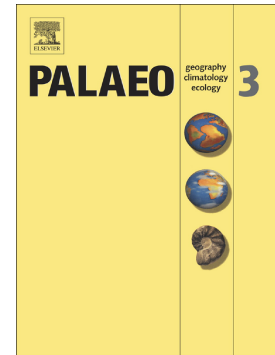


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**Do marine faunas track lithofacies? Faunal dynamics in the Upper Cretaceous Pierre Shale, Western Interior, USA**

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**Abstract**

Most studies examining faunal assemblages use their sedimentary context as a critical element in constraining and reconstructing the underlying environmental controls. This has resulted in the assumption that an absence of lithofacies change in a section should be reflected in a lack of environmental variation. This inference, however, has been placed into question by evidence that marine species are influenced by a broader range of environmental dynamics than just change in lithofacies. In this study, we examine the sensitivity of marine faunas to broadly defined environmental change within lithologically homogenous strata by examining concretionary fossil assemblages of the *Baculites eliasi* through *B. clinolobatus* biozones in monotonous, clay-rich strata of the Campanian-Maastrichtian Pierre Shale in Wyoming. We recognize five biofacies, which reflect different environmental conditions related to benthic oxygenation, substrate firmness, and water depth. Analyses of abundance trends, raw species richness trends, and life-habit patterns display recurrent switching, upsection, between low- and high-diversity intervals. Our data reveal that samples with lower diversity show a strong

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