

Southampton researchers awarded ocean acidification funding

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The National Oceanography Centre, Southampton, will lead major elements of the UK's Ocean Acidification Research Programme (UKOARP), it has been announced.

UKOARP is a five-year £12 million collaborative programme funded by the Natural Environment Research Council, the Department for Environment, Food and Rural Affairs and the Department of Energy and Climate Change. It will investigate the potentially significant negative impacts of ocean acidification on marine ecosystems, and ultimately its possible influence on global climate.

"Carbon dioxide produced by the burning of fossil fuels for energy is a cause of global warming, but it is also entering the sea and making it more acidic," explained Dr Toby Tyrrell of the University of Southampton's School of Ocean and Earth Science (SOES) based at the National Oceanography Centre, Southampton.

"Although the resulting changes to seawater chemistry are well understood, we know much less about the biological and biogeochemical impacts of altered chemistry, and it is these that the research programme aims to address," he added.

Tyrrell and his colleague Prof. Eric Achterberg, also of SOES, will coordinate a £3.6 million multi-institute consortium to investigate the impacts of acidification on the surface ocean and the plankton which inhabit it.

"This is a great opportunity to address the complex issues of ocean acidification in oceanic environments," said Achterberg: "Many studies have been conducted in laboratories and provided insightful results for single species. The next logical step is to conduct observations and experiments at sea in regions with strong spatial gradients in seawater carbon chemistry. This will inform us on the effects of enhanced carbon dioxide levels on marine microbial communities and ecosystems."

The consortium will also study how ocean acidification affects ecosystems and biodiversity and the cycling of nutrients and chemical elements in the ocean, as well as its affect on how the ocean interacts with the atmosphere to influence climate. Investigations will include studies of calcifying organisms, which build shells out of calcium carbonate, as well as non-calcifiers.

There will be three research cruises, to the Arctic Ocean, around the British Isles, and to the Southern Ocean, all places with strong horizontal gradients in seawater carbon chemistry and acidity. The researchers will make observations and conduct shipboard experiments in which seawater from the ocean surface will be put into containers and subjected to higher carbon dioxide levels. They will then monitor the responses of natural plankton communities as the seawater is made more acidic.

Achterberg has also been awarded £0.45 million to provide the UK Ocean Acidification research programme's carbonate chemistry analytical facility, which will be responsible for measurements of seawater acidification and carbon dioxide levels.

Scientists of the National Oceanography Centre, Southampton, will also make major contributions to other areas of the research programme. Dr Gavin Foster and colleagues will examine how calcareous plankton responded to major ocean acidification events in Earth's history in order better to predict how they might be impacted by future acidification. Dr Tom Anderson and Dr Katya Popova will model the consequences of acidification in the Arctic Ocean. Dr David Hydes is part of a consortium measuring the ocean to map the ongoing changes in ocean acidity. Finally, Dr Chris Hauton is part of a consortium to investigate acidification effects on organisms living on the seafloor.

This new research will complement existing ocean acidification work at the National Oceanography Centre, Southampton: Tyrrell, Achterberg and Hauton are strongly involved in the EU-funded projects EPOCA, CalMarO and MEECE, and David Hydes leads the Defra funded DEFRApH project determining present levels of acidity in UK marine waters.

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