Population Level Effects of Transport Variability Attributable to Larval Behavior and Environmental Variation

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AB: Connectance between geographically separated sub-populations of marine organisms has long been recognized as an important but poorly understood process. For most marine populations, physical models of ocean circulation are one of the only tools available for predicting the transport of larval propagules. But many questions remain regarding the relative importance of physical and biological variability. For instance, does larval behavior in the water column have a larger impact on population dynamics than does interannual variability in environmental forcing? It is important to resolve these questions as we move toward practical applications of circulation models in resource management. In this paper we couple a circulation model and an individual-based model to evaluate transport under a variety of conditions and assumed behaviors controlling vertical position. The modeled transports are then linked to a spatially-structured population model of a generalized benthic species. These coupled models are used to explore the relative importance of physical and behavioral variability on demographics and distribution.

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