Changes in Species Composition in the Oceans

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Abstract

The impact of climate change on the distribution of marine species is a subject of increasing interest. Several studies have used meta-analyses of documented effects of climate change on marine organisms, have incorporated various IPCC climate change scenarios into different predictive models, and have analyzed biodiversity hotspots to explore links between environmental change and marine biodiversity patterns. While methods have varied, the studies were for the most part limited to specific species groups and/or Ocean areas. Using data from AquaMaps (i.e. environmental preferences and tolerances of 25,000 marine species and predicted changes in environmental parameters from IPCC models), we predict global changes in the suitability of environmental parameters for the currently present species for the year 2050. Preliminary results suggest that these changes and the corresponding changes in species composition will be dramatic, within just three decades. Environmental suitability for current species composition will decrease on average with some areas (e.g. Antarctica; Ocean centers; eastern Mediterranean) losing more than half of their current species and other areas (e.g. the Arctic) becoming dominated by species from neighboring areas. The work needed to substantiate these results will be outlined.