_2$ conditions

Narimane Dorey[1], Sophie Martin[2], and Lester Kwiatkowski[3]
[1]Ecole Normale Supérieure, LMD, France (narimane.dorey@gmail.com)
[2]CNRS, EDYCO, Sorbonne Université
[3]CNRS, LOCEAN, Sorbonne Université

Understanding the coastal ocean variability and quantifying its significance in the global biogeochemical cycles is crucial to our ability to project future changes. In the shallow coastal waters, the contribution of the biological activity to water chemistry can be high locally, and responsible for seasonal and diurnal variations. These variations are not yet well-understood: they are often under-estimated and the general lack of observations means that they are seldom integrated into global predictive models such as those used by the IPCC.

In this presentation, we will present results on the natural carbonate chemistry diurnal variability in tidal rock pools in Brittany (France), during emersion times. We chose tidal rock pools as to represent "mini-coastal seas": realistic small mesocosms that simulate coastal environments with extreme variability. These have the advantage to be closed systems containing a range of calcifying organisms such as coralline encrusting and non-encrusting algae, that influence and are influenced by the carbonate chemistry. We calculated calcification of the pools community by using the alkalinity anomaly method and estimated the community photosynthesis/respiration. We also compared night-time dissolution and day-time calcification. Finally, we manipulated the pools chemistry at emersion by adding CO$_2$ to mimick future acidification changes, and explored the impact of seawater acidification on the calcification of the tidal pools' communities.