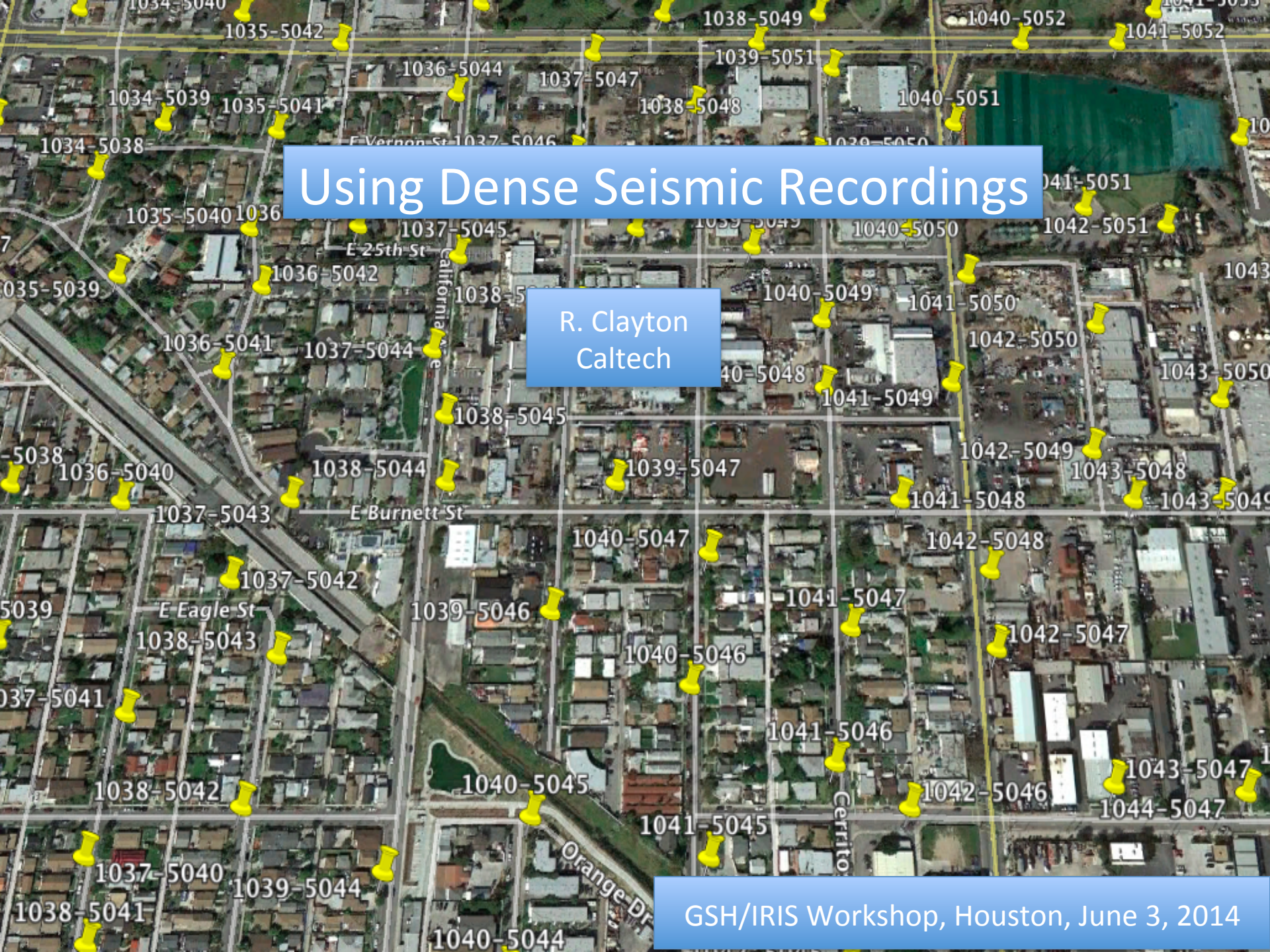


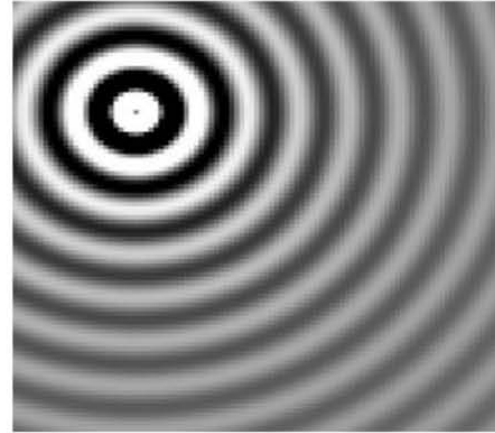
Using Dense Seismic Recordings

R. Clayton
Caltech

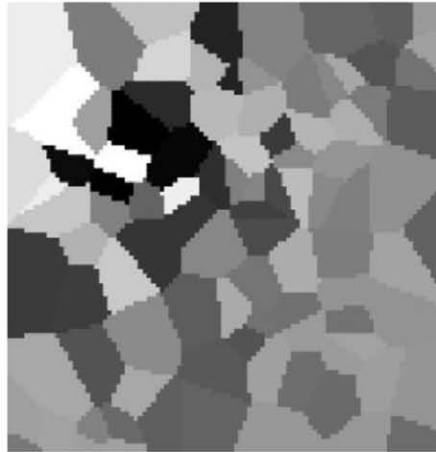
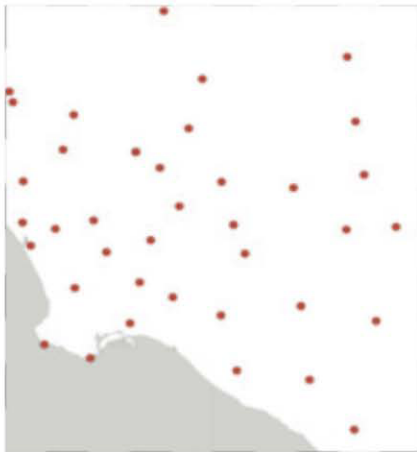


Station Density Matters

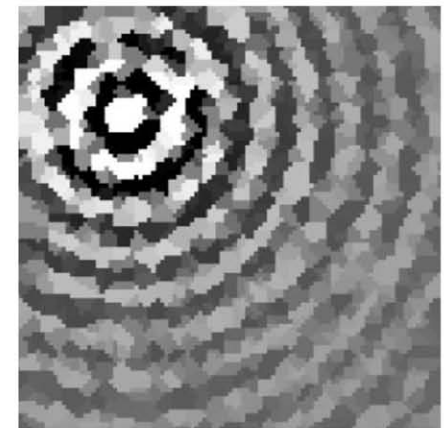
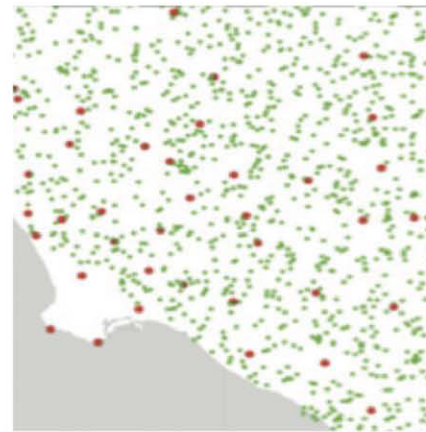
Perfect Wave Field



