CORALS IN THE EMERGENCY ROOM: CONTINUED CARBON EMISSIONS WILL INCREASE THE NEED FOR INTENSIVE REEF CARE

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Escalating carbon dioxide concentrations in the atmosphere form three major threats to the World's coral reefs. Firstly, increases in global temperatures will increase the frequency and severity of widespread coral bleaching events. Secondly, warming of ocean surface waters in the tropics will fuel more severe storms. Thirdly, a portion of the carbon emitted globally is absorbed by the ocean surface causing acidification, gradually compromising the ability of stony corals to grow and maintain reef frameworks. Eroding reef frameworks are more vulnerable to physical damage and less able to keep pace with rising sea levels. In combination, these three threats conjure a depressing scenario for the future of coral reefs and their ability to sustain provision of ecosystem services that are essential to the livelihoods and lifestyles of hundreds of millions of people inhabiting tropical coastal areas. This raises a critical question: As carbon emissions are beyond the control of reef managers, how do we manage for climate change and ocean acidification? In this talk I demonstrate that mitigation of local-scale stressors caused by human activities such as overfishing, nutrient enrichment and run-off can promote the resilience of reefs to the global threat from carbon emissions. I present a new conceptual framework for how management actions on the ground can effectively buy reefs time until carbon emissions can be stabilised. I show that, given the committed climate change that will inevitably happen even if emissions are curbed today, failing to mitigate local-scale stressors on reefs will result in declining conditions of many reefs during this century - conditions that are irreversible even if emissions are curbed and stabilised. By analogy, coral reefs are a patient with multiple medical conditions; treating the local traumas best we can gives the patient the best possible chance of overcoming the systemic (climate change and ocean acidification) condition.