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## **STEP-OVER EVOLUTION ALONG STRIKE-SLIP FAULTS AS A CAUSE OF LOCALLY DRIVEN BASIN INVERSION**

Basin inversion is traditionally associated with regional changes in tectonic regime. In contrast, field relations along the northern San Andreas fault system suggest basin inversion can be locally driven by the progressive evolution of step-overs along strike-slip faults. Such step-overs may evolve by propagation of the strike-slip fault on one side of the structure and progressive shut off of the strike-slip fault on the other side. In such a process, new transverse structures form, and the step-over region migrates with respect to materials that were once affected by it. This process is the progressive asymmetric development of a strike-slip duplex. Such step-over migration leaves pull-apart basin deposits outside of the active basin, resulting in local basin inversion because such deposits are affected by the regionally transpressive regime. Similar inversion may occur along a neutral transform system if a migrating restraining bend follows the migrating releasing bend and interacts with pull-apart basin deposits. Examples of locally-inverted basins include the Plio-Pleistocene Merced Formation (tens of km along strike) and the Pleistocene Olema Creek Formation (several km along strike) along the San Andreas fault in the San Francisco Bay area, and an inverted colluvial graben exposed in a paleoseismic trench across the Miller Creek fault (meters to tens of meters along strike) in the eastern San Francisco Bay area. Similar inversion may characterize the evolution of other basins in the world, including the Gulf of Paria pull-apart basin of northern Venezuela, the Hanmer and Dagg basins of New Zealand.