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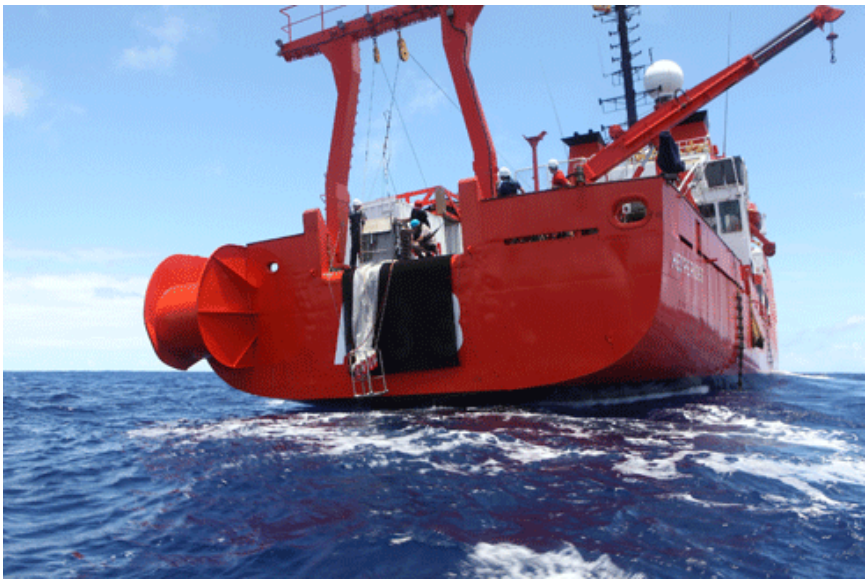
Indian Ocean major carbon sink say expedition scientists

Mary-Lou Considine

The Indian Ocean is able to act as a major carbon sink due to its capacity to absorb three times as much atmospheric nitrogen – a key fertiliser for marine plant growth – as the Atlantic. This finding came from the $23 million around-the-world 'Malaspina' science expedition, involving Spain and nine other countries, including Australia.



Credit: Spanish National Research Council (CSIC)

The aims of the expedition – still under way – are to assess the impact of global change and pollution in the oceans and explore their biodiversity.

Among the 400 scientists taking part in the nine-month voyage are some from the Oceans Institute at the University of Western Australia (UWA) and CSIRO.

During the fourth leg of the voyage, from Cape Town to Perth – where one of the expedition's two ships, the Hesperides, docked in March – the scientists collected around 4000 chemical and biological samples from as deep as 4000 metres.

Expedition Coordinator, Professor Carlos Duarte, pointed out that nitrogen is a key ingredient for phytoplankton – single-celled plants at the base of the marine food chain – to grow and photosynthesise, capturing atmospheric CO2 in the process.

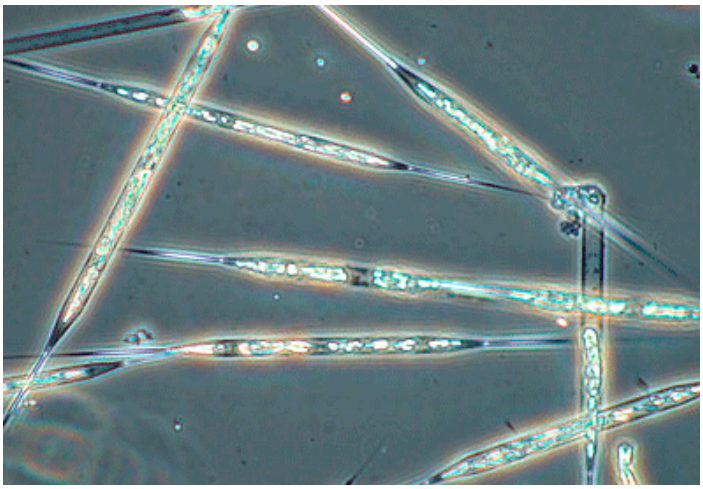
'The phytoplankton community removes more CO2 from the atmosphere than large plants do, and therefore plays a critical role in climate regulation,' said Prof Duarte, who is now Director of the Oceans Institute.

The Malaspina Expedition's Indian Ocean samples also revealed silicate concentrations three times higher than those in the Atlantic.

Silicate is an essential nutrient for the growth of a group of phytoplankton known as diatoms. Diatoms from the genus Rhizosolenia, in particular, contain a cyanobacteria that fixes nitrogen from the atmosphere. The Malaspina scientists found numerous Rhizosolenia diatoms in the top 100 metres of the water column.

They also measured concentrations of greenhouse gases in water samples and analysed the isotopic composition of atmospheric water vapour, information that will enable researchers to understand water cycling in the atmosphere over the Indian Ocean.

CSIRO and UWA researchers joined the expedition in Perth to carry out the first continuous plankton survey off southern Australia.



Credit: CIMT, Susan Coale

'The ocean south of Australia is a particularly interesting region where three oceans – the Indian, Pacific and Southern – converge,' said UWA scientist, Professor Susana Agusti. 'Exploring the biodiversity of these waters will surely reveal surprises.'

The continuous plankton recorder survey stretched from the Leeuwin Current in the west to the East Australia Current off NSW. The Hesperides towed the torpedo-shaped continuous plankton recorder at a depth of around 10 metres below the surface.

The survey is part of the Integrated Marine Observing System (IMOS), a network of equipment and data-information services used to carry out marine climate research in Australia.

'This work will help us map the biogeography of Australia's plankton, highlighting the boundaries of the temperate and sub-tropical flora and fauna,' said CSIRO marine ecologist, Dr Anthony Richardson.

'This will provide an invaluable baseline for assessing how these boundaries will shift in the future with climate change. It will also contribute to the Atlas of Australian Zooplankton, which describes the biodiversity of the microscopic inhabitants of our oceans.'

Because they are so abundant in the oceans, plankton are able to lock up large amounts of carbon dioxide after they die and sink to the depths.

At the time of writing, the Malaspina Expedition was about to leave Auckland. Prof Duarte said his team had decided to monitor radioactivity levels in the Pacific following leakages from Japan's Fukushima nuclear reactor, damaged by the recent earthquake. Monitoring was to be carried out between Auckland and Honolulu.

'The levels we observe are not likely to be dangerous to humans at present, but over time the levels will be magnified in the food web,' commented Prof Duarte.

More information

UWA News page: http://tiny.cc/4nqtd

IMOS: www.imos.org.au/