

Tectonics and Sedimentary Evolution of the Cenozoic Canyon Ferry Basin, Southwestern Montana

By:

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The Canyon Ferry Basin is an intermontane extensional basin that is part of a series of grabens and half-grabens extending from southwestern Canada to Central Utah superposed on the Cordilleran fold and thrust belt. Prior investigations have shown that the formation of the network of basins is either a product of Eocene-Oligocene rifting or Miocene-Recent Basin and Range formation. Regional Tertiary structural and sedimentary processes are poorly understood and require a resolution to major discrepancies regarding basin formation in southwestern Montana. The spatial and temporal nature of the Canyon Ferry Basin will give insight to possibilities of hydrocarbon potential in Cenozoic Rocky Mountain basins. The Eocene-Early Miocene Renova Formation within the Helena Salient is widespread within many of the basins in southwestern Montana. The relationship between sedimentation and tectonics will determine whether normal faulting is synchronous with Renova deposition or if it is unrelated.

Tertiary structural and sedimentary processes in Canyon Ferry Basin will address and resolve discrepancies of Cenozoic basin formation in the Northern Rocky Mountain region. These two opposing models will be compared. Determining the timing of footwall exhumation in the basin-bounding normal fault by Apatite-fission-track analysis and $^{40}\text{Ar}/^{39}\text{Ar}$ dating will establish the structural genesis and provide an age-control. In addition to evaluating the tectonic setting of the basin, this project will establish a 3-D structural and stratigraphic framework by using seismic reflection profiles and Bouger gravity data coupled with biostratigraphy and provenance studies. Defining basin geometry, determining facies and structural genesis are the key outcomes.