

Ancient corals hold new hope for reefs

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(PhysOrg.com) -- Fossil corals, up to half a million years old, are providing fresh hope that coral reefs may be able to withstand the huge stresses imposed on them by today's human activity.

Reef ecosystems were able to persist through massive environmental changes imposed by sharply falling sea levels during previous ice ages, an international scientific team has found. This provides new hope for their capacity to endure the increasing human impacts forecast for the 21st century.

In the world's first study of what happened to coral reefs when ocean levels sank to their lowest recorded level - over 120 metres below today's levels - a study carried out on eight fossil reefs in Papua New Guinea's Huon Gulf region has concluded that a rich diversity of corals managed to survive, although they were different in composition to the corals under more benign conditions.

"Of course, sea levels then were falling - and today they are rising," said Professor John Pandolfi of the ARC Centre of Excellence for Coral Reef Studies and The University of Queensland.

"But if we want to know how corals cope with hostile conditions, then we have to study what happens under all circumstances.

"We've seen what happens to corals in the past when sea levels rose and conditions were favourable to coral growth: we wanted to see what happened when they fell and conditions were adverse.

“When sea levels drop you get a catastrophic reduction in coral habitat and a loss of connectivity between reefs.

"Well, those circumstances are in some respects similar to what corals are experiencing today due to human impacts - so there are useful parallels.”

“Although it is little asked, the question of where reef species go when faced with extreme environmental situations is highly relevant for understanding their prospects of survival in the future - and what we need to do to give them the best chance,” Professor Pandolfi said.

In the Huon region, the team found, coral reefs survived the hard times low of sea levels with as much richness of species - but with a different composition to what they had during the good times.

“As a rule the coral colonies during the period of low sea levels were closer to the sea floor and slower-growing in comparison with times of high sea levels.”

“What we have found suggests that reef systems are able to survive adverse conditions given suitable shallow rocky habitat.

"An interesting finding of this study is that complex coral ecosystems were maintained during the less optimal periods of low [sea level](#). These may have been critical to the re-establishment of nearby reefs once environmental conditions began to improve.”

“The fossil record shows that reefs have been remarkably successful in surviving large environmental disturbances.

"However, the combination of drastic environmental changes that we’re seeing today, such as degraded water quality, depleted fish stocks, coral

bleaching, [ocean](#) acidification and loss of habitat are unprecedented in the history of [coral reefs](#).

"Although this study clearly highlights the resilience of reef ecosystems, it is important not to underestimate the magnitude of the challenges that reefs are currently facing. “

Professor Pandolfi says we somehow have to find ways of preventing or offsetting each of these impacts if we expect our reefs to ride out the major climatic changes of the 21st century in as good condition as they have in the past.

More information: Their paper: “Community dynamics of Pleistocene coral reefs during alternative climatic regimes”, by Danika Tager, Jody M. Webster, Don Potts, Willem Renema, Juan C. Braga and John M. Pandolfi appears in the latest issue of *Ecology* 91(1), 2010.

Provided by University of Queensland

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