USING POSTMORTEM SHELL AGES TO RECONSTRUCT SEDIMENT BURIAL PATHWAYS

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Sedimentary geologists have a sophisticated, process-based understanding of deposition at Earth's surface and the stratigraphic architecture of sedimentary rocks in the subsurface. However, the porosity, organic content, and stratigraphic resolution of sedimentary rocks are often determined by processes that occur as sediments transition from the surface to the subsurface. Uncertainty about the extent of sedimentary reworking, either by mixing within a sedimentary column or by exhumation and redeposition, limits the ability of geologists to predict the characteristics of hydrocarbon-bearing rocks. The objective of the proposed research is to use the postmortem ages (i.e., time since death) of molluscan shells to quantitatively characterize sediment reworking in a shallow marine depositional system (Copano Bay, Texas). Unlike detrital grains that make up the bulk of siliciclastic rocks, shells originate within a depositional system. Their postmortem ages reveal how long it took to get from their living habitat at the sediment surface to their location within a sediment column, making them natural tracers of depositional pathways. The rationale for the proposed research is that although methods exist for determining bulk rate of burial in modern sediments, buried shell age distributions will provide previously inaccessible information on the duration and extent of vertical mixing within a sediment column and the degree of sediment recycling within a larger depositional system. The proposed research will provide a new tool – shell age distributions – to quantify the role of reworking in determining rock properties and the role of sediment recycling in the genesis of stratigraphic bodies.

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