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Hosted by A/P Peter Todd



By James Davis Reimer

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James Davis Reimer's research focuses on the biodiversity of understudied marine invertebrate groups (so-called "minor taxa"), primarily benthic cnidarians including zoantharians and their endosymbionts, as well as octocorals, from shallow tropical coral reefs to the deep sea. Recent research has also examined the impact of coastal development on marine diversity and ecosystems. Since 2007, he has been based at the University of the Ryukyus, where he is currently an Associate Professor. In 2015, he was awarded the Okinawa Research Prize for science contributing to the well-being and understanding of the Ryukyu Islands.

Assessing coral reef health in Okinawa, Japan

The Ryukyu Archipelago in southern Japan is known for its high levels of marine biodiversity and endemism, and also for the threats shallow coral reef ecosystems face from a variety of stressors including local-scale coastal development and overexploitation to global scale threats such as climate change. In this presentation, we will present results from two different investigations examining coral reefs and their condition, around Okinawa Main Island.

The first study examined coral bleaching within Nakagusuku Bay, an area that has experienced eutrophication and extensive coastal development. Surprisingly, results showed the healthy control reef on the edge of the bay experienced far more bleaching than the degraded turbid reefs within the inner bay, due to the presence of more thermally sensitive *Acropora* corals and despite lower sea surface temperatures at the site. Comparisons with literature from the 1970s show that deeper-water, turbid environment corals have moved shallower while formerly shallow water species have moved deeper, indicative of 'reef compression'.

In the second study, eDNA metabarcoding sequences were generated from sediment and seawater samples from various reefs around Okinawa Island. Environmental DNA (eDNA) metabarcoding has great potential in assessing comparative total biodiversity, and facilitating robust comparisons across a wide variety of sites and taxa. In particular, eDNA combined with next-generation sequencing can help address the huge critical data gaps in our understanding of marine biodiversity, especially in regions with high levels of understudied diversity such as the coral reefs of the Indo-Pacific region. I will discuss the eDNA results in comparison to coral reef health, identify potential bioindicator taxa, and explore the relative biodiversity of coral reef communities across sites. Results indicate that taxa besides hard corals (Scleractinia) may be able to provide robust information on overall coral reef health.