

# Scientists Spend Christmas in the Southern Ocean for Climate Research



On December 2, National Oceanography Centre (NOC) scientists will embark on a research expedition that will see them spend Christmas and New Year sailing through remote waters in the Southern Ocean onboard RRS *Discovery*. This is part of the project, led by the NOC, to understand the role of this notoriously rough part of the ocean in taking up and storing carbon from the atmosphere. The team will largely be focusing on studying the seasonal growth of tiny marine plants, called phytoplankton.

Annual phytoplankton growth equals that of all land plants combined. Without life in the sea, carbon dioxide concentrations in the atmosphere would be 50% higher. The festive season in the northern hemisphere is actually mid-summer in this rarely visited part of the ocean, so marine plants will be blooming.

## Phytoplankton

Importantly, when these plants die, the carbon held within them moves deeper into the ocean, some in the stomachs of crustaceans and fish that eat them, or by sinking as 'marine snow'. This expedition aims to address some of the uncertainty around how this process happens. In particular, they will be looking at the consequences of phytoplankton becoming starved of nutrients as their population outstrips supply. This can change the variety and health of species present, affecting how quickly marine snow sinks

NOC scientist and CUSTARD project lead, Dr Adrian Martin, said "The movement of carbon into the ocean is particularly important in the Southern Ocean since it is effectively a 'motorway junction' for ocean currents. Which motorway the carbon enters determines how long it will remain 'locked' away in the ocean. If shallow, maybe a year or less, if deep, possibly hundreds of years or longer."

## Two Marine Robotics

The information collected during this expedition will be complemented with year-round data from two marine robotic vehicles called 'gliders', as well as a moored buoy provided by a US Ocean Observatories Initiative. This enables the study of seasonal change, similar to the observation of meadows flowering and dying over the year, even during the winter months with Southern Ocean waves as high as a four-storey house.

This expedition is part of the [CUSTARD](#) (Carbon Uptake and Seasonal Traits in Remineralisation Depth) project, which studies the 'biological carbon pump'. CUSTARD is funded by the Natural Environmental Research Council (NERC), and forms part of the NOC's commitment to furthering knowledge about the relationship between the oceans and climate.

CUSTARD is part of the NERC Role Of the Southern ocean in the Earth System ([ROSES](#)) programme, and involves collaborators from the Universities of Southampton, Plymouth, East Anglia and Oxford, and the British Antarctic Survey (BAS) in the UK, as well as the Max Planck Institute for Meteorology in Germany and Woods Hole Oceanographic Institute (WHOI) in US. In addition, the project is also assisted by the US National Science Foundation (NSF) through the US Ocean Observatories Initiative.

## About the NOC

The National Oceanography Centre (NOC) is the UK's leading institution for integrated coastal and deep ocean research. NOC undertakes and facilitates world-class agenda-setting scientific research to understand the global ocean by solving challenging multidisciplinary, large scale, long-term marine science problems to underpin international and UK public policy, business and wider society outcomes.

NOC operates the Royal Research Ships James Cook and Discovery and develops technology for coastal and deep ocean research. Working with its partners NOC provides long-term marine science capability including sustained ocean observing, mapping and surveying; data management and scientific advice. NOC operates at two sites, Southampton and Liverpool (UK).