An Application of High-Resolution Marine Chemostratigraphy as a Chronostratigraphic Control for "Mid" Cretaceous Oxygen-Isotope Records in Amalgamated Nonmarine Paleosols

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Ongoing sequence-stratigraphic reconstructions have led to correlation of Albian–Turonian nonmarine-marine strata in a transect perpendicular to the eastern-margin paleoshoreline of the Western Interior Seaway. In the nonmarine strata, we have developed a high-resolution palynostratigraphy and oxygen-isotope chemostratigraphy from amalgamated Albian–Cenomanian kaolinitic mudrock paleosols in Iowa and Nebraska. Our results suggest that meteorological conditions were stable in the late Albian/early Cenomanian of the midwestern U.S. However, an enrichment in $\delta^{18}O$ values from -4.5 to -3.5 ‰ occurred in the late Albian, followed by a return to more depleted values of -4.5 ‰.

The sequence stratigraphy was used to tie detailed mid-basin geochemical profiles of $\%CaCO_3$, %TOC, HI, and OI to nearshore geochemical profiles. Correlation of these profiles uses a model for the development of geochemically defined parasequences which provides ~100,000-year resolution. In Kansas, these parasequences interfinger with nonmarine paleosols. Here, oxygen-isotopic profiles generated from the paleosol sphaerosiderites allow us to tie the nonmarine oxygen-isotope chemostratigraphy to the geochemically defined marine parasequence. This approach allow us to better define the amalgamated nonmarine chronostratigraphy and therefore better interpret the paleoclimatological record.

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