Deep sea expedition into the unexplored Perth canyon abyss

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A group of acclaimed scientists from The University of Western Australia's Oceans Institute will go where few others have gone before when they set out to unlock the secrets of a deep ocean canyon off Perth the size of the USA's Grand Canyon.

A UWA team headed by Professor Malcolm McCulloch, together with researchers from the Western Australian Museum, CSIRO and the Institute of Marine Sciences in Italy, will be among the first to explore life in the vast Perth Canyon, about 50km off Fremantle.

The underwater canyon formed over tens of millions of years and extends from the continental shelf edge of Western Australia to depths

of more than four kilometres to the abyssal sea floor. Major up-swelling of essential nutrients in the canyon makes it a global marine hotspot, attracting blue whales and other large fauna that migrate to the waters seasonally to feed. Despite being so close to Perth and Fremantle, little is known about life in its deep abyss.

Professor McCulloch and his team will lead the research expedition on board the Schmidt Ocean Institute's Research Vessel, R/V Falkor, during a 12-day trip departing on Sunday, 1 March.

Researchers will use a deep-diving remotely operated vehicle (ROV) to discover and collect deep-sea corals and sea water from the canyon. Chemical and biological analyses of these rare samples will provide critical new data about the canyon's marine ecosystems. This will help determine the likely future impacts of warming seas and ocean acidification on the deep-sea life and waters in these remote and previously inaccessible habitats.

Professor McCulloch said that ROV exploration had never before been carried out there, making it a voyage of genuine discovery.

"The deep ocean is the largest habitat on earth but it's the world's least explored environment - we know more about the surface of the moon than we do about the deep sea floor," Professor McCulloch said.

"The Perth Canyon is a great unknown. It is the largest submarine canyon along Australia's shelf, less than a stone's throw from WA's capital city, yet has never been subject to rigorous scientific investigation.

"We plan to unlock its secrets using modern tools such as an ROV to collect samples, then utilise a suite of geochemical tools to investigate its longer-term history and future capacity to cope with the pressures of

climate change."

He said despite the challenges of exploration in such remote environments, it was important to research such habitats because of their key role in the Earth's climate system and in supplying the essential nutrients to sustain life in the oceans.

"By understanding these deep-water environments and their inhabitants' sensitivity to ocean acidification, the expedition will provide important new data on the ocean's role in sequestering CO2 and the degree to which coral species in the Perth Canyon are able to adapt to changing conditions."

He said the team hoped to answer the larger question of how animals that calcify skeletons are likely to be affected under future climate change scenarios, and the ability of the deeper oceans to more permanently sequester rapidly rising levels of atmospheric CO2.

"We hope to not only reveal the ocean's living treasures, but also to establish how critical seawater parameters necessary to sustain life are changing due to the combined forces of ocean warming and CO2-driven ocean acidification," he said.

Besides giving researchers the chance to better understand the Perth Canyon, the work should also help to better understand the likely threats to other deep ecosystems in the region and similar environments worldwide.

Other UWA researchers involved in the expedition include Dr Jim Falter, Dr Julie Trotter, Professor Chari Pattiaratchi and research associate Lara Garcia-Corral.

Provided by University of Western Australia