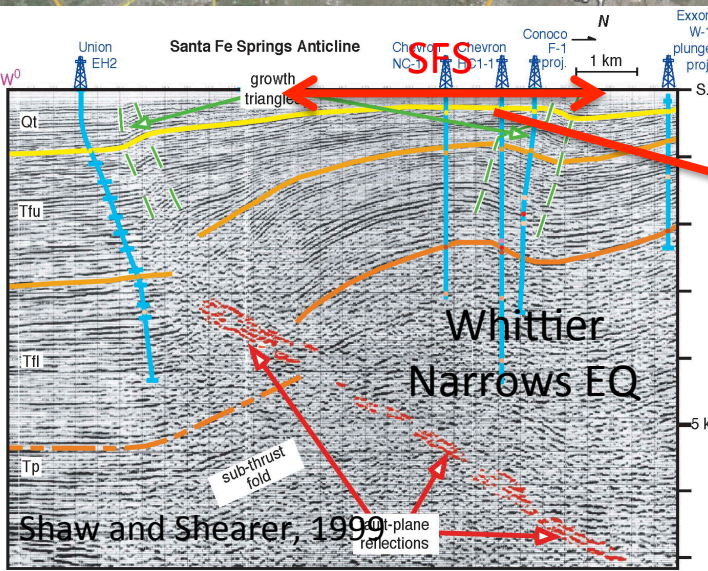
Current Array



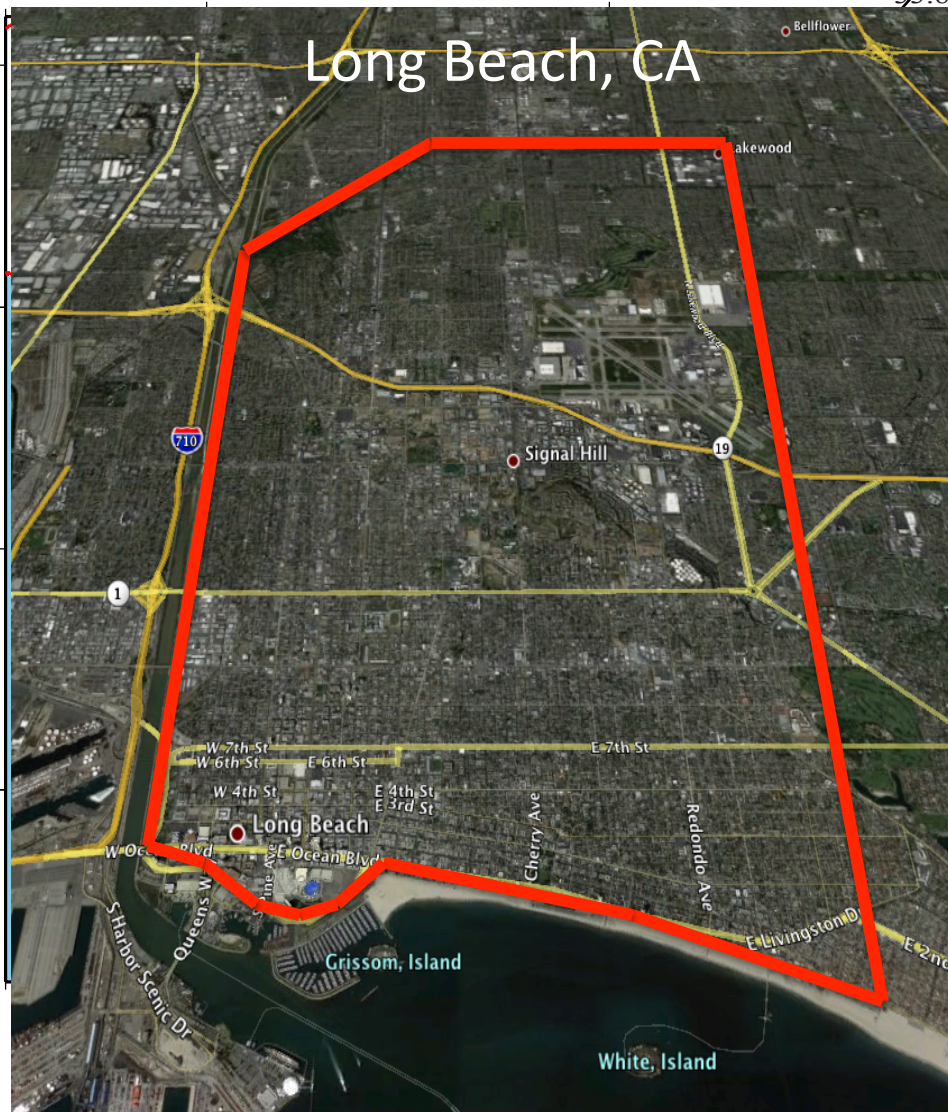
1000 Stations



Dense Arrays in the Los Angeles Basin

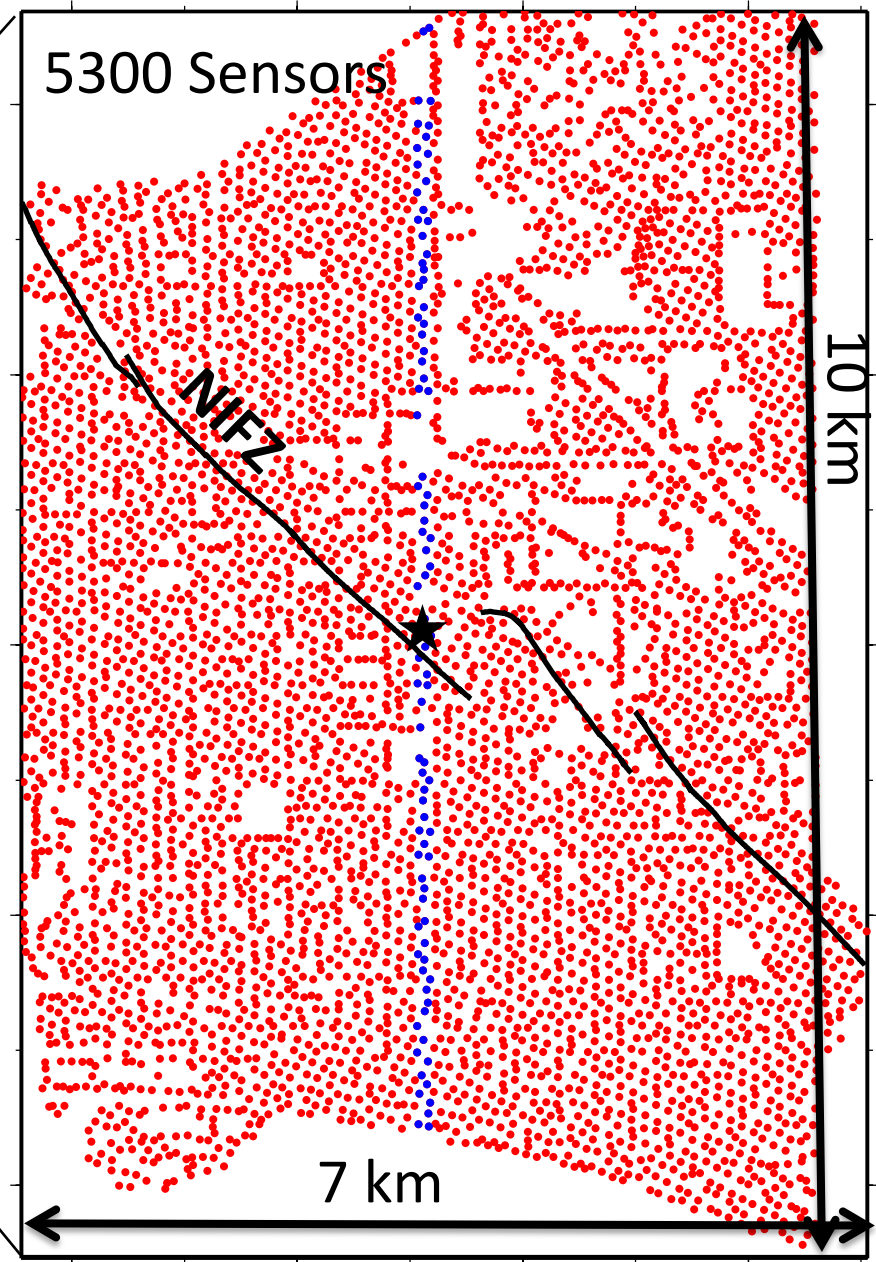


Long Beach Survey



32.84°

5300 Sensors



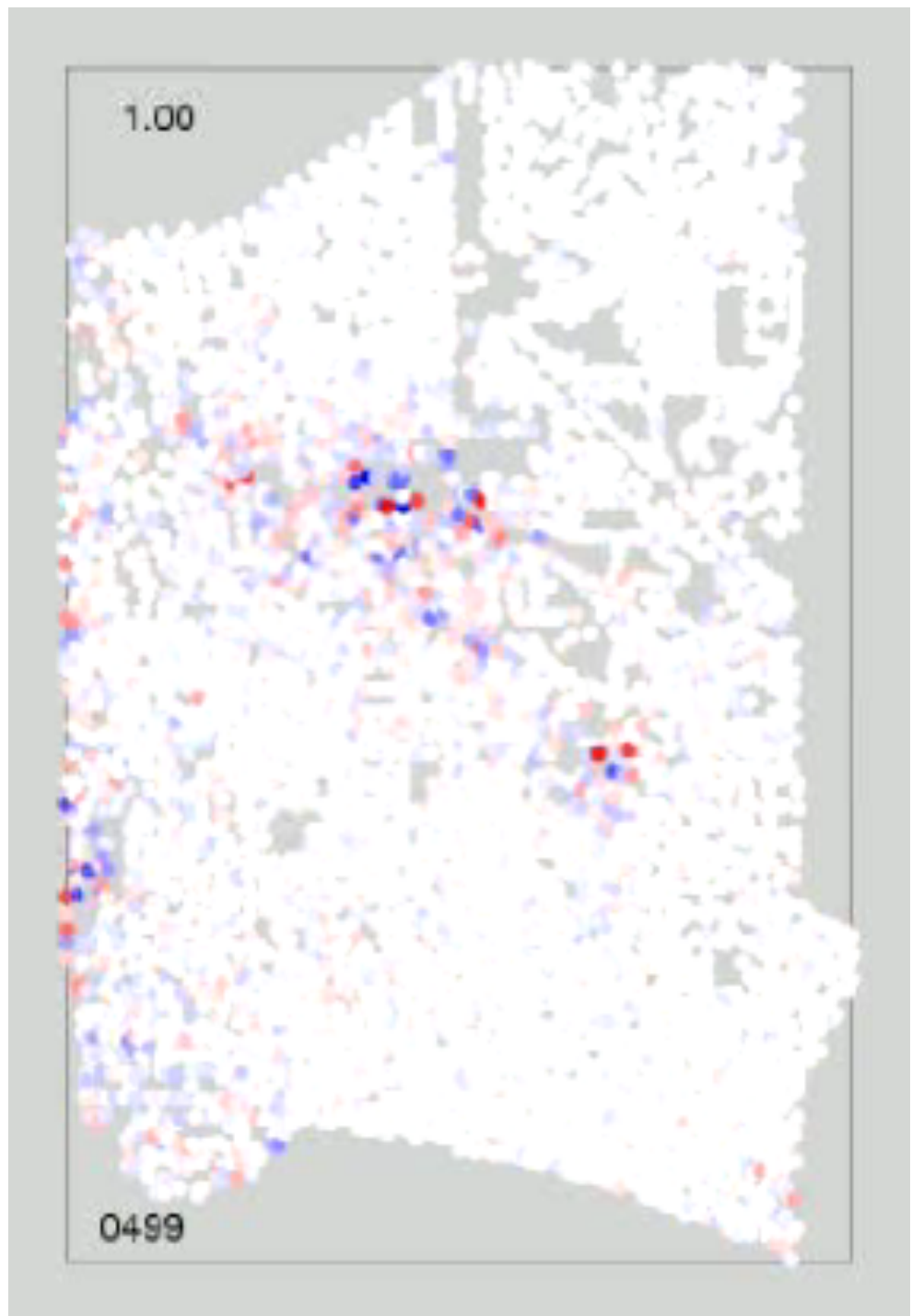
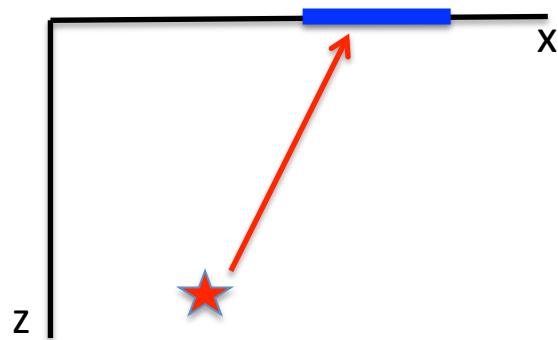
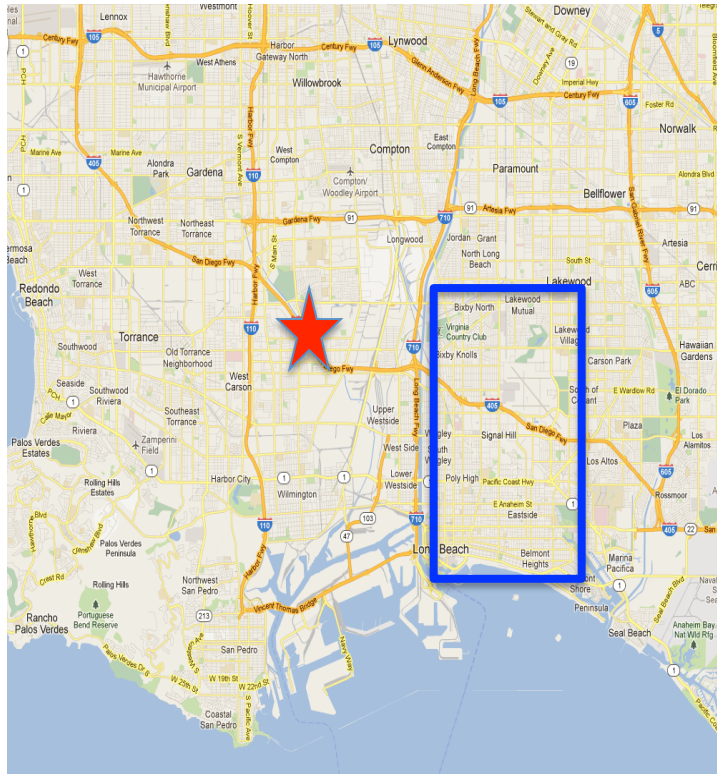
10 km

