Coral reefs in Singapore could have been growing for 7,000 years

Study of cores from Southern Islands could shed light on corals from long ago

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As Singapore evolved from a sleepy coastal village into the world’s second busiest port, the coral reefs around it were keeping a silent record of the changes underwater. And they go back just the past 200 years or so. In fact, scientists from the National University of Singapore (NUS) have found that coral reefs here could have been growing for 7,000 years.

By diving into the history of the corals, the scientists believe they will be able to piece together a better picture of the resilience of the reefs, and determine how they can be better managed in the face of threats such as climate change.

There have been studies on how recent events have affected the corals.

For example, scientists examined how the corals have been affected by land reclamation projects and land reclamation works since the 1960s, and how climatic events during extreme climate conditions can affect their reproductive cycles.

But Assistant Professor Huang Daanwei, who is the principal investigator of the latest study, explained: “We know of the reefs today only reflects environmental processes in one snapshot in time. To see how they have responded to past environmental changes, we need to go back in time.”

They did this by analyzing the remains of corals from landfills.

About 20 coral cores were obtained in 2008 to last year from five sites in Singapore’s Southern Islands, where most of the country’s reefs are located.

The scientists drilled into the reefs in places such as Kusu Island, the Cempedak, and the Sisters Islands, and retrieved cores from the depths of each reef’s calcium carbonate framework.

The lengths of the cores vary from 40cm to almost 4m. Because reef growth is so slow, the shortest core could provide insights from 4,000 years ago, said Mr Samuel Chan, a PhD student involved in the study.

The cores were dated by a technique known as radiocarbon dating. Commonly used to date archaeological finds such as fossils, the technique measures the amount of radioactive carbon-14 – which all living things absorb from their environment – left in the fossil.

Because carbon-14 decays over time, measuring it in a specimen can help scientists determine how long ago the organism died.

Prof Huang, who heads the Reef Ecology Laboratory at NUS, said: “A coral reef grows when individual coral animals build on top of one another. The reef structure grows upwards, as the coral secretes calcareous skeletons, forming a hard skeleton for the species.”

Prof Huang’s team has been studying the past 7,000 years of reef growth in Singapore.

While the latest research has shown that the corals have been growing for 7,000 years, the findings also show that the reefs have experienced significant changes over the past several centuries.

The study’s principal investigator Huang Daanwei (centre) and core members of his National University of Singapore team - (from left) research assistant Chia Rui Min, 24; PhD student Samuel Chan, 23; undergraduate Ooi Wei Xin, 23, and research assistant Abigail Ang, 23 - with the coral cores.

Assistant Professor Huang Daanwei said that the findings “will be useful in developing strategies to conserve and manage Singapore’s coral reefs for future generations.”

The coting work was funded by the National Research Foundation (NRF) under its Marine Science Research and Development Programme.

An NRF spokesman said that despite the stress faced by corals in Singapore, reefs here continue to support diverse and resilient coral communities.

The project led by Assistant Professor Huang will determine how these reefs have persisted and thrived in one of the most urbanized marine environments in the world,” the spokesman said.

The $25 million Marine Science Research and Development Programme, launched in 2016, has funded 34 projects so far.

 Asked if NRF will continue the programme beyond its five-year terms, the spokesman said marine science research is important for Singapore. “Discussions on the future of the programme are ongoing.”