CAN-136-Volcano and Coral-Papua New Guinea

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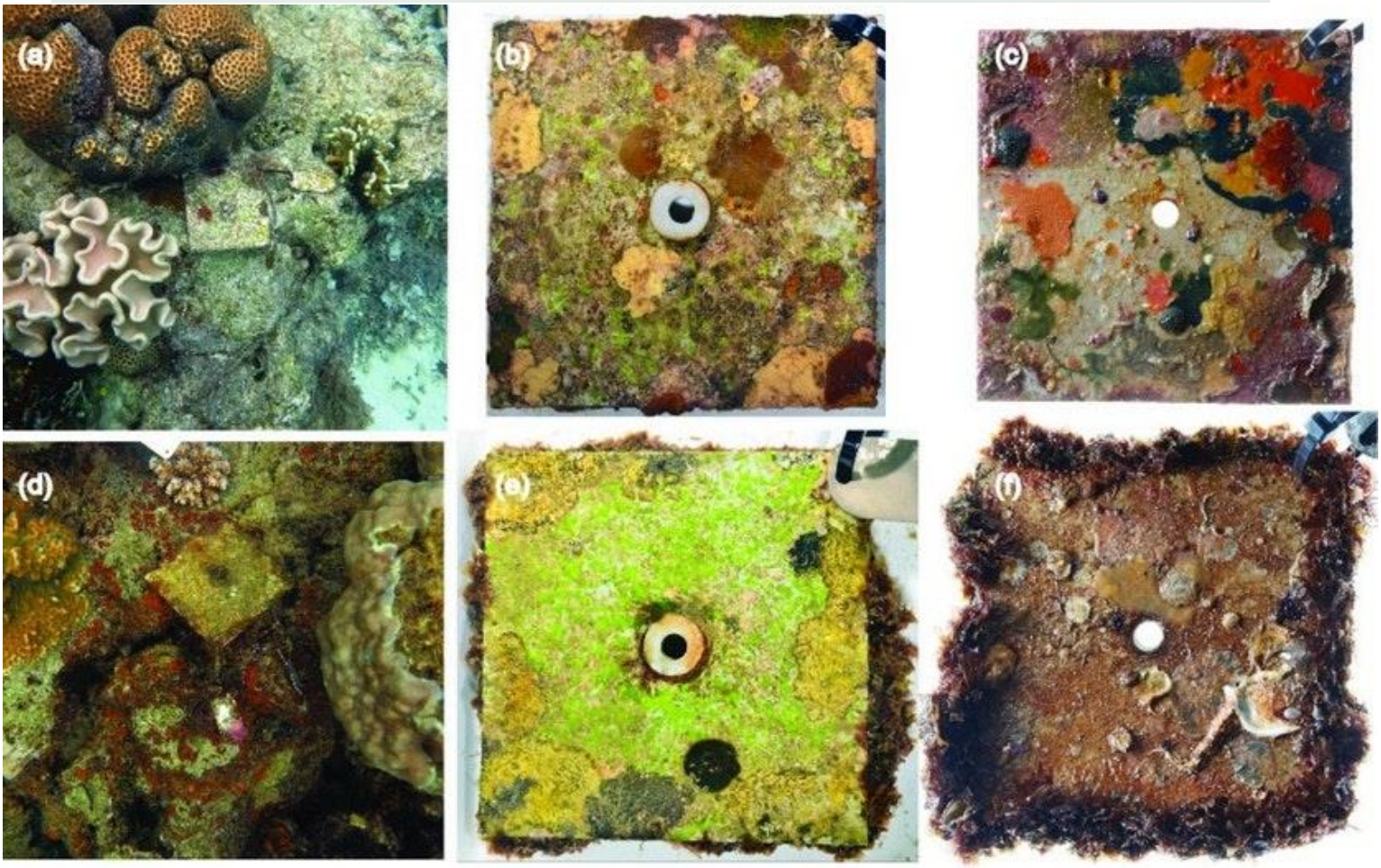
For a Diver Every day is Ocean Day

Volcanic study finds coral changes in high CO_2



Large-scale experiment off Papua New Guinea suggests reefs will look very different under global warming. Andrew Masterson reports.

Some of the coral communities used in the experiment. Those on the lower line were close to volcanic vents, and those on the upper line a control sites.
NOONAN, ET AL

Scientists have been growing coral next to volcanic vents to test the effects of increased levels of marine carbon dioxide, and the results don't look good.

In paper published in the journal *PLOS One*, researchers from the Australian Institute for Marine Science (AIMS) in Queensland, and the University of Otago in New Zealand, describe a large-scale experiment to test how coral respond to high levels of carbon dioxide – a scenario predicted in global warming models.

The scientists established 90 small coral communities on PVC tiles. Half of them were positioned close to two shallow-water volcanic carbon dioxide seeps off the coast of Papua New Guinea, with the rest placed a short distance away at control sites.

Time to speed up coral evolution?

BIOLOGY

Monitoring the sites over 13 months, the researchers measured rates of community photosynthesis, respiration and calcification.

The coral communities near the volcanic vents changed considerably during the period. The population of calcifying algae – critical to reef-building – declined, and was replaced by growing populations of non-calcifying species, such as cyanobacteria.

Invertebrates living in the coral communities, such as sea-squirts and tube-forming bristle worms, were also impacted, with populations declining as carbon dioxide levels rose.

The researchers found an overall increase in photosynthesis in the affected communities – up by between 10 and 20% – as well as a boost in "dark respiration", a form of anaerobic reaction in which organisms produce carbon dioxide without the aid of sunlight.

Interestingly, the coral communities near the volcanic vents did not die. They did, however, become markedly different to those in the control areas, harbouring different species and forming in different ways.

"The study demonstrates that ocean acidification as predicted for the end of this century will strongly alter reef communities, and will significantly change rates of community metabolism," the authors conclude.

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