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The Effects of Sea Level Change on the Molecular and Isotopic Composition of Sediments in the Cretaceous Western Interior Seaway: Oceanic Anoxic Event 3, Mesa Verde, CO, USA

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Abstract
Cretaceous Oceanic Anoxic Events (OAEs) represent periods of enhanced burial of organic matter in black shale in marine, continental margin, and epicontinental settings around the globe. Compared to other OAEs, comparatively little is known about the last of these widespread events, OAE 3 (Coniacian-Santonian). The Mancos Shale at Mesa Verde National Park is an Upper Cretaceous (Cenomanian-Campanian) formation

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containing marine sediments of the second-order Niobrara cyclothem and associated third-order transgressive-regressive events (T1-T4). The Coniacian-Santonian Niobrara interval is characterized as dark-gray, moderately to well laminated, calcareous shale and mudstone. Synthesis of new high-resolution bulk chemostratigraphy and biomarker analyses with the preexisting geochemical, lithological, and biostratigraphical framework suggest a temporally protracted oxygen minimum zone was largely responsible for the preservation of large quantities of organic matter contained in these sediments. Additionally, C/N and $\delta^{15}\text{N}$ bulk values imply denitrification and nitrogen fixation were both important metabolic processes during periods when surface water nutrient profiles may have differed much from those of the modern ocean.

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