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European Project on OCean Acidification (EPOCA)

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The *European Project on Ocean Acidification* (EPOCA) was launched in May 2008 with the overall goal to advance our understanding of the biological, ecological, biogeochemical, and societal implications of ocean acidification. Its consortium includes more than a hundred principal investigators from 31 institutes and 10 European countries. The budget of this four year long project is 15.9 M, including 6.5 M from the European Union. The research efforts of EPOCA are distributed into four themes.

- **Theme 1** focuses on past and present spatiotemporal changes in ocean chemistry and biogeography of key marine organisms. Archives of foraminifera and deep-sea corals help determine past variability in ocean chemistry (carbonate, nutrients and trace metals), which are linked to present-day chemical and biological observations.
- **Theme 2** quantifies impacts of ocean acidification on marine organisms and ecosystems. Molecular, physiological and ecological approaches are used to study climate-relevant biogeochemical processes, including calcification, primary production and nitrogen fixation. Laboratory and field perturbation experiments focus on key organisms in terms of their ecological, biogeochemical or socioeconomic importance.
- **Theme 3** seeks to improve biogeochemical, sediment and coupled ocean-climate models to better account for how ocean acidification will affect ocean biogeochemistry and ecosystems. Special attention is paid to feedbacks of physiological changes on the carbon, nitrogen, iron and sulfur cycles and how these changes will affect and be affected by future climate change.
- **Theme 4** evaluates uncertainties, risks and thresholds (tipping points) related to ocean acidification at molecular, cellular and organismal levels from local to global scales. The project assesses the decrease in CO_2emissions required to avoid these thresholds and describes the change to the marine environment and Earth system, should these emissions be exceeded.

EPOCA research is performed in close collaboration with EU (CARBOOCEAN, MESOAQUA, EUROSITES, ATP, CALMARO and MEECE) and national projects (BIOACID, UK Ocean Acidification Programme, CHOICE-C and US initiatives as part of the FOARAM Act). EPOCA has generated a large number of critical data: 68 papers were published in the first two years and 267 presentations were given at meetings.

Overarching activities include data management, training and outreach. A coherent database of past ocean acidification experiments has been developed and made accessible to the community. Students and young scientists were trained in several courses organized or co-organized by EPOCA in Bergen, Cambridge, Bremerhaven and Woods Hole. Outreach is performed through the project web site (http://epoca-project.eu), the EPOCA ocean acidification information blog (http://oceanacidification.wordpress.com/) and newsletter articles, press releases and media articles. Last but not least, the EPOCA Reference User Group (RUG) is a key tool to disseminate scientific research to various stakeholders, including policymakers. The RUG has produced, in 5 languages, two guides presenting key facts on and key answers to ocean acidification questions.