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Linkage between Fluvial Sheetsands and Their Time-Equivalent Shoreline and Shelf Sands, Mesaverde Group, Wyomingand N. Colorado

Ron Steel*

A 350km long, dip-oriented transect of correlated Campanian strata, in a 7 my time interval, from Rock springs in Wyoming to Sand Wash Basin in N. Colorado, was presented. The transect shows how a sandy fluvial succession in the updip region transits to muddy coastal-plain, sandy shoreline, and eventually shelf deposits basinwards.

In the middle reaches of the transit there are stacked, wave-dominated and deltaic tongues (20-40 m thick) that reflect more than 20 high-frequency, regressive-to-transgressive shelf transits, with transit distances up to 50 km. Regressions typically occurred during stable-to-falling relative sea-level conditions (FSST), whereas subsequent transgression reflects a rising relative sea-level change (TST). Falling relative sea level during shoreline progradation is strongly implied by the great progradational distances and by the occurrence of incised valleys in the shoreface lithosomes.

In the updip or proximal reaches of the transect there are subaerial erosion surfaces in the fluvial succession that reflect times of shoreline regression farther downbasin. These surfaces strongly suggest by-passing/ partitioning of sandy sediment down from the coastal plain to the shoreline region. Subsequent shoreline transgression is represented in the updip region by the accumulation of first fluvial and then estuarine deposits on top of the erosional sequence boundary. The stacked R/T shoreline transits are thus represented updip by unconformity clusters and by an autocyclic, backstepping fluvial-to-estuarine facies unit between each major erosion surface. The shoreline units are deeply valleyed at times by erosive sequence boundary surfaces.

In the most basinward reaches of the transect, in an apparent distal shelf location, there occur shoreline bodies that are tidal dominated, with their proximal reaches overlying the erosive sequence boundary. These shoreline bodies have a lower portion that is regressive but markedly aggradational, and an upper portion that is transgressive. The basinward location of the bodies, their position with respect to the sequence boundary, their tidal character and the nature of their shoreline trajectory all suggest that these bodies are lowstand shorelines positioned near the regressive maxima of the 350 km transect. They may be tide-dominated because they accumulated during rising relative sea level, but at the same time onlapped an irregular, embayed lowstand coastline that had been earlier created by the sequence boundary.

The long Cretaceous transect thus illustrates how (1) falling relative sea level created updip erosion and contemporaneous downdip forced regressive growth of wave-dominated strandplains and deltas, and (2) rising relative sea level created initial continued regression of

* University of Wyoming

the shorelines (but now in a tide-dominated setting) and subsequent transgression. Transgressive shelf deposits eventually overlie transgressive estuarine and fluvial deposits in the most updip regions. The time scale of the fundamental R/T transits is of the order of 2-400K years (4^{th}-order), whereas the stacking of such tongues generates larger-scale (3^{rd}-order) clastic wedges.