

Structural Evolution of the Eastern Colorado Front Range

Erich C. Heydweiller

Department of Geology and Geological Engineering, Colorado School of Mines, 1516 Illinois Street, Golden, Colorado, USA
ehydwei@mines.edu

Current conceptual models for the structural evolution of the Colorado Front Range generally consist of: (1) a snapshot of the current, deformed, state of the rocks, and (2) a 'restored' picture of a presumed simple initial condition. These models generated tremendous progress in understanding the overall structural picture, but do little to unravel details about temporal and spatial variations in fault timing, the nature of fault linkages, and the impact of structural evolution on synorogenic sedimentation. This project's goal is to use structural restorations and numerical forward models, constrained by synorogenic growth strata, to provide these details.

The goal of this study is the production of 2D structural restorations and numerical forward models across three areas on the eastern side of the Front Range. The selected areas are locations of well-exposed synorogenic growth strata, and cover three of the four major fault systems along the eastern side of the Front Range, allowing comparison of structural style and timing between different fault systems.

Advances in structural understanding will provide several benefits: (1) clues to lingering controversies about the evolution of the Front Range, (2) regional context for analysis of the Niobrara petroleum system in the Denver Basin, and (3) insights into the dynamics of basement-involved foreland basins and their synorogenic sediments, which are petroleum reservoirs and groundwater aquifers in many Rocky Mountain basins.