Key species dispersal and population connectivity at different spatial scales and under different disturbance scenarios at fragmented habitats of the MAR

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In recent decades, deep-sea ecosystems have been suffering under different anthropogenic pressures such as fishing, oil and gas extraction, climate change and, more recently, the prospect of deep seabed mining. The potential mining areas are located where specialized habitats are often present. Species can cope with impacts and changes if they are able to maintain their genetic diversity, reproduce, disperse to suitable new habitats, settle and grow to reproduce again. This process, termed connectivity, has recently been the focus of numerous population genetics studies. There is, however, the need to better understand how physical (ocean currents, habitat suitability) and biological parameters (reproduction mode, larval traits and behaviour) influence population connectivity. The Azores region hosts several hydrothermal vent fields and seamounts that might host mineral sulphide deposits and cobalt crusts, some of which are of interest to mining companies. These prospective mining sites may potentially be source or sink populations of bathyal fauna and will be either potentially mined or impacted by mining plumes. Identifying larvae sources and sinks for this specialised fauna is essential for spatial planning and strategic regional conservation plans. Here we present results from a biophysical model of larval dispersal run for two benthic invertebrate species, the vent mussel Bathymodiolus azoricus (Cosel & Comtet, 1999) and the cold-water coral Lophelia pertusa (Linnaeus, 1758). Several scenarios were implemented. The results presented here estimate how larvae originating from hydrothermal vents in the Azores might disperse, and quantify the pattern and scale of population connectivity among vents. Results are discussed at the light of potential mining activities.