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## The Role of Fluids in Promoting Seismic Activity in Active Spreading Centers of the Salton Trough, California, USA

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### ABSTRACT

We interpret seismic activity in the active spreading centers of the Salton Trough to indicate 1) a magmatic intrusion in the lower crust beneath the active Brawly, Cerro Prieto, Imperial, Elsinore, and San Jacinto fault systems; and 2) fluids in the upper crust that have been released from that magmatic body. The absence of a magmatic body and fluids at the location of fossil spreading centers along the Sand Hill and Algodones faults indicated by little or no seismic activity in those areas. We show several lines of evidence to point out that both melt and fluids related to the seismic activity. In particular, receiver function analysis,  $V_p/V_s$  ratios, and tomographic data reveal low velocity zones coincide with the location of the active spreading centers. High  $V_p/V_s$  ratios and low velocity zones in the lower crust and upper mantle attributed to melt inclusion, while low  $V_p/V_s$  ratios in the upper crust are attributed water inclusions. Frequency-magnitude distributions characterized by high  $b$ -values in southern California; high  $b$ -values have also been associated with crustal fluids. A crustal scale model developed from the receiver functions, gravity, and magnetic data supports the existence of a magmatic intrusion within about 20 km of the surface southwest of the Salton Sea, that intrusion extends for 70 km in a SW-NE direction.

### KEYWORDS

Crustal Model; Magmatic Intrusion; Salton Trough; Seismic Activity; Spreading Centers

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