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Transfer of displacement between faults of opposed dip

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The transfer of displacement between faults that dip in the same direction is well understood and relay ramps between adjacent fault segments have been frequently described. Perhaps counterintuitively, displacement can also be transferred between faults that dip in opposite directions but the structure at the boundaries between opposed dipping faults is not well understood. We constrain the mechanism by which displacement is transferred between opposed-dipping faults by examining the geometries of faulted horizons and fault throw distributions at these 'conjugate relay zones'.

Structure contour maps of horizons offset by overlapping opposed-dipping faults from different extensional settings display a consistent pattern. Above the line of intersection between the conjugate faults the deformed horizon is flat between converging faults and displacement transfer is reflected in changes in footwall elevation. Below the line of fault intersection the mutual footwall is flat and elevation changes occur in the hanging walls of the divergent faults. These elevation changes can be explained as a simple superposition of the deformation fields of two faults that have retarded lateral propagation due to the presence of the other synchronous fault, irrespective of whether the two faults actually intersect. The observed patterns of horizon elevation strongly resemble those seen at boundaries between adjacent basin-scale half-graben of opposed polarity.