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# A deep crustal fluid channel into the San Andreas Fault system imaged with magnetotellurics

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Fluids are ultimately linked to many fault-related processes at transform plate boundaries and key to understanding fault structure. From the chemical analysis of well waters, it was suggested that fluids can enter the brittle regime of the San Andreas Fault (SAF) system from the lower crust and mantle and may thus contribute directly to fault-weakening high-fluid pressures at seismogenic depths. These studies implied the existence of a deep fluid source and a permeable pathway through the crust. However, recent studies within the San Andreas Fault Observatory at Depth (SAFOD) main hole indicate, that pore pressures within the core of the SAF zone are not anomalously high and that mantle-derived fluids are minor constituents to the fault-zone fluid composition. This suggests that the seismically-defined SAF is itself likely not a major channel for deep-rooted fluid ascent. Here we present results from a magnetotelluric (MT) profile across the SAF at SAFOD from which we infer a deep-reaching, steeply dipping zone of high electrical conductivity within the Earth's crust, which reaches near-surface several kilometers NE from the seismically-defined near-vertical SAF. This zone of high electrical conductivity may reflect a major channel for crustal and/or mantle fluid escape and can explain why higher mantle gas contents have been detected only in wells 1-1.5 km NE of the SAF and not within the San Andreas Fault Observatory at Depth. High fluid pressures due to mantle fluid influx into the brittle regime may have important implications for the crustal strength and the dynamics of the fault zone.