Subseasonal geochemical and sclerochronological variations in coastal mollusc shells

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Subseasonal environmental and biological events are evident in the geochemical profiles of many coastal and estuarine mollusc species. These events can be manifest in a number of ways, including periodic and non-periodic intervals of slow growth or growth cessations, and/or brief geochemical excursions in sclerochronological data series. Short terms events and growth anomalies are not often considered in the interpretation of seasonally-resolved environmental proxy data. However, even those geochemical profiles measured at low temporal resolution may be influenced by undetected short term events and cycles. For example, the timing of tidal cycles relative to diurnal water temperature variation may alter the seasonal-scale $\delta^{18}O$ profiles of molluscs that experience growth rate variation caused by local water movement.

The factors that cause these short-term variations are difficult to assess in validation studies because high temporal resolution geochemical measurements cannot often be confidently aligned with accompanying environmental time series data of similar periodicity. Therefore this talk will utilize a combination of geochemical modeling and time series data profiles from recent and ancient molluscs to explore this topic. A series of $\delta^{18}O$/temperature/salinity models were constructed based on one year of environmental data collected at 30-minute time intervals in upper Mobile Bay, northern Gulf of Mexico. The models will be compared to measured $\delta^{18}O$ data profiles from local *Rangia cuneata* valves. Examples will also include short term events recorded in $\delta^{18}O$ profiles from littoral and estuarine species common to the the Atlantic and Gulf of Mexico US coasts, and radiocarbon and $\delta^{18}O$ time series data from Peruvian molluscs. Potential application of subseasonal data profiles to archaeology and paleoenvironmental reconstruction will also be discussed.