

**Dynamic pedostratigraphy: Vertisol genesis and sedimentation
in an Early Cretaceous (Neocomian–Aptian) fluvial-to-palustrine setting,
Sevier foreland, Utah, USA**

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The Yellow Cat Member (YCM) of the Cedar Mountain in the Poison Strip in Grand County, Utah consists of at many as six alluvial sequences (not channel stories) consisting of fluvial channel, overbank, and splay deposits, as well as minor palustrine carbonates. These sequences are bounded by erosional surfaces that are very prominent in many places, but slightly obscured by soil development in others. The stratigraphy and internal architecture of the YCM was partially determined by syndepositional pedogenesis and the development of soil microrelief.

The YCM is dominated overall by comparatively thick, massive, reddish mudstones in which paleo-Vertisol profiles as deep as 450 cm have developed. Within these profiles, nested, synformal sets of very large slickensides (“bowls”) intersect at their margins as “peaks” distributed at intervals of a few to several meters, in a fashion identical to the general pattern among modern Vertisols. In a prominent paleo-Vertisol that dominates one of the uppermost alluvial sequences of the YCM, palustrine carbonates are displaced along slickensides, indicating pedoturbation followed an episode of mixed alluvial-clastic and palustrine-carbonate deposition. Sediment colors, textures, and fabrics exhibit variable degrees of vertical and lateral gradations that are relatable to pedogenesis. Many thin beds of sandstone or intercalated sandstone and mudstone have termini that curve upward by at least one bed thickness. This phenomenon appears to be related to: (1) syndepositional control of deposition in splays and shallow floodplain channels by pre-existing gilgai microrelief atop paleo-Vertisols, and (2) deformation of the same kinds of strata by soil-related processes after the shallow burial of a given alluvial sequence.

Paleo-Vertisols exhibiting deep cracking suggest deep desiccation under a seasonal rainfall regime and they seem to reflect the emergence of an orographic effect east of the contemporary Sevier Mountains. We refer to the cumulative effects of ancient pedogenesis on deposition, erosion, and the lateral and vertical relationships of sedimentary bodies as *dynamic pedostratigraphy*. In devising this term, we seek to communicate that there were feedbacks and other linkages between ancient soil development and sedimentation.