

# **Structural and Textural Variability of Mud Mound and Stromatolite Layers from the Notch Peak Formation (upper Cambrian, Utah, USA)**

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One of the classic localities for the study of Cambro-Ordovician stratigraphy is the House Range (Utah, USA) where a several km-thick Lower Paleozoic succession was deposited on the western passive margin of the North American craton. The Notch Peak Fm spans the upper Cambrian to lowermost Ordovician portion of the succession and mostly consists of limestone, partly dolomitized, containing numerous extensive beds of stromatolitic to thrombolitic boundstone.

We studied the distribution, sedimentological characteristics and associated facies of 3 boundstone layers in a 45 m thick interval of the Notch Peak Fm, mapping them with high resolution GPS equipment over an area of ~ 10 km<sup>2</sup>.

The lower layer is 2 m thick on average, and occurs continuously throughout the study area. It overlies with a sharp planar contact either cross-bedded dolomitized oolitic grainstone or finely laminated dolo-micritic limestone. The boundstone consists of regularly spaced columnar stromatolites with an average diameter of 40 cm. The sediment in lateral contact with the stromatolites consists of cross-stratified intraclastic grainstone. The top of the layer is cut by a planar erosional unconformity which uniformly truncates both stromatolites and associated sediment.

The middle layer is found in most of the study area and consists of unevenly spaced mud mounds up to 3.5 m thick and up to 30 m across. Their internal structure is complex, with irregular to columnar-shaped thrombolites and micritic masses associated with biocalstic wackestone and packstone. The original tridimensional shape of the mounds included elongated and irregular pockets and cavities that were later filled with laminated sediment. The top of the mounds is often erosionally truncated. Intense postdepositional deformation is observed in the sediments surrounding the mounds.

The upper layer has an average thickness of 1 m and is found only in the southern and central section of the study area. It consists of evenly spaced narrow columnar stromatolites associated with bioclastic wackestone to packstone. The boundstone is often interrupted by channels and metric-sized cavities filled with cross-bedded sediment. A flat erosional surface truncates both the stromatolites and the sediment in lateral contact.

Original variability in structural and textural composition in the three studied layers caused differences in early lithification, relief on the seafloor, erosion and postdepositional deformation in the context of a relatively homogeneous depositional setting.