

Characteristics, Type, Distribution, and Controlling Factors of Paleosols and Their Implications on Paleoclimatic Conditions, Cyclic Sedimentation, and Stratigraphic Correlation, Oread Cyclothem (Upper Pennsylvanian), SE Kansas and NE Oklahoma

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The Oread Cyclothem contains three minor cyclothem composed of nonmarine and marine siliciclastic and carbonate rocks deposited in the paleoequatorial belt during the Early Pennsylvanian when continental glaciation and deglaciation were active, similar to the Plio-Pleistocene. Each minor cyclothem is capped by paleosols developed upon regressive fluvial deposits. Paleoclimate, among other allogenic and autogenic processes, probably had significant control on the type, amount, and timing of sediment supply during cyclic sedimentation. Previous studies have indicated that the layer-cake stratigraphy defined by persistent limestone markers in SE Kansas change into complex fluvial and deltaic-dominated stratigraphy to the south in NE Oklahoma. A sound stratigraphic correlation between the shelfal and marginal Oread Cyclothem is needed to establish a regional stratigraphic architecture to better understand the processes controlling cyclic sedimentation.

Paleosols are good climatic indicators because climatic conditions significantly control soil type and maturity. Thus, the capping paleosols in the Oread Cyclothem can be used to reconstruct climatic conditions and changes during cycle formation. Temperature, precipitation, and their seasonalities will be interpreted from the type, maturity, and stacking of soil packages using existing models. This study will focus on the paleosols capping the regressive Snyderville Shale. Correlation across the study area will show the persistency and variations of soil type, thickness, and stacking, which will be used to interpret the spatial variations of climatic conditions. The correlation will also demonstrate the feasibility of using paleosols as stratigraphic markers. If feasible, the paleosol markers will greatly facilitate stratigraphic correlation where limestone markers are absent.