

Life in the deep

Rob Beaman's interest in the life of the ocean floor has taken him from the warm tropics to the dark, cold waters of Antarctica.



Dr Rob Beaman loads a camera that revealed new life on the Antarctic seabed

During a six-week voyage on the Australian Antarctic Division's *Aurora Australis*, Dr Beaman found those two marine extremes had much in common.

"The most obvious connection is the megafauna that depend on those two environments," he said.

"Whales spend their winters mating and breeding in the calm, clear waters of the tropics, and then travel south in the summer to feed on the plentiful supplies of krill around Antarctica."

But what Dr Beaman had not expected was the similar levels of colour and density of ocean floor life that he found in Antarctic waters, even in dark waters a kilometre below.

"In the tropics where the waters are warm and calm, you expect to see colour and diversity. But in Antarctica where the water is -1C and lashed by the infamous katabatic winds, you don't expect a lot," he said.

"In areas that are under sea ice for three quarters of the year, we found a wealth of surprises. The colour of the seabed life and the sponge

and bryozoa reefs rivalled anything I've seen on the Great Barrier Reef. Many of the animals we saw were the first records of life in this part of Antarctica."

The voyage was part of the CEAMARC Expedition, a census of Antarctic marine life being undertaken by Australian, French and Japanese ships during the International Polar Year (www.ipy.org).

Using techniques honed in Australia and France, the researchers towed nets and cameras behind the *Aurora Australis* to survey the ocean floor.

"On the Great Barrier Reef I've been working on understanding the connections between the physical geography of the seabed and the types of marine life found in different topographies," Dr Beaman said.

"We applied the same approach in Antarctica, using echo-sounders to find the ridges, valleys and basins that supported a wealth of sea life, and then trawling in those areas."

The scientists were surprised by the sheer size of some of the creatures they filmed and netted.

"We found giant sea spiders as big as dinner plates, and worms that in the tropics might be fingernail sized, but in Antarctica were the

size of a hand," Dr Beaman said.

"There were sponges a metre high and the octopus were huge. Although the above-water environment is harsh, underwater it can be very stable, and that may be what helps support the spectacular growth."

The researchers were also able to document the regeneration of the seabed after it had been scoured by icebergs.

"Icebergs really tear up the seafloor, but if left undisturbed, eventually it's recolonised," Dr Beaman said.

"First the scavenger worm species move in to clear up the damaged marine life. Then the pioneers arrive, such as tall sea-squirts, to settle in the cleared area. Eventually, the longer-lived and more diverse marine life takes over."

The findings will provide the baseline for a long-term study measuring the impact of climate change on the polar regions.

"The poles are extreme environments, where life is uniquely adapted to the surroundings. The polar regions are experiencing greater rates of climate change than elsewhere on the planet. So there is an urgent need to identify the state of the various communities in the Antarctic," Dr Beaman said. 

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The voyage revealed a wealth of newly documented marine life.

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Scientists recorded the impact of icebergs on the seabed. Photo: Rob Beaman