

Life And Light At Deep-Sea Hydrothermal Vents

Cindy Lee Van Dover; The College of William & Mary

Characteristics of communities of organisms at hydrothermal vents are closely coupled to planetary processes associated with plate tectonics. Rather than a single, globally cosmopolitan fauna, we find biogeographic provinces with distinctive faunal components that reflect global variations in historical, spatial, and temporal scales of volcanism and tectonics. In contrast to the biogeography of continental land masses, the biogeography of vent faunas is in its infancy; vent ecosystems in entire ocean basins have yet to be explored. With exploration will come discovery of novel forms of life that are likely to expand our appreciation of the scope of biological exploitation of resources. Discovery of “eyeless” shrimp at deep-sea vents on the Mid-Atlantic Ridge provides us with a case study of how the ecology and anatomy of an organism provided clues to a geothermal light source, ultimately leading to the hypotheses that hydrothermal vents may support geothermally driven photosynthesis and that perhaps photosynthesis itself evolved in hydrothermal systems.