

Pelagic calcifiers face increased mortality and habitat loss with warming and ocean acidification

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Abstract

Global change is impacting the oceans in an unprecedented way with resulting changes in species distributions or species loss. There is increasing evidence that multiple environmental stressors act together to constrain species habitat more than expected from single stressor. Here, we conducted a comprehensive study of the combined impact of ocean warming and acidification (OWA) on a global distribution of pteropods, ecologically important pelagic calcifiers and an indicator species for ocean change. We co-validated three different approaches to evaluate the impact of OWA on pteropod survival and distribution. First, we used co-located physical, chemical, and biological data from oceanographic cruises and regional time-series; second, we conducted multifactorial experimental incubations using OWA to evaluate survival; and third, we validated pteropod distributions using global carbonate chemistry and observation datasets. Habitat suitability indices and global distributions suggest that a multi-stressor framework is essential for understanding distributions of this pelagic calcifier.

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