

Biogeography of the vent and seep fauna - a network approach

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Deep-sea hydrothermal vents and methane seeps are inhabited by members of the same higher taxa but share few species, thus scientists have long sought habitats or regions of intermediate character that would facilitate connectivity among these habitats. Here, a network analysis of 79 vent, seep, and whale-fall communities with 121 genus-level taxa identified sedimented vents as a main intermediate link between the two types of ecosystems.

Sedimented vents share hot, metal-rich fluids with mid-ocean ridge-type vents and soft sediment with seeps. Such sites are common along the active continental margins of the Pacific Ocean, facilitating connectivity among vent/seep faunas in this region. By contrast, sedimented vents are rare in the Atlantic Ocean, offering an explanation for the greater distinction between its vent and seep faunas compared with those of the Pacific Ocean. The distribution of subduction zones and associated back-arc basins, where sedimented vents are common, likely plays a major role in the evolutionary and biogeographic connectivity of vent and seep faunas. The hypothesis that decaying whale carcasses are dispersal stepping stones linking these environments is not supported.