

# Experimental insights on the geometry and kinematics of active folds

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Physical experiments were performed to gain a better understanding on the causes of the variations in geometry and kinematics of active folds. We tested the influence of (1) the dip of basement faults and (2) stratigraphic variations of cover rocks using dry sand and viscous silicon polymer. A 1260 mm long, 418 mm wide, and 325 mm high box were used in the model tests. Computerized X-ray tomography applied to the experiments made it possible to analyze the kinematic evolution and geometry of folds and faults. Field surveys of active folds in California were also made to investigate the variations in geometry and kinematics of active folds. A comparison of the experimental results with natural cases of active folds reveals that sedimentary cover exhibit two distinct styles of deformation: (1) folds and thrusts form in front of the monoclinial flexure which propagates from the high-angle reverse basement fault (e.g. active folds and fault related to the 2004 Mid Niigata prefecture earthquake, Japan) and (2) the block of rock between imbricate foreland-verging thrust faults and back-thrusts is uplifted into a pop-up structure with increasing displacement of the low-angle reverse basement fault (e.g. Coalinga anticline, California).