GEOCHEMISTRY AND SCLERACTINIAN EVOLUTION. D.G. Fautin* and R.W. Buddemeier. Univ. Kansas, Lawrence.

Radioimmunoassay (RIA) data support the hypothesis that sea anemones (Orders Actiniaria and Corallimorpharia) evolved from hard corals (Order Scleractinia). RIA combined with fossil evidence suggests that the corallimorpharians *Corynactis* and *Rhodactis* and the scleratinian *Fungiacyathus* diverged in the Eocene (ca. 55 Ma BP). Sea anemones diverged from the coral lineage containing *Porites* and *Goniopora* in the early Cretaceous (ca. 115 Ma BP). Calcification rates of some modern reef organisms are sensitive to the degree of calcium carbonate supersaturation in ocean water, which is reduced by high or rising pCO_2 values. Geochemical models suggest that in the Eocene, oceanic pCO_2 levels rose and pH fell; the early Cretaceous was a period of high volcanic CO_2 release and rising carbonate compensation depths. Evolution of non-skeletogenic scleractinians may be linked to reduced carbonate mineral saturation levels in the surface oceans, which would increase the energy cost of calcification and might neutralize the competitive advantages of zooxanthellate Scleractinia. This reflects contemporary biogeography: in the tropics, waters are supersaturated with aragonite and anthozoan communities are dominated by zooxanthellate Scleractinia, while in undersaturated high-latitude waters, anemones (both zooxanthellate and azooxanthellate) abound whereas corals are azooxanthellate and relatively uncommon.