

August 19 - 28th, 2018  
Charles Darwin Research Station, Puerto Ayora, Galápagos,  
Ecuador

# 2018 Galapagos Ocean Acidification School

**CO<sub>2</sub> Vents at Roca Redonda, Galapagos Islands: A Natural Laboratory for Long-Term Multidisciplinary Ocean Acidification Experiments and Capacity Building**

## Open Call for Applications

Ocean acidification (OA), a process of increasing seawater acidity caused by the uptake on anthropogenic carbon dioxide (CO<sub>2</sub>) by the ocean; is expected to change surface ocean pH to levels unprecedented for millions of years, affecting marine organisms at different levels, from shell formation up to food web structures, trophic interactions and community structure. Although the current knowledge of the effects of OA in aquatic ecosystems has rapidly increase in the previous years, most of the research has been conducted in vitro (laboratories) or in semi-natural conditions (mesocosms), which may hinder responses of natural communities as the organisms are isolated from their environment. Thus, the study of ecosystems at shallow coastal sites, where volcanic CO<sub>2</sub> vents lower the pH of the water column, can offer a more holistic response of such environments to OA. The Galapagos Islands are a unique natural laboratory, a site where different currents converge, giving origin to an exceptional marine diversity. Roca Redonda, located north of Isabela Island, is an active submarine volcano where CO<sub>2</sub> is released through cold vents, thus the conditions of ocean acidification are naturally simulated. This makes Roca Redonda an exceptional study site of OA effects in the Eastern Pacific.

## Aim

Here we aim to use natural CO<sub>2</sub> gradients around Roca Redonda to conduct in situ observations using a wide range of techniques for long-term capacity building (chemistry, biology, geology, etc) and data collection. In order to achieve this, we propose the realization of an advance training course, using natural CO<sub>2</sub> seeps as experimental units, to be held on the Galapagos Island at the Charles Darwin Research Station facilities in Galapagos.

## Objectives

During this course, participants will be trained in different aspects of OA research such as:

- Standard measurements for carbon system parameters, including analytical chemistry techniques,
- The use of stable isotopes as a major tool in food web analysis in the framework of OA research,
- In-situ sample collection in a CO<sub>2</sub> vent for chemical and biological analysis,
- The study of benthic community structure under the influence of high CO<sub>2</sub> conditions.





## Scientific objectives

By using this different approaches we aim at the same time to assess relevant scientific questions:

- Are different DIC sources involved in calcium carbonate formation in marine organisms (i.e. corals, echinoderms, barnacles and gastropods)?
- Does the community shift to more <sup>13</sup>C depleted values due to use of volcanic <sup>13</sup>C-depleted sources upon low pH/high pCO<sub>2</sub> conditions?
- What is the effect of high CO<sub>2</sub>-low pH in the functional structure and biomass-energy transference of benthic communities and food webs?

## How to apply

Complete the application form online with all your personal and educational information, letter of intention, and Curriculum Vitae and send to:

Dr. Rafael Bermudez: [jrbermud@espol.edu.ec](mailto:jrbermud@espol.edu.ec) or  
Dr. Cristian A. Vargas: [crvargas@udec.cl](mailto:crvargas@udec.cl)

**Deadline: June 4th, 2018**

## Organizers

Dr. Rafael Bermudez, Escuela Superior Politécnica del Litoral ESPOL, Galapagos, Ecuador [jrbermud@espol.edu.ec](mailto:jrbermud@espol.edu.ec)

Dr. Cristian A. Vargas, Department of Aquatic System, Faculty of Environmental Sciences, Millennium Institute of Oceanography (IMO), and Center for the Study of Multiple Drivers on Marine Socio-Ecological Systems (MUSELS), Universidad de Concepción, Chile [crvargas@udec.cl](mailto:crvargas@udec.cl)

## Target participants

All participants will be selected based on their current role in their laboratories indicating their active, full-time involvement with relevant analytical duties in the field and in their laboratories. Participants involved in research of natural CO<sub>2</sub> vents in their respective countries (e.g. Colombia and Caribe) will be extra-benefits in the selection process. Given the limited space on board of the research vessel, participants that are currently involved in OA-related research activities on their home institution will be given preference to participate.

## Lecturers



**Dr. Rafael Bermudez**, Galapagos Marine Research and Exploration Program, Joint ESPOL-CDF initiative. Escuela Superior Politécnica del Litoral ESPOL, Galapagos, Ecuador



**Dr. Cristian A. Vargas**, Department of Aquatic System, Faculty of Environmental Sciences, Millennium Institute of Oceanography (IMO), and Center for the Study of Multiple Drivers on Marine Socio-Ecological Systems (MUSELS), Universidad de Concepción, Chile.



**Ms. Lorena Arias B.** Millennium Institute of Oceanography (IMO), Universidad de Concepción, Concepción, Chile



**Dr. Salvatrice Vizzini**, Dipartimento di Scienze della Terra e del Mare, Università di Palermo, Palermo, Italy



**Dr. Nelson A. Lagos**, Centro de Investigación e Innovación para el Cambio Climático, Universidad Santo Tomás, Santiago, Chile.



**Mr. Graham Kolodziej**, Cooperative Institute for Marine and Atmospheric Studies, University of Miami - Atlantic Oceanographic and Meteorological Laboratory, NOAA



**Dr. Nataly Guevara**, Colegio de Ciencias Biológicas y Ambientales, Galapagos Science Center GSC, Universidad San Francisco de Quito (USFQ), Ecuador



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