

Flexural Modeling: Variable Tectonic Subsidence in the Paleozoic Appalachian Foreland Basin, Pennsylvanian Salient, Central-Northern West Virginia and Southern-Central Pennsylvania

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Since the thickness, timing and lithologic character of stratigraphy in a foreland basin reflect the lithospheric flexural response to the thrust-driven loading in an adjacent orogen, stratigraphic successions have been used for reconstruction of convergence history of orogens. We compiled a series of Ordovician - Mississippian stratigraphic sections from the Appalachian foreland basin from published literature and well-logs adjacent to the Pennsylvania salient of central-northern West Virginia and southern-central Pennsylvania. Using realistic water depths, initial porosities and updated ages for the succession boundaries, we backstripped stratigraphic sections to reconstruct the sediment accumulation and tectonic subsidence histories of the studied regions. Preliminary results indicates that the rate of tectonic subsidence is 30m/m.y. during the Taconic orogeny (458 Ma to 444 Ma) and 60 m/m.y. during the Acadian orogeny (390-360 Ma) suggesting that Taconic tectonic loads for the central Appalachian basin was about twice as small as Acadian tectonic loads. On the other hand, there is a tectonic inversion (uplift) during Silurian tectonic quiescence, which is equivalent with basin-wide unconformity development in the central Appalachians. We compare our qualitative results to the migratory foreland basin model, reconstruct the history of foreland basin migration, and ultimately, evaluate the history of underthrusting and/or convergence of the Appalachians.