Hydrological and Biogeochemical Change to Rapid Warming in Eocene Lake Uinta, Green River Formation, Utah

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The Early Eocene Climatic Optimum (EECO, 53-50 Ma) provides a natural experiment of the impacts of rapid global warming on the Earth system, including hydrological and associated biogeochemical feedbacks. Here we present lithologic, carbon isotopic, and compound-specific hydrogen isotopic analyses of *n*-alkanes, isoprenoids and hopanes extracted from a 120-m-thick sequence from a transect of cores through the basin margin and centre of the lacustrine Parachute Creek Member of the Uinta Basin, Utah. The study interval includes the Mahogany Oil Shale, a deposit unusually rich in TOC (up to 40%). Quantitative $\delta^{13}C$ data from this terrestrial succession can be correlated to marine sections through astrochronology tying to 21 geochronological dates from tuff deposits.

Comparison of this novel record with high-resolution sedimentary log, additional lipid biomarker profiles and organic petrographic data allows the differentiation of hydrological change from broader ecosystem change during the EECO. We conclude that lake and wetland hydrological change in the Eocene likely had an under-appreciated role in early Cenozoic greenhouse conditions.