Sedimentary Basin Inversion in Rotational Tectonics

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The primary goal of this research is to evaluate how tectonic block rotation affects the formation and inversion of sedimentary basins and the occurance of hydrocarbons in these rotated basins. To do this, we are investigating the fault and fold characteristics of an oil-bearing basin in California (Santa Maria Basin) to develop a general model of basin inversion in rotational tectonics that can be applied to other areas of the world. We have derived a mathematical relationship between fold geometry and rotation amount that can be used to estimate rotation in the field or infer structural patterns from rock magnetic data. This equation has been tested on folded rocks in the field area with good agreement between predicted and measured amounts of rotational folding. Progress has also been made in describing the fold and fault patterns in the basin and evaluating the degree of active deformation using uplifted river terraces along major drainages.