

Extraction of paleoclimatic signal from the Eocene Green River Formation Lake Sediments in Utah, USA

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EECO (Early Eocene Climatic Optimum) is known as the warmest period in the Cenozoic era. The Eocene Green River Formation, distributed at Utah, Colorado and Wyoming in US. consists of lake sediments in foreland basin of the Rocky Mountain. Most study about Green River Formation focused on oil shale with petroleum geology and organic geochemistry, However, there are only few sedimentological and inorganic geochemical works for reconstruction of paleoenvironment from the Green River Formation. Here we tried to reconstruct climate change during the EECO from the Green river Formation at the Uintah basin, based on the sedimentary analysis and geochemical analysis.

The Green River Formation is divided into 6 lake stages; fresh lake, transitional lake, highly fluctuating lake, rising lake, high lake and closing lake (Milkeviciene and Sarg, 2012). We investigated sedimentary facies at the Indian Canyon section, Utah, and recognized 3 -5 lake stages resulted from facies analysis. High lake stage, called Mahogany zone, was suggested as the peak of EECO. Furthermore, we established depth ranks by lithofacies and development of lamination to estimate detailed changes in paleo-lake levels. We also examined XRF and elemental analyzer measuring CNS to examine the inorganic and organic geochemical analysis, respectively.

Stable Ti/Al variation implies the changes in provenance would be negligible. The fluctuations of Ca/Al and Mn/Al are similar to that of depth rank record. K/Al shows high value at the high lake interval (Mahogany zone), implying enhanced chemical weathering intensity. Additionally, high TOC and low C/N in the Mahogany zone suggest the increased algae productivity in this zone. Our results suggest that the development of warm and humid environment in the middle-latitude North America at the EECO. We will analyze drilling core sample of Green River Formation with high-resolution.