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Syntectonic Sedimentation and Laramide Basement Thrusting: *Timing of Deformation*

Recent seismic and drilling data from the Laramide basement-cored uplifts of the Rocky Mountain Foreland indicate that thick-skinned basement thrusting due to horizontal compression, rather than block uplift due to vertical forces is responsible for their origin. Interpretation of Laramide uplifts as basement thrusts requires a new sedimentary-tectonic model for the region. Sedimentary facies associations within the upper Cretaceous and lower Tertiary strata of Laramide intermontane basins are best understood as a response of sedimentation to thick-skinned basement thrusting. Sedimentary facies of the basins reflect a common history of asymmetric subsidence due to thrust loading and a consistent pattern of depositional environments. These facies have a depositional polarity similar to the structural asymmetry of their underlying basement. The structural and depositional axes of these basins were nearly coincident during the Paleocene and early Eocene.

Episodes of rapid Laramide basement thrusting caused equally rapid tectonically induced asymmetric basin subsidence which equaled or exceeded the rate of sedimentation. Basement thrusting is correlated with maximum subsidence of the footwall of each thrust. Major sediment sources were shallowly dipped basin margins **opposite** each thrust. The tips of basement thrusts provided coarse but volumetrically minor quantities of clastic sediment during thrust movement. Interbasinal sediment transport occurred across lateral ramps, whereas intrabasinal transport occurred via major trunk streams along depositional axes and their tributaries. Rapid thrusting and tectonically induced subsidence relative to sedimentation in intermontane basins yielded low-gradient conditions above their depositional axes during the Paleocene and Eocene. Extensive, thick, fluvial molasse wedges developed adjacent to the tips of basement thrusts only after thrusting had greatly slowed or ceased. Facies patterns representing these types of syntectonic and post-tectonic sedimentation are documented in seven Laramide intermontane basins of the Rocky Mountain Foreland.