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Late Cretaceous Greenhorn Transgressive-Regressive Cycle and Transgressive Phase of Niobrara Cycle in Central and Southern Utah: Interaction of Tectonics and Eustacy

Eustatic and tectonic influences can be distinguished in the Greenhorn transgressive-regressive cycle and the following transgressive phase of the Niobrara cycle in central and southwestern Utah. The Dakota sandstone constitutes the transgressive systems tract. It comprises numerous parasequences, most of which occur in a back-stepping arrangement. The rapid, sustained Dakota transgression was the result of Cenomanian eustatic sea-level rise combined with subsidence of the foredeep east of the Sevier Orogenic belt. The Straight Cliffs formation of southwestern Utah constitutes the highstand systems tract. Falling eustatic sea level during Middle Turonian time led to eastward migration of the shoreline and to shoaling of the sea floor in central Utah, where the Clawson and Washboard units of the lower Ferron accumulated as shelf sand bodies. Renewed rise of eustatic sea level in Late Turonian time led to transgression. The transgression was, however, short-lived. Uplift within the foredeep caused widespread erosion and bypassing of clastics eastward to the shoreline. The upper Ferron records this event. Despite the rising sea level, upper Ferron shorelines prograded rapidly. The presence of river-dominated deltas attests to high rates of sedimentation. Stacking of Ferron shoreline sands and aggradation of the Calico bed of the Straight Cliffs formation record near balance between sedimentation and accommodation rates. Renewed subsidence, coupled with continued sea-level rise, led to a near shutdown of the supply of sediment to the shoreline and to very rapid transgression during Coniacian time. Ultimately, the sea transgressed directly onto the coarse clastics of the Calico bed.