Martin, J. B., S. Day (University of Florida, Gainesville), A. Rathbun, M. E. Pérez (Indiana State University, Terre Haute), J. Gieskes, C. Mahn (Scripps Institution of Oceanography, La Jolla, CA)

ISOTOPIC RECORD OF FORAMINIFERA LIVING IN METHANE-VENTING COLD SEEPS

Oxidation of methane venting from cold seeps at continental margins generates isotopically light pools of dissolved inorganic carbon (DIC) in the pore fluids. This DIC may, in principle, alter the $\delta^{13}C$ value of carbonate tests of foraminifera living at the cold seeps, thus recording the location and times of methane venting. The record depends on sources of C incorporated into the tests, which may include the ambient pool of DIC, food, or a combination of these. Minimum isotopic compositions of DIC in two cold seeps in Monterey Bay range from approximately –9‰ at 12 cm below sea floor (cmbsf) at Invertebrate Cliffs to –48‰ at 2 cmbsf at Clam Flats. Notwithstanding the light isotope ratios of DIC, isotopic composition of live (i.e. Rose Bengal stained) foraminifera, including *B. mexicana*, *E. pacifica*, *U. peregrina*, and *G. pacifica*, have average isotopic compositions that range from –0.52‰ (σ = 0.18; n = 27) to –1.45‰ (σ = 0.49; n = 25) at Invertebrate Cliffs, and from –0.95‰ (σ = 0.45; n = 37;) to –3.97‰ (σ = 0.49; n = 3) at Clam Flats. Fossil foraminifera (non-stained) from these sites had similar carbon isotopic compositions and variability, suggesting that diagenetic alteration does not influence their isotopic compositions. The isotopic compositions are somewhat lighter than have been identified previously in the same species from non-seep sites south of Pt. Sur and from the mid-Atlantic Bight, but are far from equilibrium with the light isotopic composition of the ambient pore water. This disequilibrium indicates that the bulk pool of DIC does not provide the major source of carbon for the foraminiferal tests. The variations in isotopic compositions are larger than occur in non-seep sites and they appear to provide a better record of venting than the absolute isotopic compositions.