

Sediment diagenesis in the Indian River Lagoon, Florida

M. Roy¹, J. B. Martin¹, J. Cable², C. Smith², J. Cherrier³, and A. Dorsett³

¹University of Florida, Gainesville, Florida

²Louisiana State University, Baton Rouge, Louisiana

³Florida A & M University, Tallahassee, Florida

In coastal sediments several electron acceptor are available for organic carbon remineralization (OC). These electron acceptors are utilized in the order of their energy yields to microbes. Based on that, Fe-oxides, which have higher energy yields than sulfates, are utilized before in the costal sediments for OC remineralization. Thus, Feoxide reduction zone occurs on the top of sulfate reduction zone. In the study area (Indian River Lagoon, Florida), where groundwater flows from a carbonate aquifer, an opposite scenario is observed, sulfate reduction zone overlying Fe-oxide reduction zone. Sulfate reduction zone is associated with black OC rich marine sediments that were deposited within the lagoon environment. In contrast, Fe-oxide sediments were deposited in the terrestrial environment, and were brought into the lagoon by the sea level rise. Therefore, sulfate reduction zone is associated with marine OC, and Fe-oxide reduction zone is associated with terrestrial OC. Microbes utilize labile marine OC more easily than terrestrial cellulose type OC. This difference in the sources of OC resulted into reverse redox zonation in the Indian River Lagoon site. Unlike, in costal sediments both Fe-oxide and sulfate reduction zones are associated with marine OC. This study suggests coastal areas are important for OC diagenesis, particularly in the carbonate platforms.