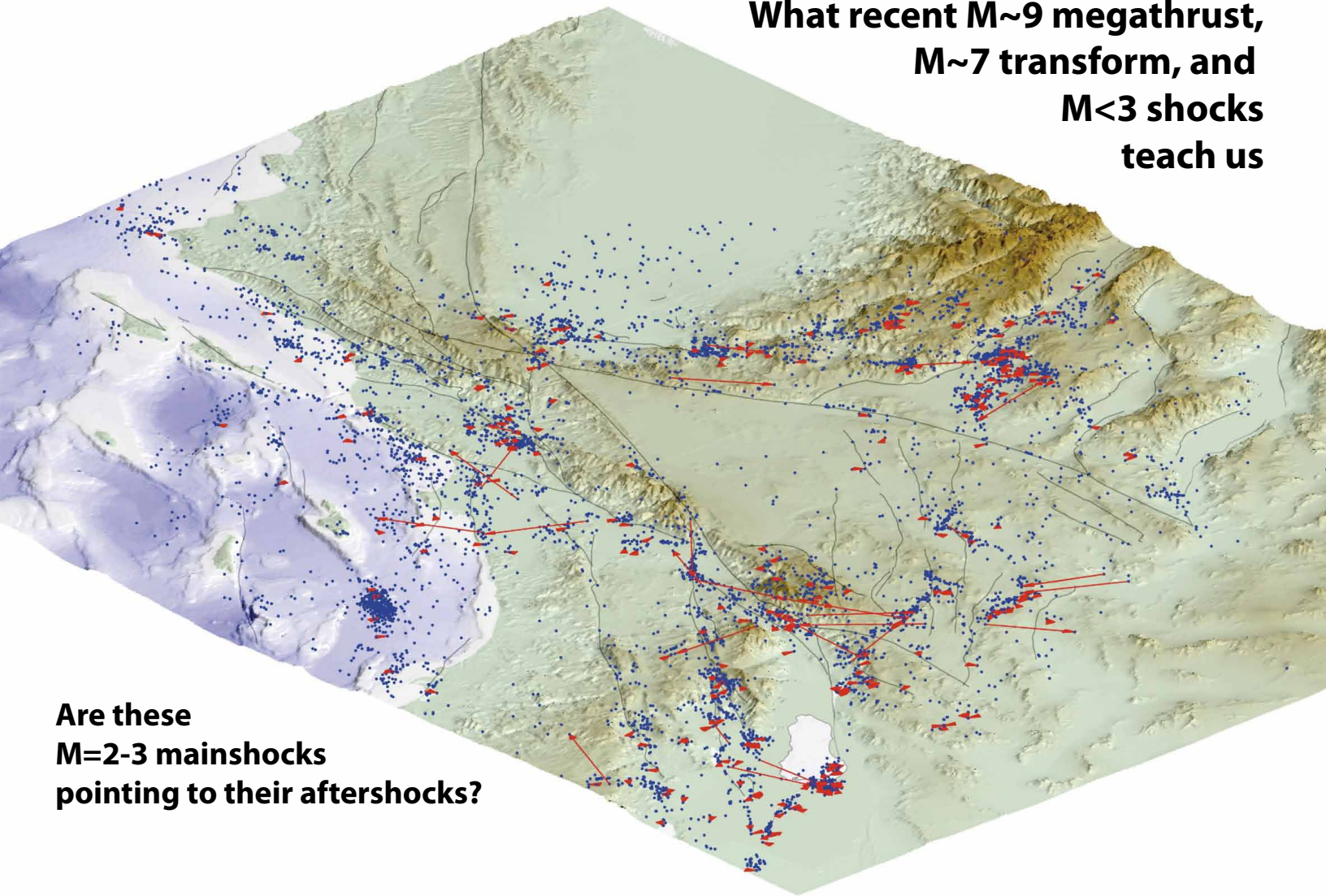


The debate about static and dynamic quake triggering

What recent $M \sim 9$ megathrust,
 $M \sim 7$ transform, and
 $M < 3$ shocks
teach us



Are these
 $M=2-3$ mainshocks
pointing to their aftershocks?

Ross Stein
U.S. Geological Survey
Menlo Park, California

The Coulomb hypothesis holds that the permanent stresses imparted by earthquakes can promote or inhibit aftershocks and subsequent mainshocks. But aftershocks can also be triggered at remote distances by transient stresses carried by the seismic waves. Felzer & Brodsky (Nature 2006) contend that all aftershocks are the product of these dynamic stresses, with $M=3$ mainshocks triggering aftershocks 50 km away. Stein will argue that falsification tests of their study, as well as the record of the 2004 $M=9.2$ Sumatra, 2010 $M=8.8$ Chile, 1999 $M=7.6$ Chi-Chi, and 1992 $M=7.3$ Landers earthquakes, instead point to the dominant—but not exclusive—role of the permanent stress changes in triggering earthquakes.