Sequence Stratigraphic Interpretation of the Pennsylvanian Hermosa Group in Rico, Colorado

David J. Todaro[1], Gary L. Gianniny[1], and Kim Miskell-Gerhardt[2]
[1]Dept. of Geosciences, Fort Lewis College, Durango, CO.
[2]Consulting Geologist, Durango, CO.

A detailed measured section and the first sequencestratigraphic interpretation of the Pennsylvanian (Moscovian) Hermosa Formation on Sandstone Mountain near Rico Colorado, delineates twenty unconformity-bounded sequences, nested within four to five sequence sets. Measuring 286 m in thickness, the section provides the closest surface location to examine the updip facies equivalent to the prodeltaic shales that host recent shale-gas plays in the Paradox basin. The measured section is in the medial to upper portions of the Hermosa Group as defined by Cross and Spencer, 1900. This section appears to correlate with the sequences of the Hermosa Cliffs, located 23 kilometers to the east described by Gianniny, Miskell-Gerhardt, and Ritter (2008).

The Pennsylvanian strata in Rico consist of marine mixed carbonate-siliciclastic lithologies and non-marine clastics. The siliclastics are interpreted to be dominated by proximal fluvial and deltaic facies with a notably lower feldspar content than those of the Hermosa Cliffs sections. Marine facies range from prodeltaic black shales, to shallow-marine, photic zone carbonates with a diverse open-marine fauna. Lithostratigraphic correlations suggest that the base of this section is above the upper Akah interval evaporites and may range into the upper Pennsylvanian below the Permian marine Rico Formation. Subaerial exposure and subsequent scour of the tops of the carbonate beds delineate the position of sequence boundaries, while flooding surfaces in both carbonate and clastic lithologies define higher frequency stratigraphic cyclicity. The highfrequency cyclicity of this section is attributed to glacial eustasy in addition to the variations in sediment supply due to climate and uplift/subsidence on this tectonically active basin margin.