

Cooling ocean temperature could buy more time for coral reefs

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A Red Sea coral reef. Credit: Elena Couce

(Phys.org) —Limiting the amount of warming experienced by the world's oceans in the future could buy some time for tropical coral reefs, say researchers from the University of Bristol.

The study, published by the journal *Geophysical Research Letters*, used computer models to investigate how shallow-water tropical coral [reef habitats](#) may respond to climate change over the coming decades. Elena Couce and colleagues found that restricting greenhouse warming to three watts per square metre (equivalent to just 50-100 parts per million carbon dioxide, or approximately half again the increase since the Industrial Revolution) is needed in order to avoid large-scale reductions in reef habitat occurring in the future. Shallow-water [tropical coral reefs](#) are amongst the most productive and diverse ecosystems on the planet. They are currently in decline due to increasing frequency of bleaching

events, linked to rising temperatures and [fossil fuel emissions](#).

Elena Couce said: "If [sea surface temperatures](#) continue to rise, our models predict a large habitat collapse in the tropical western Pacific which would affect some of the most biodiverse coral reefs in the world. To protect shallow-water tropical coral reefs, the warming experienced by the world's oceans needs to be limited."

The researchers modelled whether artificial means of limiting global temperatures – known as solar radiation 'geoengineering' – could help. Their results suggest that if geoengineering could be successfully deployed then the decline of [suitable habitats](#) for tropical coral reefs could be slowed. They found, however, that over-engineering the climate could actually be detrimental as tropical corals do not favour overly-cool conditions. Solar radiation geoengineering also leaves unchecked a carbon dioxide problem known as '[ocean acidification](#)'.

Elena Couce said: "The use of geoengineering technologies cannot safeguard coral habitat long term because ocean acidification will continue unabated. Decreasing the amount of carbon dioxide in the atmosphere is the only way to address reef decline caused by ocean acidification."

Dr Erica Hendy, one of the co-authors, added: "This is the first attempt to model the consequences of using solar radiation geoengineering on a marine ecosystem. There are many dangers associated with deliberate human interventions in the climate system and a lot more work is needed to fully appreciate the consequences of intervening in this way."

More information: 'Tropical coral reef habitat in a geoengineered, high-CO₂ world' by E. Couce, P.J. Irvine, L. J. Gregorie, A. Ridgwell and E.J. Hendy in *Geophysical Research Letters*:
onlinelibrary.wiley.com/doi/10.1002/grl.50340/pdf

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