NIFZ

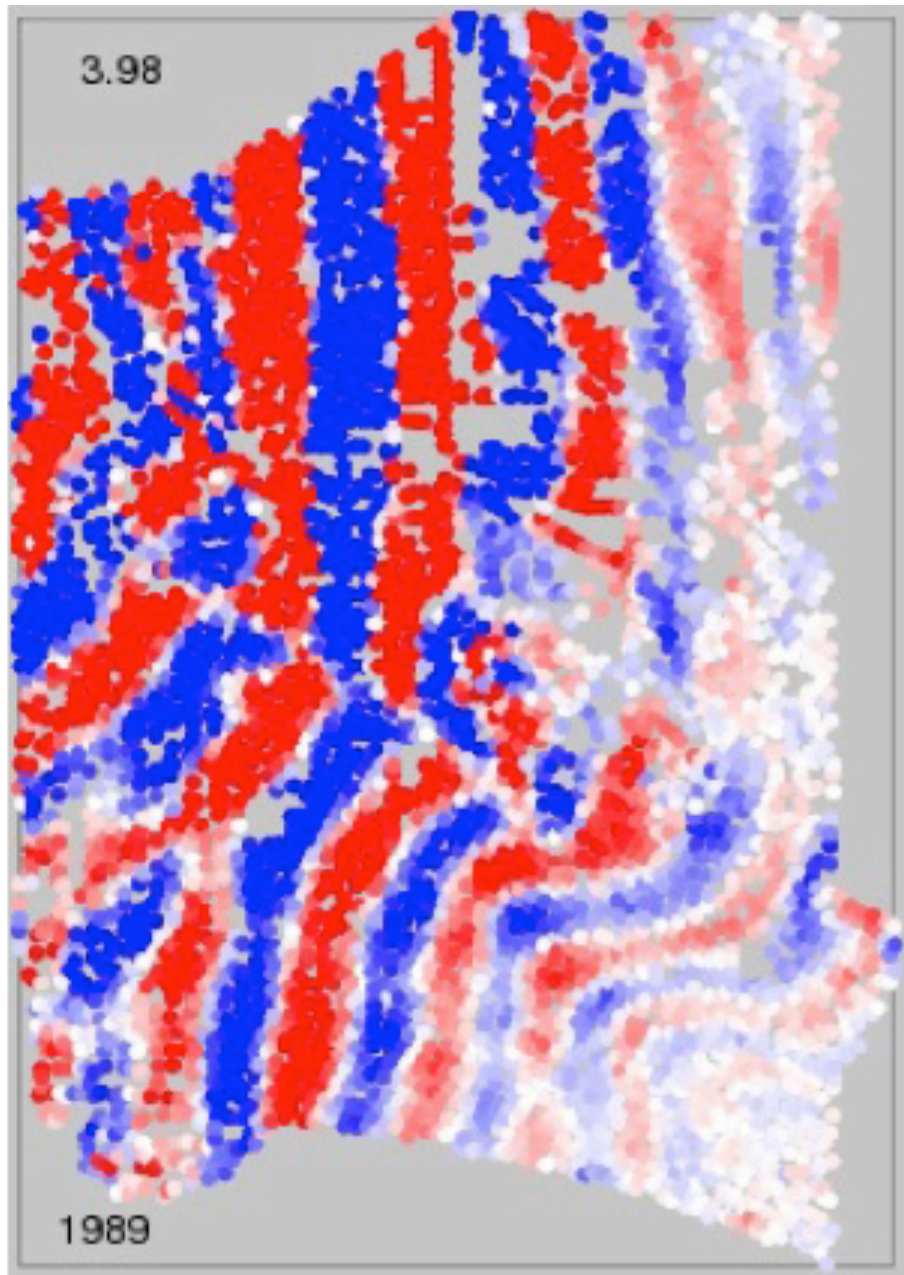
7 km

Carson Earthquake

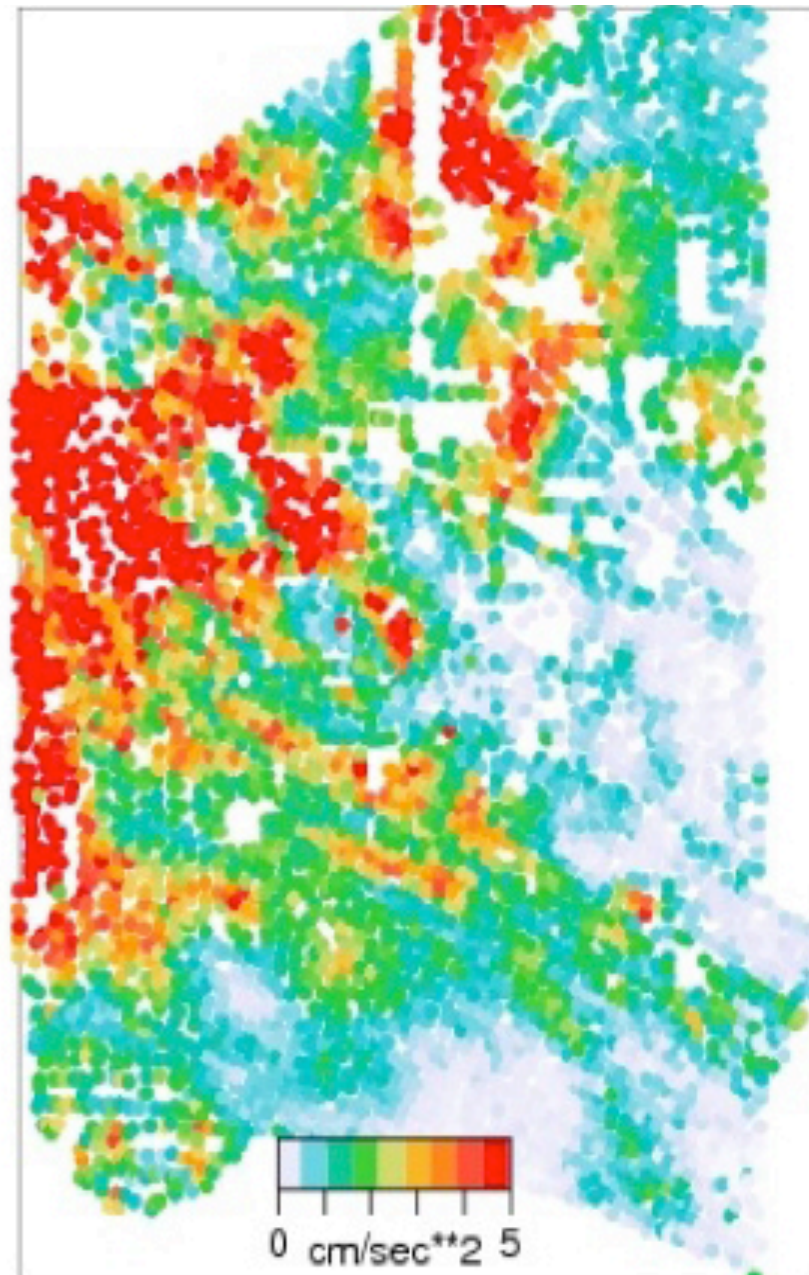
2011/05/14
Mb 2.5 depth 12 km

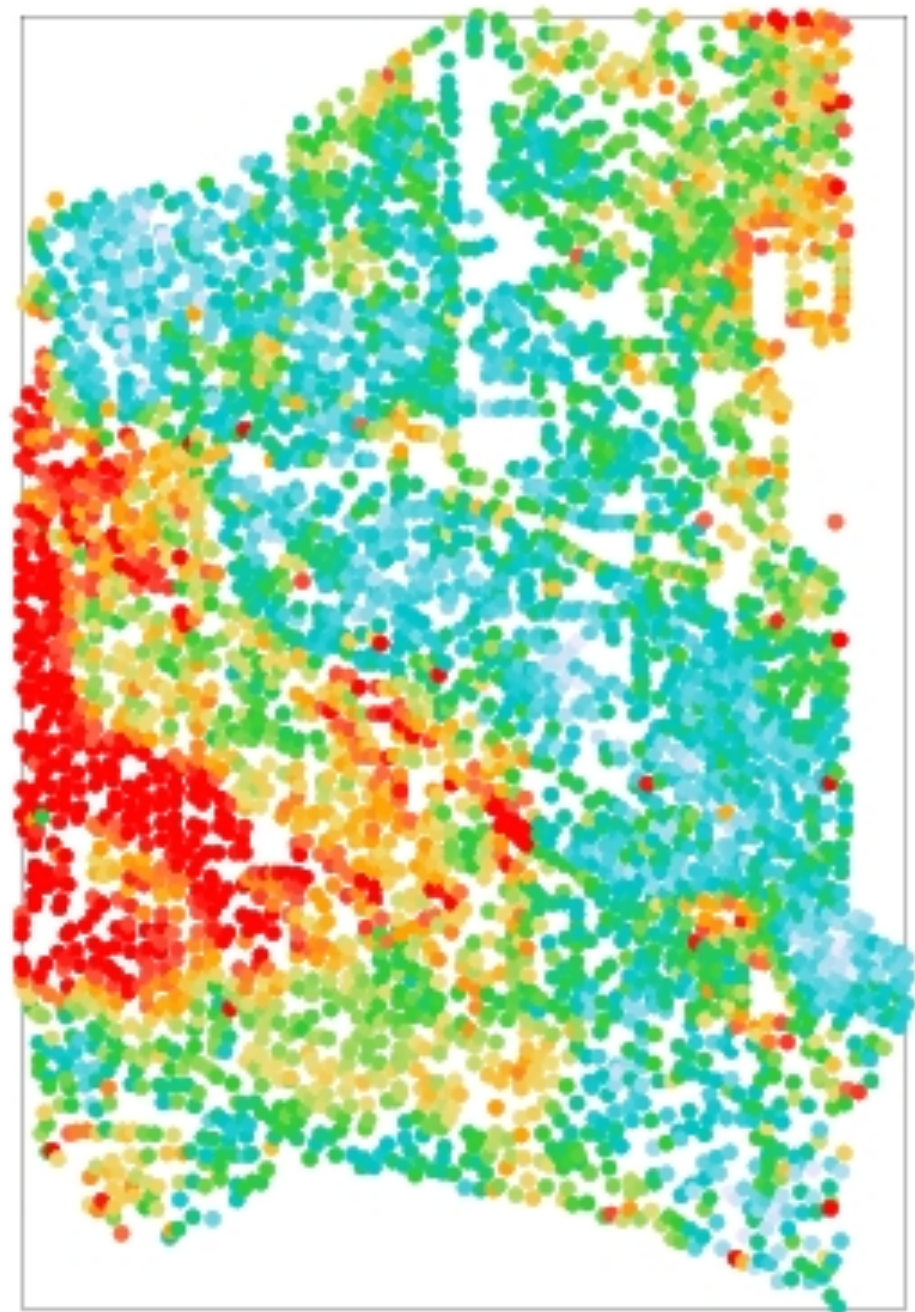
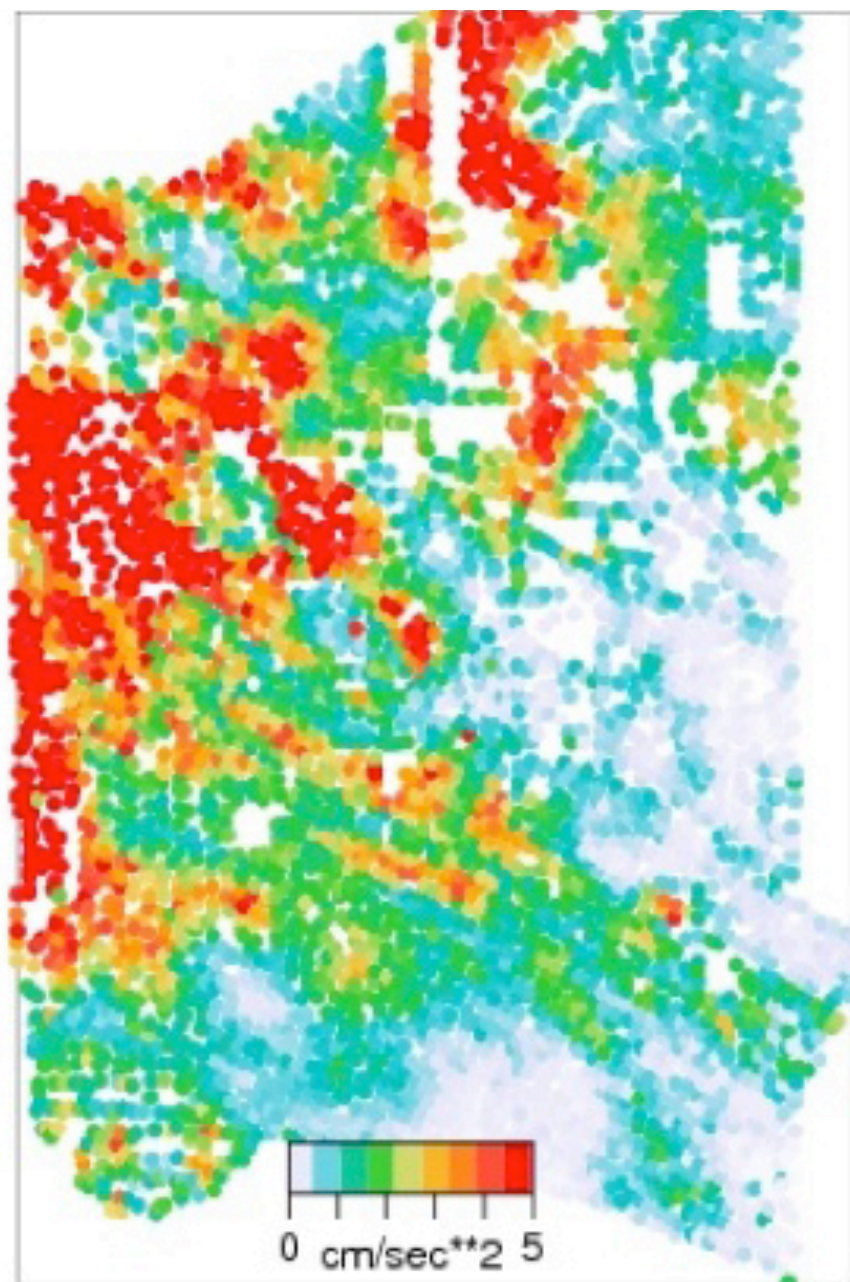


