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Analytical and physical models generate structures that are accurate according to the principles of mechanics, but require assumptions about physical properties and boundary conditions that may or may not be appropriate for actual oil fields. In order to learn how results from models can be applied to oil fields, a geomechanical model from Albertz and Lingrey (2012) is evaluated using methods normally applied to natural examples: line-length restoration, kinematic modeling, and area-depth-strain (ADS) analysis. The model selected is a compressional drape-fold, a style characteristic of many oil fields in the Rocky Mountains and elsewhere. The geomechanical model allows length changes, thickness changes, and compaction, features that may invalidate some methods commonly used to interpret oil-field structures. The results show which methods provide the greatest insight. Extrapolated footwall regionals correctly indicate a slight regional uplift of the hangingwall due to bed thickening. Line-length restoration incorrectly suggests the presence of growth stratigraphy. The best-fitting kinematic model is rigid-block rotation above a circular-arc fault which provides an excellent match to the depth to detachment and the shape of the fault ramp. The second best kinematic model is 60° antithetic oblique simple shear which provides a match to the lower detachment but predicts a ramp that is too steep. The ADS analysis is affected by the area loss in the model but is not invalidated. Based on the lower detachment obtained from the successful kinematic models, the area-depth line for the basement block gives a displacement that is a good match to that from the rotated-block model. The cover sequence area-depth points do not fall on the basement area-depth line, a result inferred to be caused by vertical compaction having reduced all the excess areas in the cover sequence. The difference between the expected and the measured areas allows the amount of compaction to be estimated. The style of the area-depth graph resembles that of a fault-bend fold, but the structure does not have an upper detachment. This particular combination of structural style and area-depth graph is not yet known from a natural example, but should be seen where vertical compaction is significant in the cover sequence. All methods produce estimates for the boundary displacement that are too small because the geometry does not reflect the horizontal compaction present in the geomechanical model.