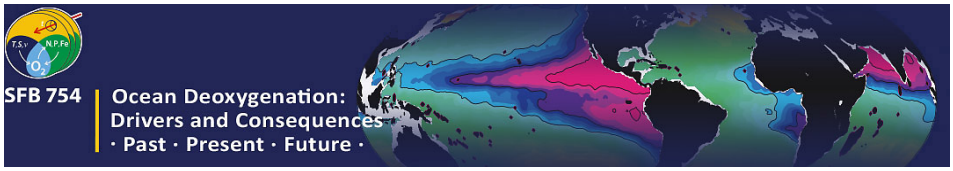

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Understanding physiological mechanisms of Chilean scallop to the multiple-stressor scenario of upwelling by using an experimental integrative approach

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Understanding physiological mechanisms of Chilean scallop to the multiple-stressor scenario of upwelling by using an experimental integrative approach
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Environmental variability of coastal areas in many cases overcomes forthcoming climatic projections. Studies simulating future environmental conditions conclude that higher temperatures and decreasing pH and oxygen levels have negative impacts on the physiology and life-history traits of marine biota. Nevertheless, a constantly growing number of studies notify neutral or positive responses of marine species to future climatic conditions. These studies reveal the existence of biological mechanisms, and provide significant information, of how coastal species are successfully able to cope with their environment. The northern Chilean coast has one of the most intense upwelling centers of the Humboldt Current System (Punta Lengua de Vaca, 30°18'S), whose activity (wind-activation and relaxation) modifies largely the pH, dissolved oxygen and temperature conditions of nearby coastal areas. This environmental scenario impacts over the most important scallop (*Argopecten purpuratus*) culture industry of Chile, located at Tongoy Bay (30°15'S). Previous studies that addressed how *A. purpuratus* would response to future predicted changes in temperature, pH and oxygen have evidenced certain tolerance to these changes. These studies suggest that *A. purpuratus* is adapted to a great range of environmental changes as consequence of the exposure to upwelling conditions. However, to understand how this species will respond to future conditions, it is required to untangle the biological mechanisms, as well as, the tolerance ranges to average and extreme conditions that upwelling imposes. This study, contributes with information about the biological mechanisms that this species displays to cope with upwelling conditions by using an integrative approach (field and laboratory experiments). Biological and biochemical mechanisms were studied by measuring metabolic, growth, calcification responses, as well as, the expression of multiple stress proteins. The results of this study would allow a better prediction of the sensibility of *A. purpuratus* to future global change.

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