Snapshot



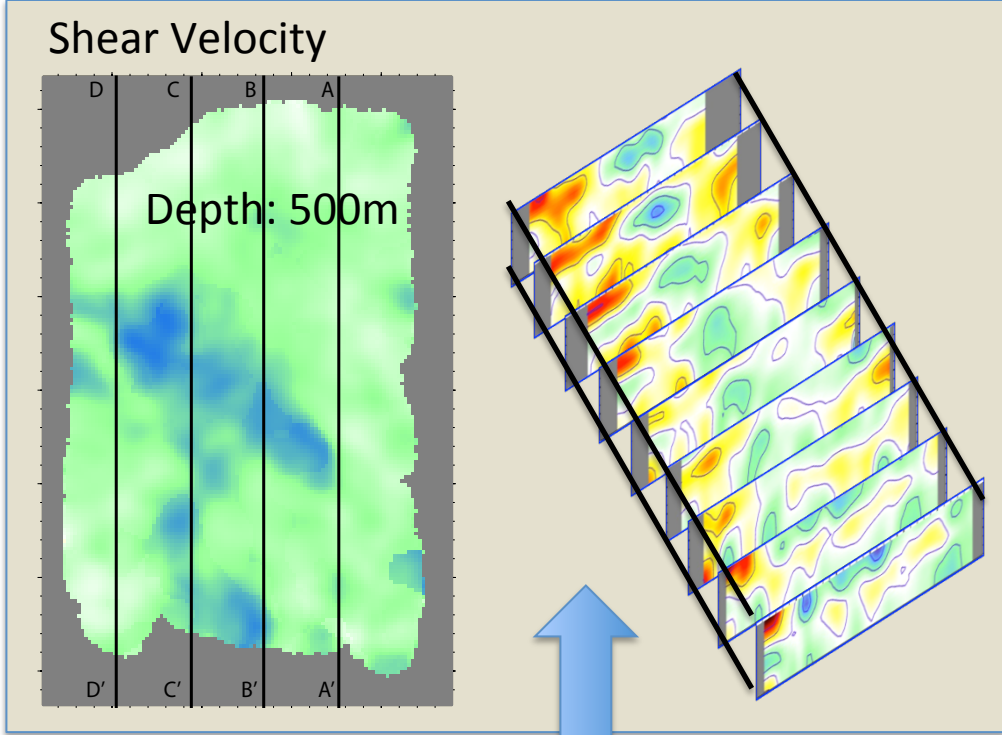
Peak Acceleration



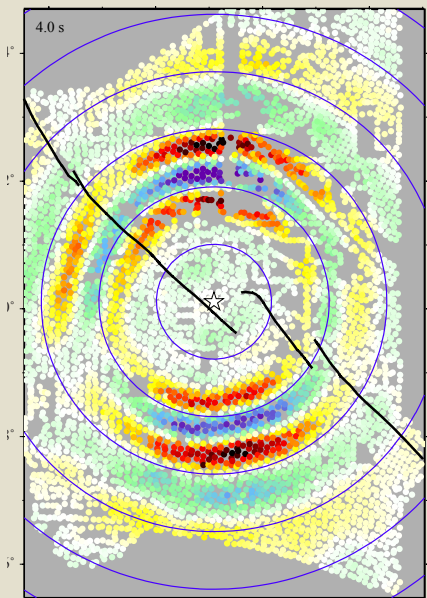


Shallow 3D Shear Velocity

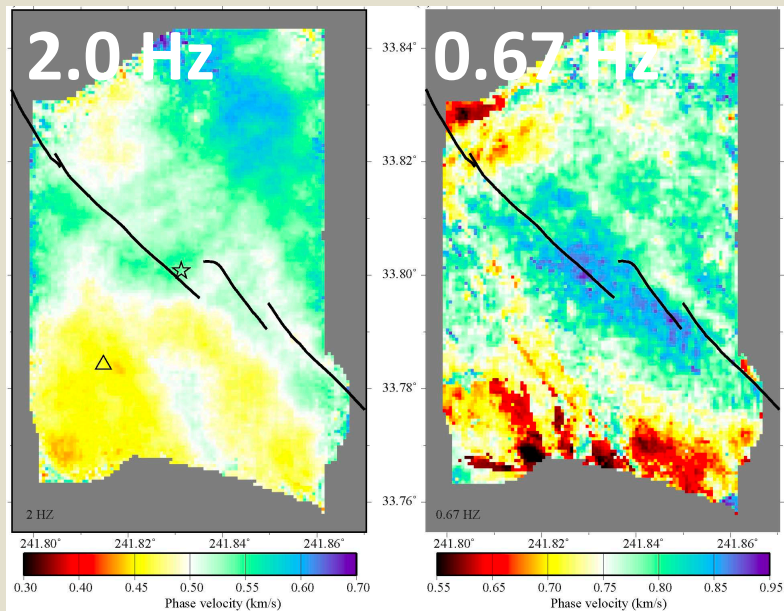
Lin et al, 2013, Geophysics

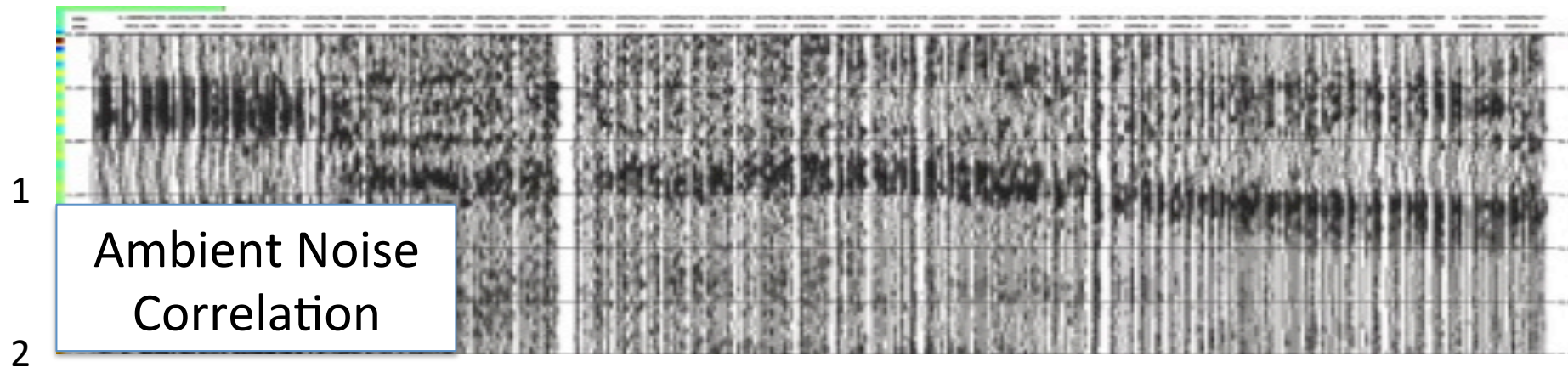
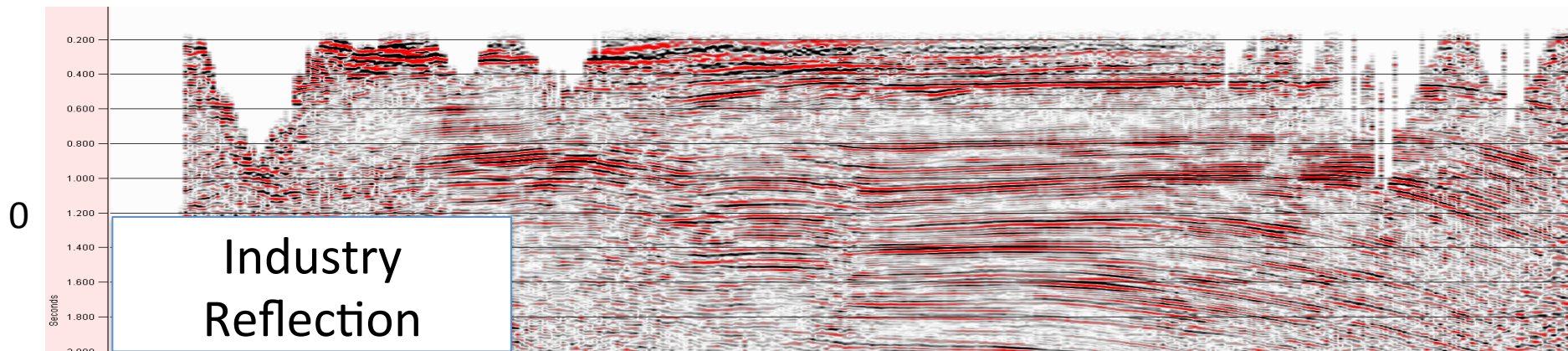
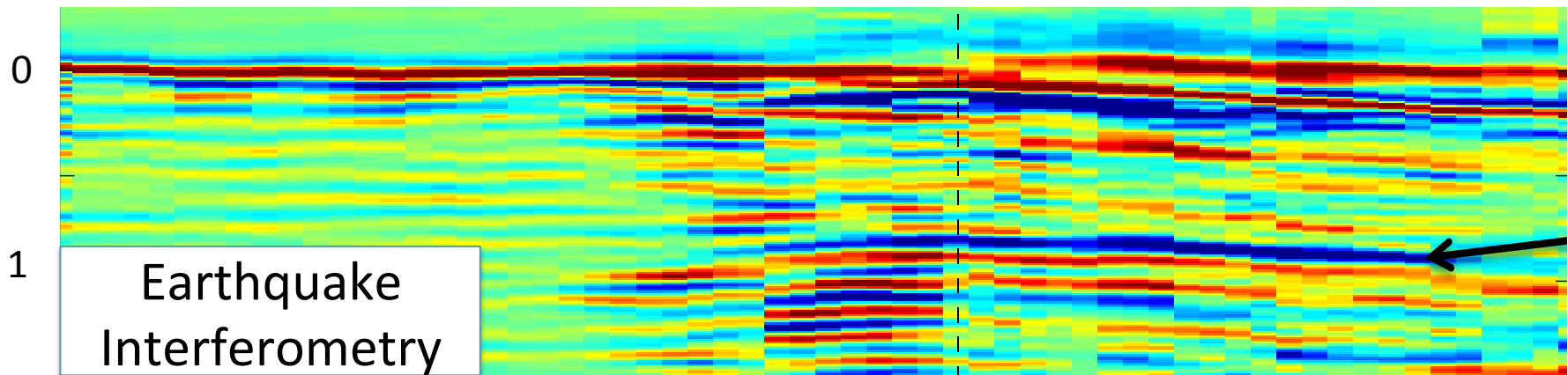


Ambient Noise Correlation

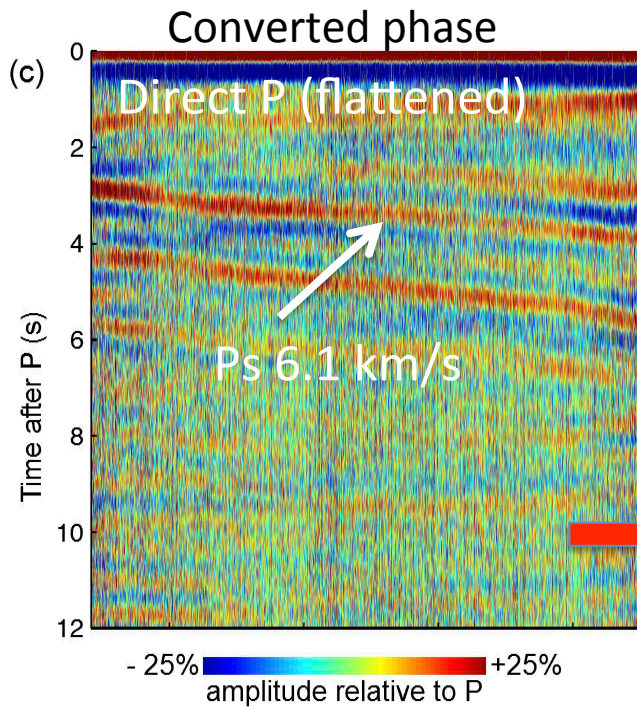
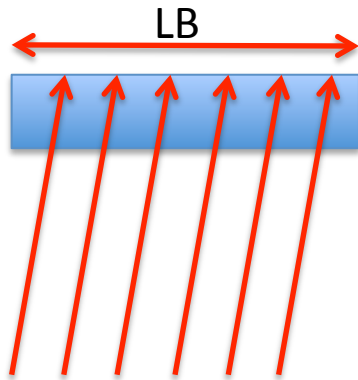


Phase Velocity Maps

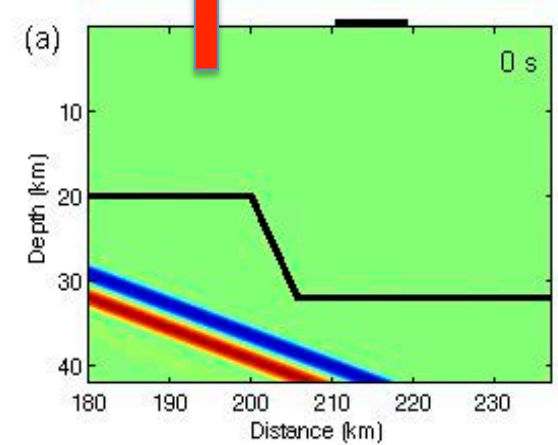
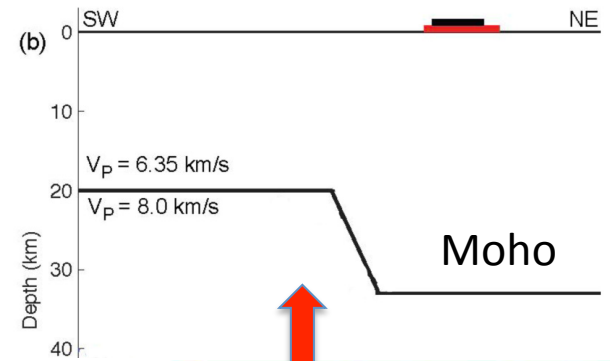
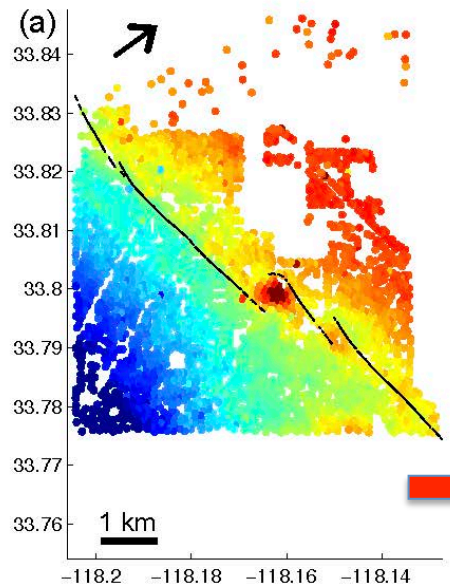




