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OLIGOCENE TO MIDDLE MIOCENE (WHITE RIVER AND ARIKAREE GROUPS) STRATIGRAPHY AND PALEOGEOGRAPHY OF WESTERN NEBRASKA

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The White River Group traditionally has been divided into three stratigraphic units in western Nebraska, the Chadron, Orella, and Whitney. We also recognize three depositional sequences in the group but these consist of the following stratigraphic intervals (oldest to youngest): 1) the base of the Chadron to the unconformity in the Orella Member; 2) the unconformity to the top of the Whitney; and 3) the Brown Siltstone beds (a new informal unit). We divide the Arikaree into three units; 1) the Gering; 2) Monroe Creek-Harrison formations; and 3) the Upper Harrison beds.

The oldest Cenozoic sediments (Chadron Formation) are Early Oligocene alluvial fills deposited in two southeast-trending paleovalley systems. Subsequent to filling of these drainages and continuing for about the next 7 m.y., landscape development in western Nebraska was dominated by eolian deposition of tremendous volumes of rhyolitic volcanic ash derived from western eruptions. One significant episode of regional erosion occurred during this interval creating a series of eastward trending drainage systems prior to deposition of the upper part of the Orella. Uplift in the Rocky Mountains and Great Plains (pre-Gering Formation) caused erosion of two major easterly trending paleovalleys and brought epiclastic detritus into the area about 28 m.y. ago. Eolian volcaniclastic sedimentation continued building the plains during and after Gering alluvial deposition except for a minor erosional episode prior to deposition of the Upper Harrison beds. About 19 m.y. ago, Arikaree deposition ceased as western volcanic activity declined.