

## **Modeling the San Joaquin Basin in Three Dimensions**

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We present a new 3-D model of the San Joaquin Basin (SJB) that may be the first compilation of subsurface data spanning the entire basin. The 3-D map spans 200 x 90 mi, is oriented along the basin axis, and extends to ~11 mi depth, for a total of over 1 million grid nodes. This model supports a USGS assessment of future additions to reserves of oil and gas in the SJB. Data sources include horizon picks from more than 3200 prospect and production wells, from proprietary well-top and seismic databases, from regional seismic grids and fault maps, and from detailed surficial geologic maps of the west-side fold belt. To accurately map the paleogeography of the basin, we compiled stratigraphic surfaces at specific geologic times. Mapped surfaces include the tops of Mesozoic crystalline basement; Cretaceous, Paleocene, Eocene, and Oligocene strata; two Miocene-aged units; and two Pliocene-aged deposits. All of these units serve as hydrocarbon reservoirs in the SJB, and at least three constitute hydrocarbon source rocks. The White Wolf fault near the southern end of the basin divides the map volume into 2 separate fault blocks. The construction of a robust 3-D model of the SJB encountered many challenges, including complex and inconsistent stratigraphic nomenclature, significant facies changes across and along the basin axis, time-transgressive formation tops, uncertain correlation of outcrops with their subsurface equivalents, and contradictory formation top data. The horizon tops and fault surfaces are compiled into a consistent, stratigraphic-structural 3-D model using EarthVision software.