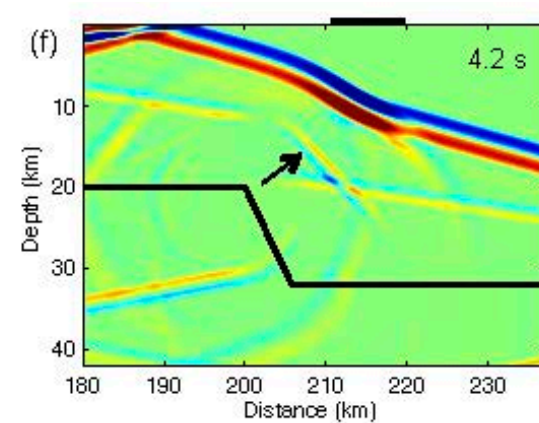
Deep Structure Teleseismic Waves



Traveltime Residuals

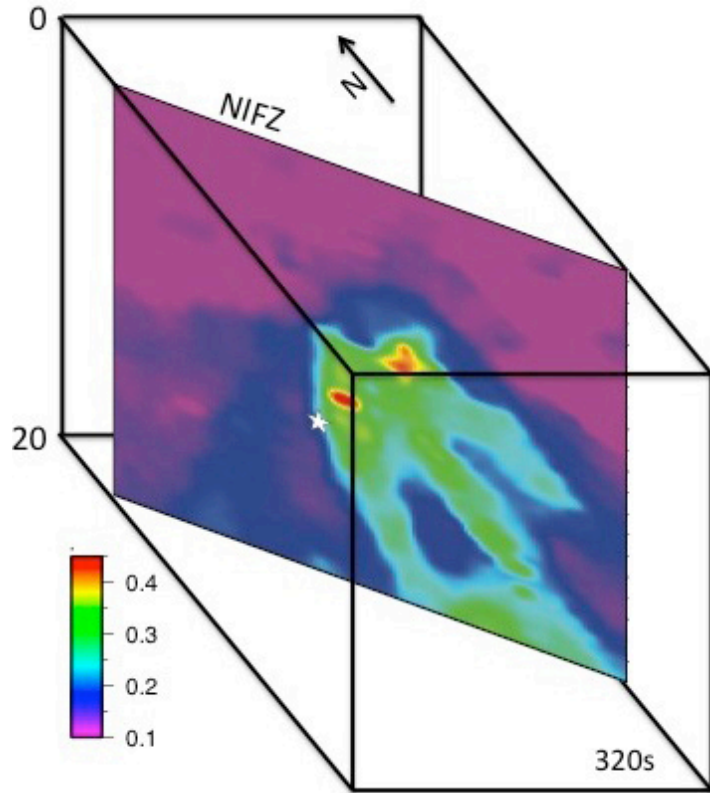


FD Modeling

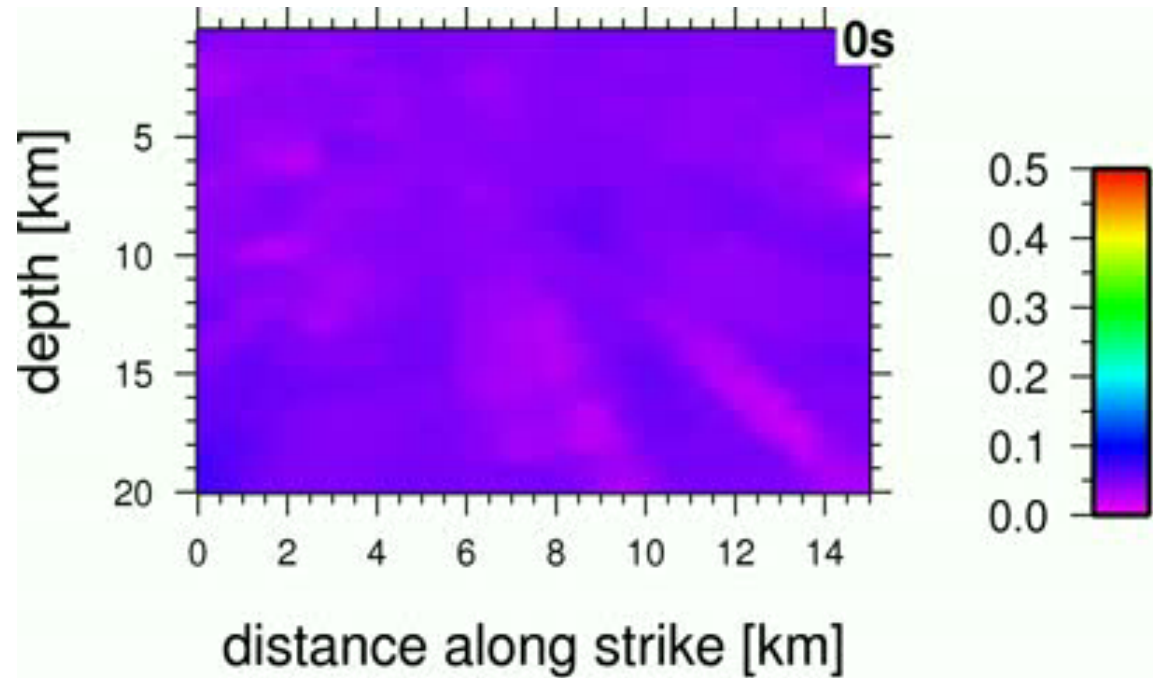


Mapping Fault Activity

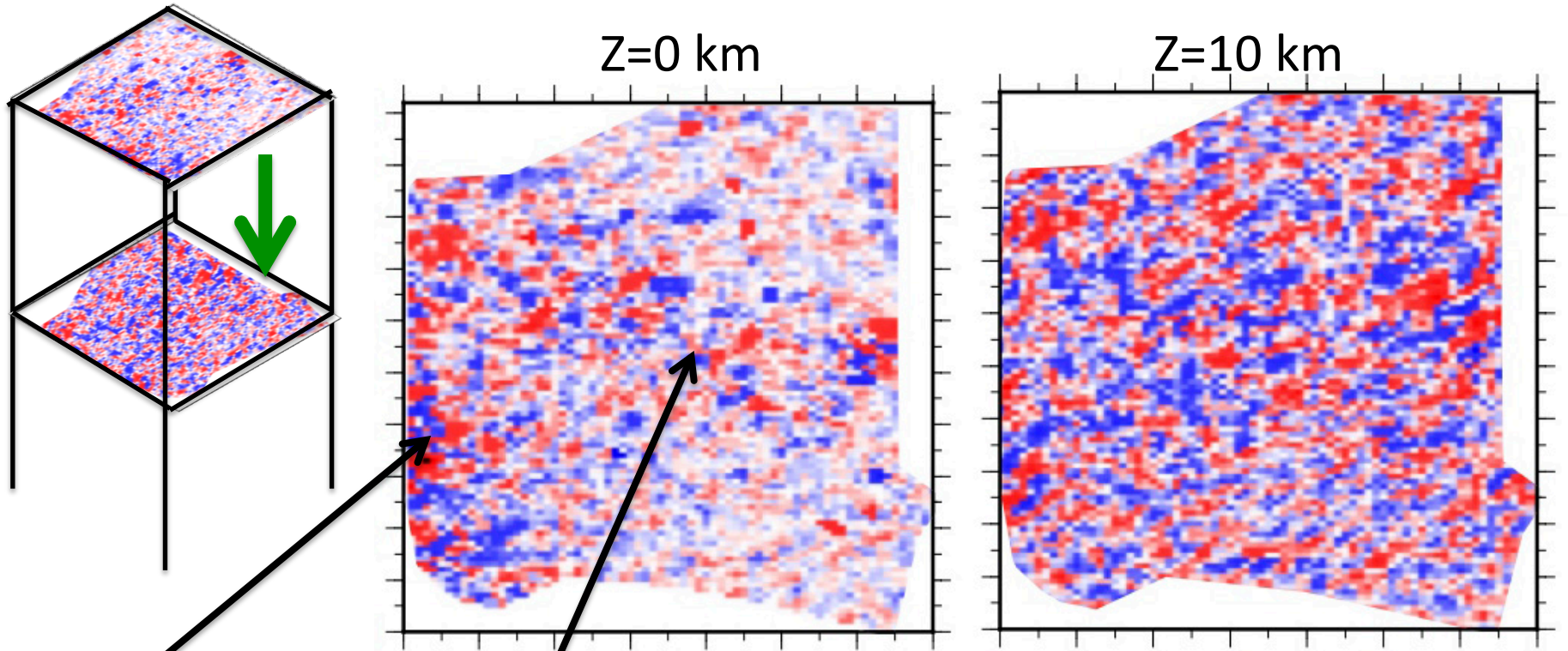
(back-projecting to a fault surface)



