ABSTRACT

BIOLOGICAL CHARACTERISTICS MODULATING THE SENSITIVITY OF CALCIFICATION TO OCEAN ACIDIFICATION: COMPARATIVE APPROACH IN ECHINODERMS

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The increase of the atmospheric carbon dioxide concentration, due to human activities, induces changes in ocean chemistry, namely a decrease in carbonate concentration and an increase in proton concentration. These two phenomena are called Ocean Acidification (OA). In Metazoa, different physiological processes, including calcification, can be affected by this acidification. However, the magnitude of the OA impact differs according to taxa or even within taxa. Several hypotheses about the mechanisms behind these differences were proposed: (1) contrasted acid-base physiologies, (2) differences in variability of the original habitats, (3) differences in the quality or quantity of available foods. For instance, in echinoderms, a taxon provided with a well-developed high-magnesium calcite skeleton, the calcification process is affected by OA but at different degrees according to the considered species. The goal of the present study is to assess the importance of different biological characteristics which could modulate the sensitivity of calcification to OA in Metazoa. A comparative approach using different postmetamorphic echinoderms with contrasted acid-base physiologies and food sources and originating from contrasted habitats (variable or stable) is developed. Studied organisms principally come from long term OA experiments and natural CO2 vents. The significance of the considered factor is determined by comparing the effects of OA on the skeleton of echinoderms with contrasted characteristics for this factor. The effects on the skeleton is studied at the morphological, mechanical and calcification gene expression levels.