

Reconstructing terrestrial effects of the Early Eocene Climatic Optimum in the Greater Green River Basin through a high-precision $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology

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Abstract:

The Greater Green River Basin in WY preserves one of the best sedimentary record from the time of the Cenozoic peak warmth, known as the Early Eocene Climatic Optimum (EECO). This proposal aims to date a series of volcanic ash beds from the basin to develop a chronology for the basin deposits. The high-resolution chronology will facilitate our understanding on the potential effect of the EECO on the terrestrial records from the basin. The focus will be to date a key facies change within the lacustrine Green River Formation. This transition represents a time of change in lake type from evaporative to more profundal, and it has been assumed to have taken place simultaneously across the basin. By dating ash beds from near the facies transition, I hope to test the synchronicity of the facies change across the basin and compare its timing with the peak of the EECO as recorded in the deep marine sediments. The timing of the change in the lake type also has bearing on our understanding on the way in which tectonics and climate affect sedimentary deposition within the paleolake that deposited the Green River Formation. If the timing of the facies change was everywhere synchronous, it provides support for a scenario of climate driven deposition. Alternatively, if the facies change was diachronous, a tectonically induced drainage change is implied. Finally, a rich record of fossil mammals from the basin will also be studied within the temporal framework provided by the $^{40}\text{Ar}/^{39}\text{Ar}$ dating of the ashes. I will study changes in morphological characters that are susceptible to climatic conditions to provide another aspect of the potential effect of the EECO on land.