Newport-Inglewood Fault Zone



Downward Continue the Data



710 Fwy + Port

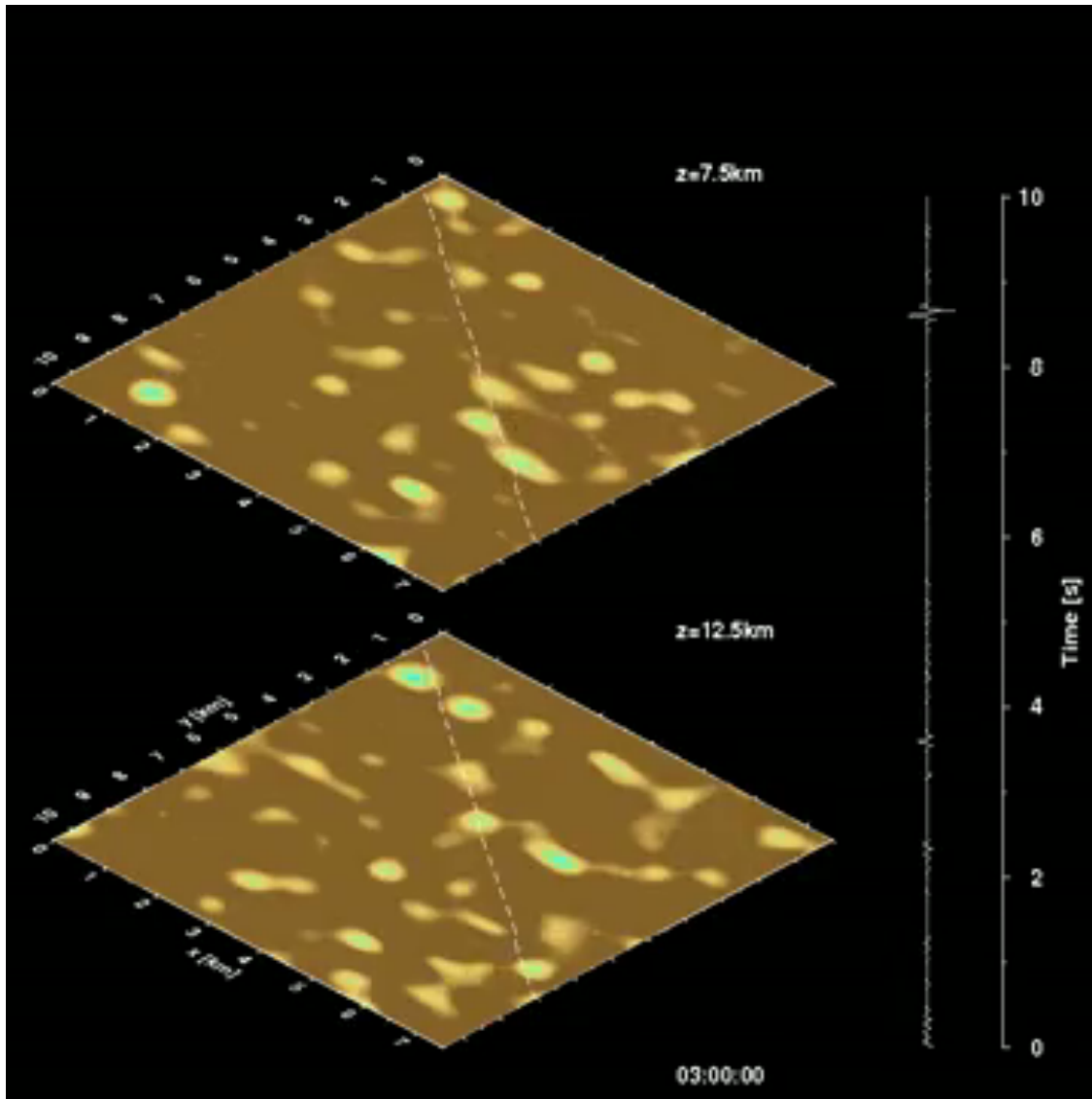
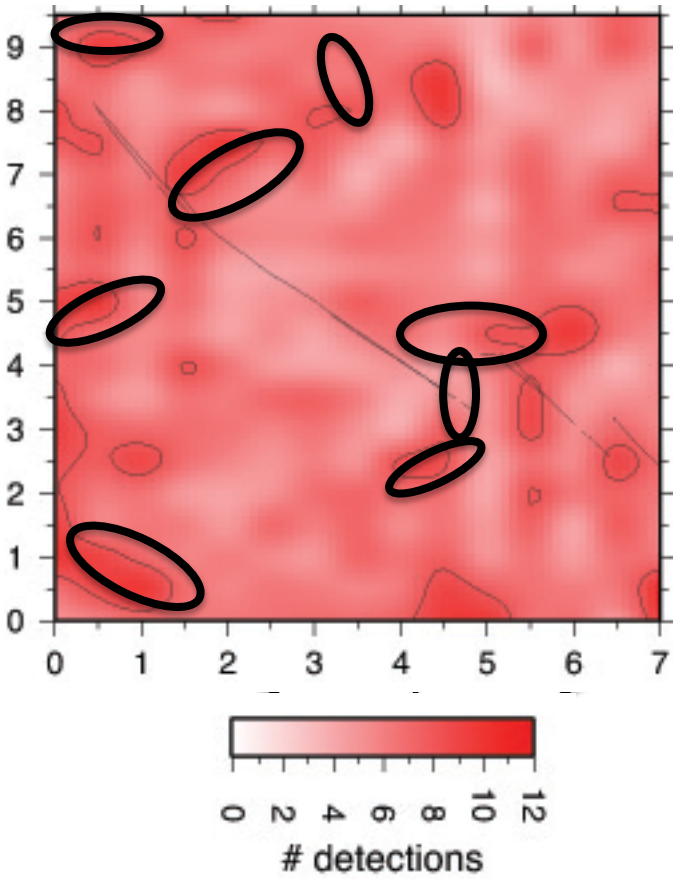
405 Fwy + Oilfield

