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TITLE: Climate?driven changes to ocean circulation and their inferred impacts on marine dispersal patterns

AUTHOR: ['Laura J. Wilson', 'Christopher J. Fulton', 'Andrew McC. Hogg', 'Karen E. Joyce', 'Ben Radford', 'Ceridwen I. Fraser']

ABSTRACT:

Abstract Aim The dispersal and distribution patterns of many marine organisms are driven by oceanographic conditions, which are influenced by global climate. Climate?driven oceanographic changes are thus likely to result in biogeographical changes. We assess how recent and predicted oceanographic changes affect the dispersal capacities and distributions of ecologically important (especially habitat?forming) marine organisms. Location We include studies from tropical, temperate and sub?polar regions to draw globally relevant conclusions. Methods We review biogeographical, biological and oceanographic studies to critically evaluate emerging trends in biogeographical responses to climate?driven oceanographic changes, and predict how future changes will affect marine ecosystems. Results Many oceanic dispersal pathways are being altered by climate change. These changes will affect marine ecosystems by differentially affecting the replenishment potential and connectivity of key habitat?forming species. In particular, the length of propagule pre?competency periods, propagule behaviour and the geographical distance between areas of suitable habitat will be critical in determining how oceanographic changes affect the pattern and success of dispersal events, including the likelihood of species experiencing poleward range shifts in response to a warming climate. Main conclusions Future climate?driven oceanographic changes are likely to strengthen or weaken different oceanic dispersal pathways, which will either increase or decrease the potential for dispersal and connectivity in various marine taxa according to the interaction between the local oceanographic, geographical and taxon?specific biological factors. A key focus for future work should be the development of fine?scale near?shore ocean circulation models that can be used to assess the dispersal response of key marine taxa under various marine climate change scenarios.

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