

## Is the Sub-antarctic sea urchin *Abatus cordatus* threatened by ocean acidification?

Dubois Philippe<sup>1</sup>, Margot Gonthier-Maurin<sup>2</sup>, Nadia Ameziane<sup>3</sup>, Sarah Di Giglio<sup>1</sup>, Jean-Pierre Féral<sup>4</sup>, Christian Marschal<sup>4</sup>, Loïc Michel<sup>5</sup>, Sébastien Motreuil<sup>6</sup>, Thomas Saucède<sup>6</sup>

<sup>1</sup> Laboratoire de Biologie marine CP160/15, Université Libre de Bruxelles, 50 av. Roosevelt, B1050 Bruxelles, Belgium

E-mail: [phdubois@ulb.ac.be](mailto:phdubois@ulb.ac.be)

<sup>2</sup> Ecole d'Ingénieurs de PURPAN, 75 voie du TOEC, BP57611, F31076 TOULOUSE Cedex 3, France

<sup>3</sup> UMR7208-BOREA, Département Milieux et Peuplements Aquatiques, Muséum National d'Histoire Naturelle, BP 225, F29182 Concarneau Cedex, France

<sup>4</sup> Institut Méditerranéen de Biodiversité et d'Ecologie marine et continentale-IMBE, UMR AMU/CNRS 7263/IRD 237/UAPV, Station Marine d'Endoume, F13007 Marseille, France

<sup>5</sup> Laboratory of Oceanology, University of Liège, B6C, Allée du 6 Août 15, Quartier Agora, Sart-Tilman, B4000 Liège, Belgium

<sup>6</sup> Biogéosciences, UMR 6282, Université de Bourgogne Franche-Comté, 6 bvd Gabriel, F21000 Dijon, France

Increasing atmospheric carbon dioxide concentration alters the chemistry of the oceans towards more acidic conditions. Polar oceans are particularly affected due to their low temperature, low carbonate content and mixing patterns, for instance upwellings. Brooding Echinodermata were hypothesized to be at risk due to their high-magnesium calcite skeleton and brooding habits. We investigated the acid-base status of the Sub-antarctic irregular brooding euechinoid *Abatus cordatus* during a 13-days acidification experiment carried out in Port-aux-Français, Kerguelen Islands, in the frame of the vERSO BELSPO and PROTEKER IPEV projects. Four seawater pH-T were tested (8.3, 8.0, 7.7, 7.4). At the time scale of the experiment, *A. cordatus* regulates the pH of the coelomic fluid, the main extracellular compartment but this is not linked to an accumulation of bicarbonate as it is the case in regular euechinoids. The pH of sea water in the brooding chambers depends on the pH of the surrounding sea water but is lower than the latter by 0.3 to 0.6 pH units and it is further reduced in presence of calcified juveniles. This suggests that adult *A. cordatus* might be resilient to near-future ocean acidification. However juveniles will endure worse acidification conditions and might be possibly at risk. The impact on brooded juveniles of irregular euechinoids should be further investigated.