ABSTRACT

TITLE:	Characteristics of Cretaceous Tidal Rhythmites in the Menefee Formation, Durango, CO
AUTHOR(S):	Gianniny, Dr. Gary L.; Kunz, Brody J.
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ABSTRACT: Late Cretaceous (Campanian) tidal rhythmites are documented in the upper Menefee Formation at the Cliff House Sandstone transition near Durango, Colorado, USA. These tidal rhythmites are records of daily tidal cycles and also indicate the presence of diurnal or mixed diurnal tides in this portion of the Cretaceous Western Interior Seaway. The tidal rhythmites occur within beds at the base of lateral accretion surfaces in a fluvially connected deltaic meandering tidal channel. The occurrence of Skolithos and rare Teredolites confirm a marine influence in this deposit. Tidal channels at the transition of the fluvial Menefee Formation to the overlying marine Cliff House Sandstone are well documented in the region (Olsen et al., 1999). The tidal channel filling deposits have a modern day analogue of the Brahmaputra River Delta. These Cretaceous tidal rhythmite thickness patterns occur in both planar laminations and bidirectional ripples. Alternating sandstone and shale planar lamination are inferred to be deposits from tidal flood and ebb events. Bidirectional ripples with shale "mud drapes" also have thickness patterns consistent with tidal rhythmites. Both types of tidal rhythmites show evidence of a semidiurnal or semidiurnal mixed paleotidal system as they lack a distinct linear trend between flood and ebb lamina (Archer et al., 1995). Fifty four planar laminations are persevered that represent 27 tidal cycles. Thirty six separate ripples with opposing slip face directions represent 36 tidal cycles. The cyclic variation in thickness patterns of both planar laminations and bidirectional ripples are similar to modern asymmetrical tidal patterns (flood dominant or ebb dominant). The thickness patterns are consistent with neap/ spring cycles and may be records of synodic half months, several tropical half months, and one anomalistic month. The thickness and recorded duration of the tidal rhythmite cycles was limited due to truncation of bidirectional ripple deposits by either storm surges or fluvial floods. Migrating channel deposits have been previously documented for having a robust tidal rhythmite record, but with a limited number of preserved cycles (Coueffe et al., 2004).