

Chemosynthetic habitats on the California slope: whale-, wood- and kelp-falls compared to vents and seeps

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Chemosynthetic habitats are formed by a variety of geological and biological processes on continental margins. The biota of geological reducing habitats (e.g., vents and seeps) must be compared with those of biogenic origin (due to large organic falls) to fully understand the biogeography and evolution of chemosynthetic communities. Using natural whale falls in combination with whale, wood and kelp emplacements, we are investigating sulfide levels, habitat duration, and faunal community structure at biogenic reducing habitats on the California slope (depth = 1000-2000 m). Fresh whale falls produce the highest sulfides levels in underlying sediments, with concentrations up to 10 mM in the top 4 cm after 4.5 yr. Whale skeletons at the seafloor for 50-80 yr yield substantially lower sediment sulfide concentrations (<45 microM). Kelp parcels (100 kg) support intermediate sediment-sulfide concentrations (0.1–1.2 mM) after 3 to 6 months. Wood parcels (200 kg) support low concentrations of sulfides (up to 50 microM) in underlying sediments three years after emplacement. Each of these chemosynthetic habitats appears to foster a characteristic fauna with sulfide-rich whale falls harboring a highly diverse assemblage (100–200 species) dominated by bathymodiolin mussels, cocculiniform limpets, dorvilleid polychaetes, and in some cases vesicomid clams. Wood falls harbor low-diversity assemblages of wood-boring bivalves (*Xylophaga washingtonius*), galatheids, and ampharetid, dorvilleid and polynoid polychaetes (Baco et al., in prep). Kelp falls appeared to be dominated by shrimp (*Pandalopsis ampla*), ampharetid polychaetes, trochid gastropods (*Bathybembix bairdii*), galatheid crabs and occasionally, lysianassid amphipods (Baco et al., in prep.). At present, whale falls are known to share 11 species with hydrothermal vents and 20 species with cold seeps. Species overlap among wood falls, kelp falls and other reducing habitats is currently under investigation (Baco et al., in prep.).