

INVESTIGATING THE EFFECTS OF PALEOCLIMATIC VARIATIONS ON THE TEMPORAL AND SPATIAL DISTRIBUTION OF UPPER CRETACEOUS CHALKS AND MARLS

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ABSTRACT

Upper Cretaceous chalks and marls serve as economically viable hydrocarbon source rocks and unconventional reservoirs. These chalks and marls are generally characterized by positive shifts in the global $\delta^{13}\text{C}$ record, which is generally attributed to increased paleoproductivity due to eustatic sea-level rise; however, this relationship is not as straightforward. This project focuses on the late Campanian-Maastrichtian, a time interval where climatic shifts varied regionally and intensification of the meridional temperature gradient occurred. We also see the provincialism of tropical and temperate calcareous nannoplankton taxa, which ultimately affected the distribution of planktic communities across different ocean basins and paleolatitudes. The goal of this project is to document paleotemperatures from different ocean basins and paleolatitudes using clumped isotopes on the coccolith-fraction of the chalks and marls. The well-constrained paleotemperatures from different localities will then be compared to the established global $\delta^{13}\text{C}$ records and sea level curves. Paleoproductivity will also be assessed using calcareous nannofossil abundance data and correlated to the derived paleotemperatures. This study will have greater implications because paleoproductivity associated with sea surface temperature changes will provide new insights into evaluating the distribution of potential hydrocarbon source rocks and unconventional reservoirs deposited during the Upper Cretaceous.

AAPG Search and Discovery Article #90298 © 2017 AAPG Foundation 2016 Grants-in-Aid Projects