

Mountains, Biomarker Isotopes and Fluvial Systems

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Stable carbon and hydrogen isotopes of terrestrially-produced organic molecular biomarkers that are preserved in sedimentary archives provide a record of past climate, hydrology and ecosystems. Yet, while sediment archives frequently preserve organic molecules through changing stratigraphy, not all sediments record the same processes or reflect the same organic molecular input. In reality, terrestrial and marine stratigraphy record a range of depositional conditions from channel to floodplain sediments, lake deposits and shallow to deep marine. In areas of high topography and warm climates, the production of organic matter over a range of elevations, climatic conditions and water isotope compositions, and differences in molecular production rates, integration, storage and export can vary dramatically through space and time. This poses a fundamental challenge to interpreting terrestrial organic biomarker records. This talk will focus on stable carbon and hydrogen isotope signatures of fluvially-exported carbon in modern (Taiwan) and ancient (Western US) orogens to discuss the factors that shape organic molecular isotope signatures, the effect of varying topography on sediment export, and paleoenvironmental interpretation.