The Control of Shelf Topography on the Distribution of Early Triassic Anoxic Upwelling

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The Early Triassic was a time of extensive deep ocean anoxia. Benthic marine life is thought to have survived this time of environmental stress within a hypothesized "habitable zone" where wave activity mixed in atmospheric oxygen mitigating shelf anoxia and protecting the benthic fauna. This habitable zone is found from the lower shoreface to the offshore transition. My research compares benthic marine invertebrate diversity between two shoreface environments within the Moenkopi Formation of the Early Triassic. The Smithian Sinbad Member of Utah has a laterally extensive shelf deposited mostly within the hypothesized habitable zone while the Spathian Virgin Limestone of Nevada is laterally limited with only some environments falling within the habitable zone. Depositional environments were interpreted in a parasequence framework based on sedimentary structures observed in the field and thin section analysis. Areas of higher benthic diversity are used to infer the environmental distribution of the well oxygenated habitable zone within each parasequence and locality. I hypothesize that the Smithian shoreface will show higher diversity due to a wider distribution of oxygenated, habitable environments. Understanding the dynamics of these shoreface systems will lead to better hypotheses that can locate shelf regions with increased organic deposition as a result of increased anoxia.