The Menefee Formation of Southwestern Colorado: World Class Exposures of Non-Marine Progradational and Retrogradational Systems Tracts

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The Menefee Formation of SW Colorado is a non-marine coastal plain, back barrier deposit formed along the SW margin of the Late Cretaceous interior seaway. It is conformably underlain by the Point Lookout SS and conformably overlain by the Cliff House SS. Together these three formations comprise the Mesa Verde Group.

The Menefee crops out in scattered exposures along the northern edge of the San Juan Basin from Mesa Verde to east of Durango, CO, a distance of over 50 miles included in this study. Total formation thickness is 200-400 ft. Lithology consists of interbedded lenticular sandstone, siltstone, mudstone, and coal. The study area features spectacular road cut exposures of Menefee in Mesa Verde National Park up to 70 ft thick and 1200 ft long (Park study permit MEVE-2009-SCI-0013). Other excellent exposures were studied along roads west and east of Durango.

This study looks at the Menefee from a depositional history and large scale systems tract perspective. The lower Menefee is the coastal plain portion of a progradational HST that includes the shorezone Point Lookout Sandstone and the offshore Mancos Shale. This systems tract was deposited during sea level fall and shoreline advance northeastward into the basin. The upper Menefee is the coastal plain portion of a retrogradational TST that includes the shorezone Cliff House Sandstone and the offshore Lewis Shale. This systems tract was deposited during sea level rise and shoreline retreat to the southwest. This history of a progradational episode followed by a retrogradational episode first produced a vertical stacking of lower Menefee over Pt. Lookout over Mancos (proximal over distal), followed by a reverse vertical stacking of Lewis over Cliff House over upper Menefee (distal over proximal). These events formed the Mesa Verde Group with the Menefee in the middle as a classic example of Walther's Law.

The lower Menefee contains many multistoried coarse channel sandstones interbedded with thin splay sandstones, lagoonal mudstones, and salt marsh coals. Channel-sandstone geometry indicates transport from SW to NE supplying the prograding Point Lookout shorezone with sand. Coals are more common and thicker in the lower Menefee with the thickest coal generally found directly over Pt. Lookout SS.

The upper Menefee is marked by fewer and smaller channel sandstones as the retrogradation trapped coarse sediment in updip fluvial areas. Lagoonal and estuarine mudstones dominate this section with thin washover sandstones from the shorezone area. Coals are uncommon and thin.

The non-marine Menefee Formation is a composite of two depositional systems tracts, each with distinct lithology and stratigraphy. The coarser and more coal prone lower portion in the HST records a sea level fall and progradation, while the mudstone dominated upper portion in the TST records a sea level rise and retrogradation.