Illustration of Shallow Water Depositional Cycles in Core from the Central Texas Ellenburger Group

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The Lower Ordovician Ellenburger Group was named for outcrops in the Ellenburger Hills of the Llano region in central Texas. It is equivalent to the productive Ellenburger of the Permian Basin, but in central Texas outcrops are only partially dolomitized and hence can provide more information about the original depositional environments and cyclicity of the formation. Mineral exploration cores were cut in a number of shallow wells on the north and west sides of the Llano uplift in the 1950's and 1960's. Some of these wells cut continuous core through the entire Ellenburger Group. They have been stored at the Bureau of Economic Geology in Austin. Until recently they were unslabbed and unstudied. Currently efforts are underway at University of Texas of the Permian Basin to describe these cores and build a modern depositional and sequence stratigraphic framework for the central Texas Ellenburger. Despite a strong karst diagenetic overprint in portions of the core, we have identified two types of cycles that will be on display. One type shallows up to tidal flats and exposure, contains algal laminations, fenestral textures and mudcracks, and is relatively less porous and permeable. The other type shallows up to high energy grainstone shoals, is highly dolomitized in the shoal caps, contains cross bedding, and is relatively more porous and permeable. Slabbed core examples of both Ellenburger cycle types will be on display during the poster session.

The tidal flat capped cycles are identified by the presence of algal laminations, fenestral fabrics, mud cracks, burrows, intraclasts and a restricted fauna of gastropods and ostracodes. Porosity is minimal and dolomitization is abundant throughout these very shallow water cycles.

The grainstone shoal-capped cycles formed in slightly deeper water, but were still high energy deposits. The cycle tops are cross-bedded and extensively dolomitized, but ghosts of rounded grains are abundant. Presumably most of these grains were oolites. The cycle bases are burrowed and contain more limestone and a relatively open marine fauna of trilobites, brachiopods and scattered gastropods. Intercrystalline/intergranular porosity is well developed in the caps of the shoaling upward cycles and would be capable of containing fluids or gas if hydrocarbons were available.