



Undersea lost world – found!

Tantalising evidence that there might be a unique and unknown ecosystem lying off the coast of Scotland has led to the discovery of a lost world beneath the sea.

Following up on a research cruise in Scottish waters in 2012 when scientists spotted previously unknown creatures brought up from the seabed, a collaborative expedition set sail aboard the Marine Scotland research vessel *Scotia* to the deep waters off Rockall. The aim was to establish whether the evidence they had previously gathered did indeed point to an ecosystem never before discovered around the British Isles.

The specimens from the previous cruise had pointed to a unique and unknown ecosystem. As the specimens were chemosynthetic species, it suggested the presence of cold seeps. Cold seeps are where hydrocarbons and fluids seep from the deep sea floor supporting specialist bacterial communities that then form the basis of the food chain supporting highly diverse and specialised communities of marine animals. These types of marine ecosystem were only discovered as recently as the 1980s. If the suspicions of the scientists were to be true this would be the first cold seep system in this area of the North Atlantic, the nearest other examples being off the coast of Norway and in the Gulf of Cadiz, Spain, thousands of kilometres away.

This alerted the interest of the Marine Alliance for Science and Technology for Scotland (MASTS) deep-sea forum and Marine Scotland, Oceanlab, British Geological Survey (BGS) and SAMS got together to write a project proposal to go back to the site and undertake a comprehensive survey to properly document this novel and important new ecosystem. Early applications for funding were met with scepticism with the project being likened to searching for a needle in a haystack, but in 2014 Marine Scotland invited proposals from MASTS to use its research vessel *Scotia* for dedicated R&D projects. An application was successful, resulting in 12 days of ship-time in 2015.

The research expedition sailed on 16 July with a full board of scientists and a suite of sampling tools including towed HD cameras, seabed corers, sediment grabs, baited cameras, beam trawls and an epibenthic sledge. Following up on the previous cruise the ship sailed to the area where the evidence had first been found, and despite not having a precise location as to where the seep, if it existed, was located, within an hour of searching the needle in the haystack was found!

In the words of Dr Francis Neat, the Marine Scotland scientist who led the search:

“It was unlike any seafloor any of us had ever seen before – strange thick green and white rippled patches with lots of flocculent matter everywhere. These were almost certainly the bacterial mats that are typical of cold-seep ecosystems. The following day we got our first glimpse of active seepage from the seafloor – sediment rich puffs of fluid being emitted beneath odd pillow like formations. We got lots of core samples of the sea-bed – stinking with the bad egg smell of hydrogen sulphide – again an indicator of hydrocarbon associated seepage. The samples from the beam trawl and sledge confirmed the presence of the same species we had found three years ago. There were also some unusual looking sea-anemones. So, there is a little doubt now that there is a very unusual cold seep ecosystem out there. Exactly what it is and what is causing it and what sorts of new species it might harbour remain to be confirmed as it will take some time to process all the samples.”



While the methane emissions might point to hydrocarbon reserves beneath the seabed, or the bacterial mats might harbour compounds with the potential for pharmaceuticals or other bioproducts it is the uniqueness of the ecosystem that fires the imagination and enthusiasm of the scientists. Dr Neat is in no doubt that this ecosystem is very special and deserves yet more investigation. “ It’s like finding a patch of tropical rainforest that no one else has seen a true lost world, revealed, it is equally fascinating and far more challenging to study. It’s also a great success story for how science works. You get the clues, you follow the hunch and make the discovery – and it shows how working together and pooling complementary expertise from the MASTS community resulted in a new discovery, the significance of which we can only guess for now.

ENDS

NOTES: Preliminary results from the research cruise that made the discovery were presented at the MASTS Annual Science Meeting this week at the University of Strathclyde, in Glasgow.

Compiled from materials provided by Dr Francis Neat of Marine Scotland

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The Marine Alliance for Science and Technology for Scotland (MASTS) represents the majority of Scotland’s marine research capacity. It strives to ensure that marine science in Scotland remains internationally competitive and provides the academic platform and knowledge for marine governance and commerce by helping to establish a Scottish strategy for marine science that will deliver increased value to the public from its investments. MASTS is funded by the Scottish Funding Council together with its member institutions. It is organised around three major Research Themes that cover regions from the coasts to the deep oceans and subjects ranging from the effects of global climate change to marine energy, fisheries and aquaculture. Website: <http://www.masts.ac.uk>

MASTS is organising the 2015 Scottish Inshore Fisheries Conference on behalf of Scottish Government.

Marine Scotland is the directorate of Scottish Government (SG) responsible for the integrated management of Scotland’s seas. Its mission is to manage Scotland’s seas for prosperity and environmental sustainability which contributes to the Scottish Government’s overall purpose of sustainable economic growth and achievement of a shared vision of clean, healthy, safe, productive, biologically diverse marine and coastal environments, managed to meet the long term needs of people and nature.

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