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Four-dimensional tomography reveals changes in structure 1996 - 2002 at the Coso geothermal area, California

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The Coso geothermal area, at the southern end of Owens Valley in eastern California, has been commercially exploited for electricity generation for more than a decade. Seismic activity in the area is monitored by a network of three-component digital borehole seismometers operated by the US Navy, and several thousand locatable earthquakes occur each year. This situation is ideal for Local Earthquake Tomography. Inversions for three-dimensional V_p and V_p/V_s structure with resolution of 2 km horizontally and 1 km vertically show that between 1996 and 2002 the V_p/V_s ratio decreased at depths shallower than 2 km below the surface, primarily because of an increase in V_s . This change might be caused by either drying of the rock matrix or decrease in the pore pressure. Time-varying tomography of this kind, previously applied to Long Valley caldera and The Geysers geothermal field, provides a method of monitoring physical changes such as fluid depletion in volcanoes and exploited geothermal reservoirs.