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Reconstructing Paleoecosystems: Community Structure Throughout the EECO

Examining ecological community structure through time (millions of years) and how it changes through the global warming and cooling cycles can lead to an accurate representation of the effects of current climate change. By categorizing animals from various paleoecosystems into different ecological guilds such as food guilds, body size guilds, and locomotor guilds, ecosystems can be recreated before and after rapid instances of climate change. Research was concentrated on Early Eocene Climatic Optimum because of the close similarities with current instances of climate change. Three sites with similar Eocene ecology; Buck Spring (~51 mya), Davis Ranch-Red Beds (~50 mya), and Bridger 869-Twin Buttes (~47mya); were analyzed using ecological diversity spectra and faunal resemblance indices. The sites correspond to the warming, peak, and cooling parts of the EECO, respectively. These two measurements (ecological guilds and FRI) led to the conclusion that the ecosystems changed from small mammals (scansorial and arboreal) to larger mammals with more specialized feeding habits and locomotion. As the climate warmed the species diversity increased and specialization occurred because more niches were created by the increased flora. Modern ecosystems can be compared to this instance of climate change with some reservation; however the changes throughout the EECO suggest that with warming, more species will emerge in more niches. Without human interference (i.e pollution, poaching), species can adapt to climate change. Current research is being concentrated on more concrete comparisons with modern fauna.