

The Elusive Correlative Conformity in Sequence Stratigraphy: An Example from the Upper Cretaceous of the San Juan and Raton Basins, Southwestern United States

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Since the advent of modern sequence stratigraphy principles a shift has occurred from an initial seismic and wire-line log data based approach, to more integrated studies partly based on outcrop analyses. System tracts and sequence boundaries have been recognized in exposures of epeiric marine deposits. However, distal equivalents of third-order sequence boundaries (correlative conformities, or 'CCs') have evaded documentation, despite being an integral aspect of sequence stratigraphy.

Late Turonian to Early Coniacian marine deposits of New Mexico (San Juan Basin: SJB) and Colorado (Raton Basin: RB) provide a 400 km-long transect in which to test the CC concept. Third-order regression during the Late Turonian (*Prionocyclus quadratus*/*P. germari* zones) resulted in basinward migration of the western shoreline of the seaway. Shoaling-upward parasequences of the Gallup Sandstone in the SJB prograded eastward during this time, while a more condensed interval of fine-grained calcareous facies were deposited in the RB. Strata coeval to the Gallup Sandstone include the Montezuma Valley Shale (Carlile Formation) and the basal four limestone beds and mudstone interbeds of the Fort Hays Member (Niobrara Formation). Subsequent relative eustatic lowstand in the SJB resulted in removal of considerable portions of the Gallup shoreface, and deposition of coarse-grained siliciclastics of the Torrivio Formation. In the RB sediment omission led to the development of a calcareous firmground. This surface became extensively colonized by the oyster *Pycnodonte* in the mid-basin, producing a diagnostic biostrome within Bed 5 of the Fort Hays Limestone. Earliest Coniacian ammonites (e.g., *Forresteria brancoi*) appear above this level in both the RB (Fort Hays Mbr above Bed 5) and SJB (Tocito Sandstone). Therefore, correlation of the *Pycnodonte* Biostrome in the RB with the erosional, valley-fill Torrivio Sandstone in the SJB is established by molluscan macrofauna; the *Pycnodonte* Biostrome is interpreted as an offshore correlative conformity of the sequence boundary capping the nearshore Gallup Sandstone.