Data: 5-10 Hz

FT Mesh: 0.1x0.1 km

Method: Phase-Shift (Gazdag, 1978) Method

Back-projecting to a volume

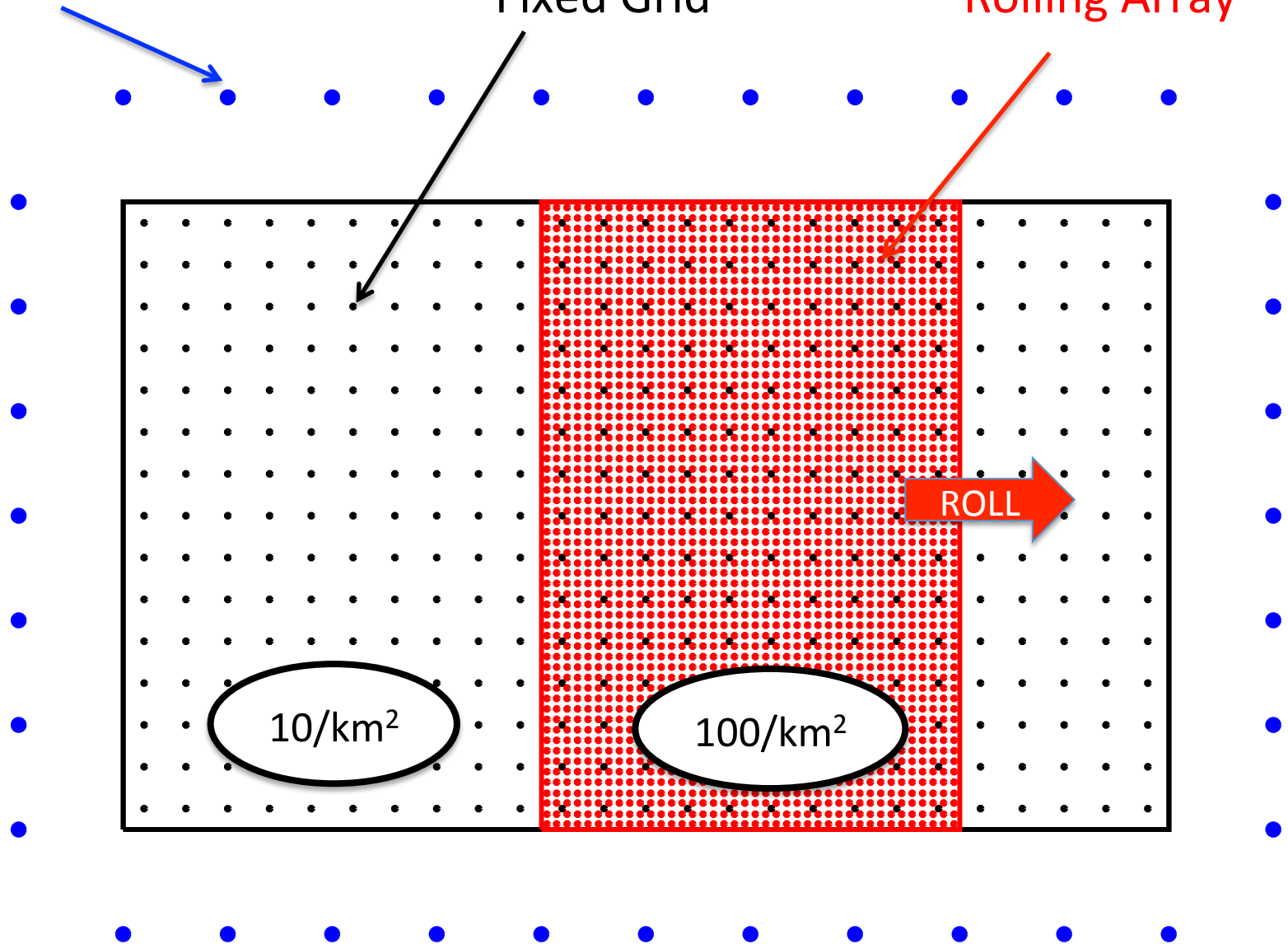


Possible Modifications to Traditional 3D Surveys

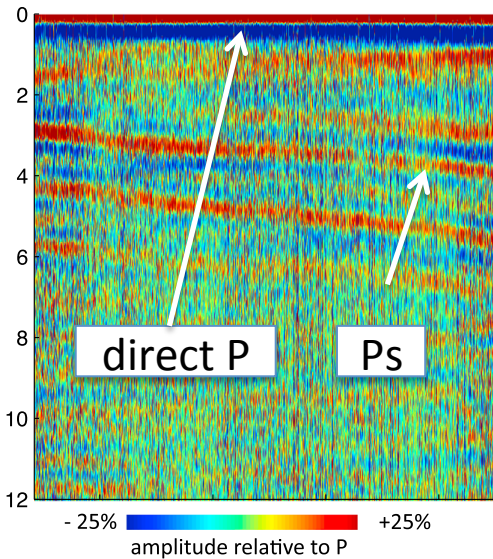
Outriders

Fixed Grid

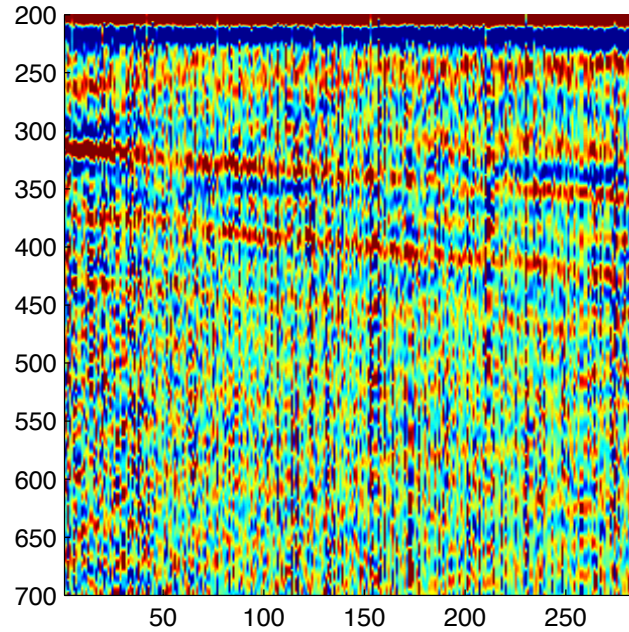
Rolling Array



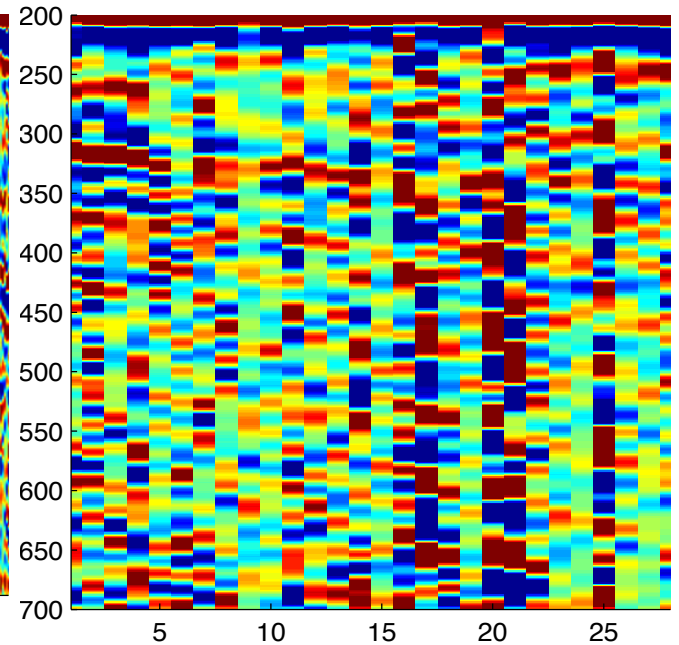
Array Density For Teleseismic Waves



100 stations/km**2

