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Middle Ordovician Clastic Wedges in East Tennessee: A New Look at an Old Basin

Two Middle-Upper Ordovician (Taconian) clastic wedges formed in the southern and central Appalachians: the Blountian (Sevier, Middle Ordovician) and the Martinsburg-Tuscarora (Upper Ordovician to Early Silurian). Several depositional models have been proposed for each. We are constructing a 3-D model for the Blountian basin in Tennessee and adjacent states and reevaluating existing models. Development of a 3-D model of the Middle Ordovician clastic wedge in East Tennessee permits reexamination of current models of syn/post-Taconic orogenic basin dynamics. Within this basin major facies changes, both along and across strike, have been previously recognized but not examined in mapping context. Detailed geologic mapping, and stratigraphic and structural analysis are being conducted in selected areas where Blountian basin deposits are preserved in several Alleghanian synclines. 1:24,000- and 1:12,000-scale mapping facilitate more precise delineation of facies distributions and refined correlations of units in the Middle Ordovician Chickamauga Group. Two-dimensional industry seismic reflection data and detailed mapping permit a reevaluation of stratigraphic thickness estimates, previously considered as much as 10,000 ft. More quantitative estimates of Alleghanian structural geometries and stratigraphic thicknesses will yield viable palinspastic restorations of basin and facies geometries. Paleocurrent indicators in carbonate bank and basin facies are being employed for the first time to determine sediment dispersal and sources. Facies distributions and source areas are particularly important if tectonic and thermal loading of Middle Ordovician black shales are a source of hydrocarbons in carbonate reservoirs farther west.