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TITLE: Coral bleaching impacts from back-to-back 2015-2016 thermal anomalies in the remote central Indian Ocean

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ABSTRACT:

Studying scleractinian coral bleaching and recovery dynamics in remote, isolated reef systems offers an opportunity to examine impacts of global reef stressors in the absence of local human threats. Reefs in the Chagos Archipelago, central Indian Ocean, suffered severe bleaching and mortality in 2015 following a 7.5 maximum degree heating weeks (DHWs) thermal anomaly, causing a 60% coral cover decrease from 30% cover in 2012 to 12% in April 2016. Mortality was taxon specific, with *Porites* becoming the dominant coral genus post-bleaching because of an 86% decline in *Acropora* from 14 to 2% cover. Spatial heterogeneity in *Acropora* mortality across the Archipelago was significantly negatively correlated with variation in DHWs and with chlorophyll-a concentrations. In 2016, a 17.6 maximum DHWs thermal anomaly caused further damage, with 68% of remaining corals bleaching in May 2016, and coral cover further declining by 29% at Peros Banhos Atoll (northern Chagos Archipelago) from 14% in March 2016 to 10% in April 2017. We therefore document back-to-back coral bleaching and mortality events for two successive years in the remote central Indian Ocean. Our results indicate lower coral mortality in 2016 than 2015 despite a more severe thermal anomaly event in 2016. This could be caused by increased thermal resistance and resilience within corals surviving the 2015 thermal anomaly; however, high bleaching prevalence in 2016 suggests there remained a high sensitivity to bleaching. Similar coral mortality and community change were seen in the Chagos Archipelago following the 1998 global bleaching event, from which recovery took 10 yr. This relatively rapid recovery suggests high reef resiliency and indicates that the Archipelago's lack of local disturbances will increase the probability that the reefs will again recover over time. However, as the return time between thermal anomaly events becomes shorter, this ability to recover will become increasingly compromised.

SOURCE: Coral reefs

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