Understanding spatial and temporal patterns of fault rupture is essential for forecasting damaging earthquakes. For most faults, the historic record of seismicity is shorter than the time between large earthquakes. Therefore, longterm rupture patterns are estimated by correlating prehistoric earthquakes at different paleoseismic study sites, but uncertainty in ages of paleoearthquakes leads to uncertainty in correlations and rupture patterns. Fragile landforms such as precariously balanced rocks (PBRs) are susceptible to toppling by earthquakes. Here we show that fragile landforms can be used in combination with other data to constrain rupture patterns and magnitudes of past earthquakes. Active traces of the San Andreas and San Jacinto faults are approximately 2 km apart in Cajon Pass, well within the documented limited for ruptures to jump across a step-over. The distribution, fragility and approximate ages of PBRs in southern California suggests that ruptures have jumped between the San Andreas and San Jacinto faults, with the most recent joint rupture in 1812 CE. The locations, fragility and age of PBRs suggest that the southern half of the San Andreas fault has not generated a large magnitude “wall-to-wall” rupture in >10,000 yrs, but a large magnitude joint rupture of both faults cannot be ruled out.