

Community ecology of methane seeps along the Costa Rica margin

Alanna Durkin¹, Lisa Levin², Erik E. Cordes¹

¹Temple University; alanna.durkin@temple.edu

²Scripps Institute of Oceanography

The Costa Rica margin is home to many methane seeps that host chemosynthetic communities, and in 2009, a hybrid hydrothermal seep site was discovered in this region at Jaco Scar. Unlike other “cold” seeps, the fluids released at this site were elevated above ambient temperature and released at a relatively high flow rate, giving them a shimmering quality. As a result, both seep and vent species were present in the fauna observed at Jaco Scar. This study examines the community structure of this hydrothermal seep and other seeps of the Costa Rica margin with respect to other seep and vent communities from the region and globally. When compared to published family-level abundance data collected with the same sampling equipment, the mussel- and tubeworm-associated communities collected from the Costa Rica sites are determined to be quantitatively distinct from both seep and vent communities. Typical vent grazers such as lepetodrilid limpets were present among the communities including the hydrothermal seep, but not other vent families such as uristid amphipods. Community ecology dissimilarity metrics and non-metric multidimensional scaling continued to support the finding that all of these Costa Rica communities are statistically different from both habitat types when the analysis was expanded to include a global dataset of vents seep communities sampled with varying equipment. These communities and the intermediate environmental conditions of the hydrothermal seep may provide insight into community ecology hypotheses about chemosynthetic ecosystem biogeography and metacommunity structure and the degree to which depth, geography, evolutionary history, and environmental conditions influence vent and seep community structure.