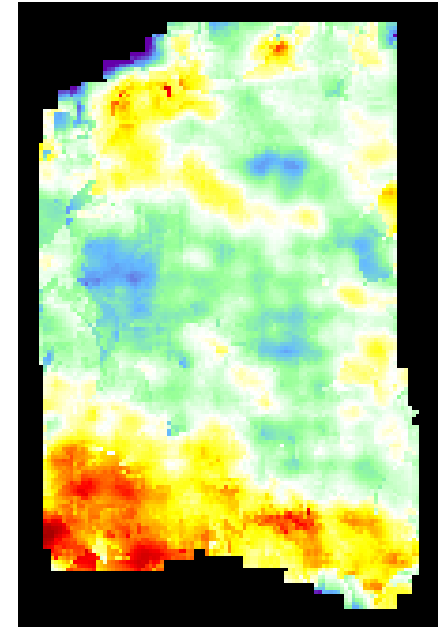
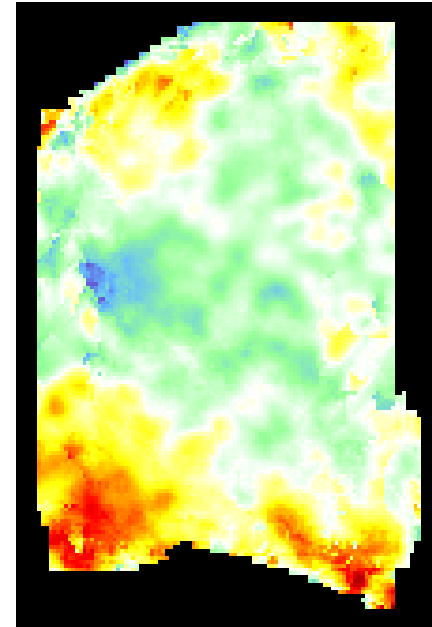
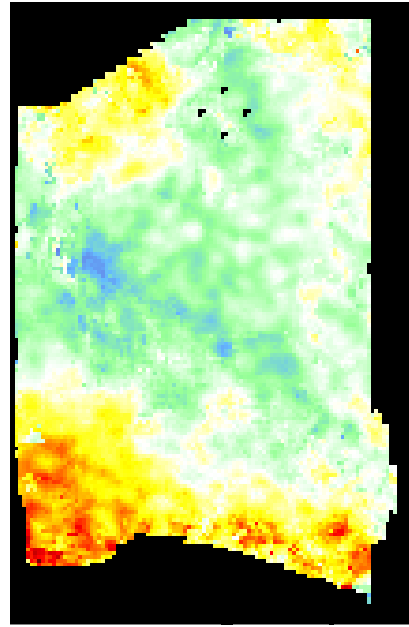
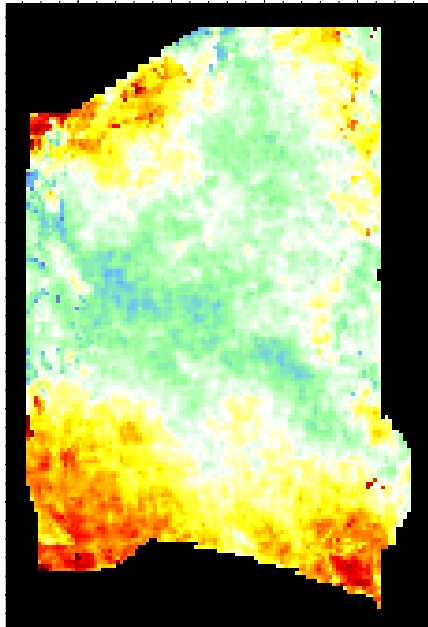
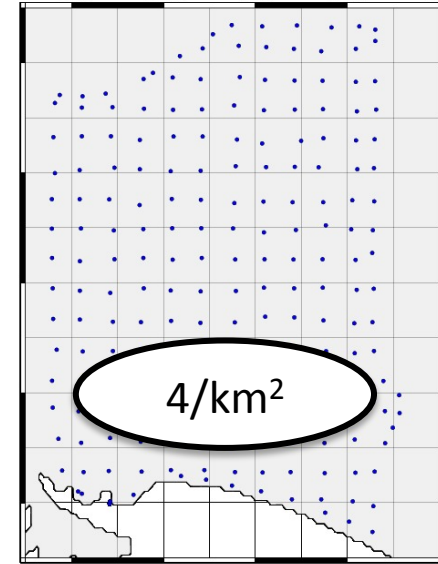
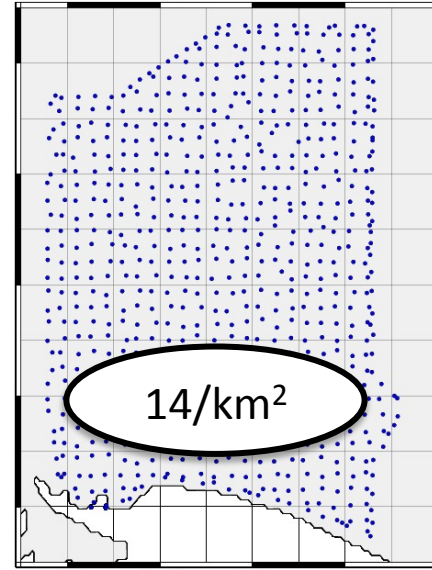
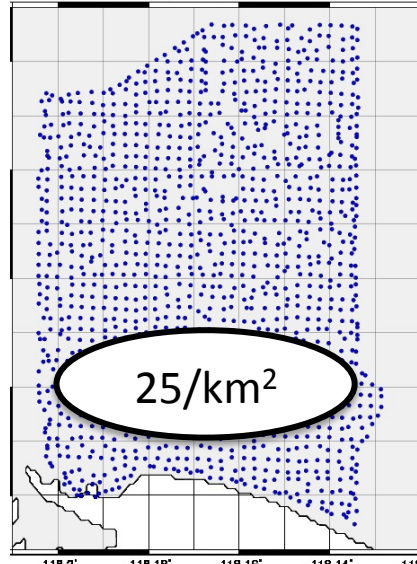
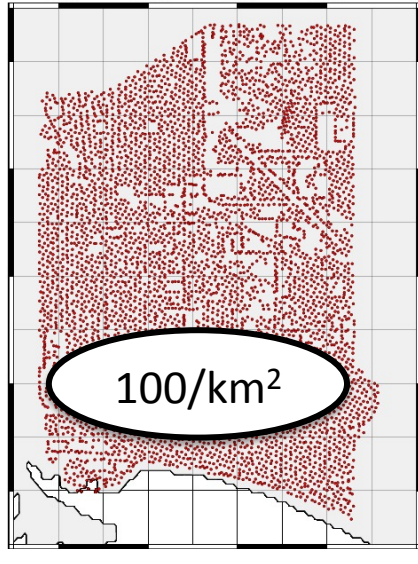


10 stations/km**2

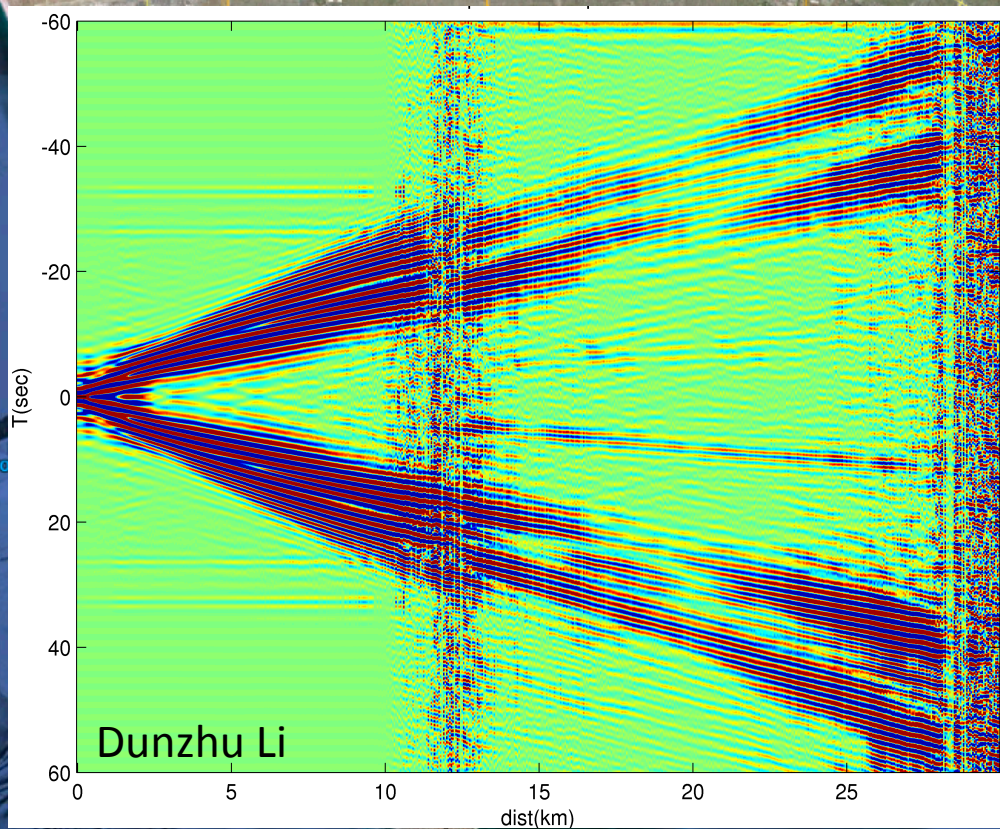


1 stations/km**2

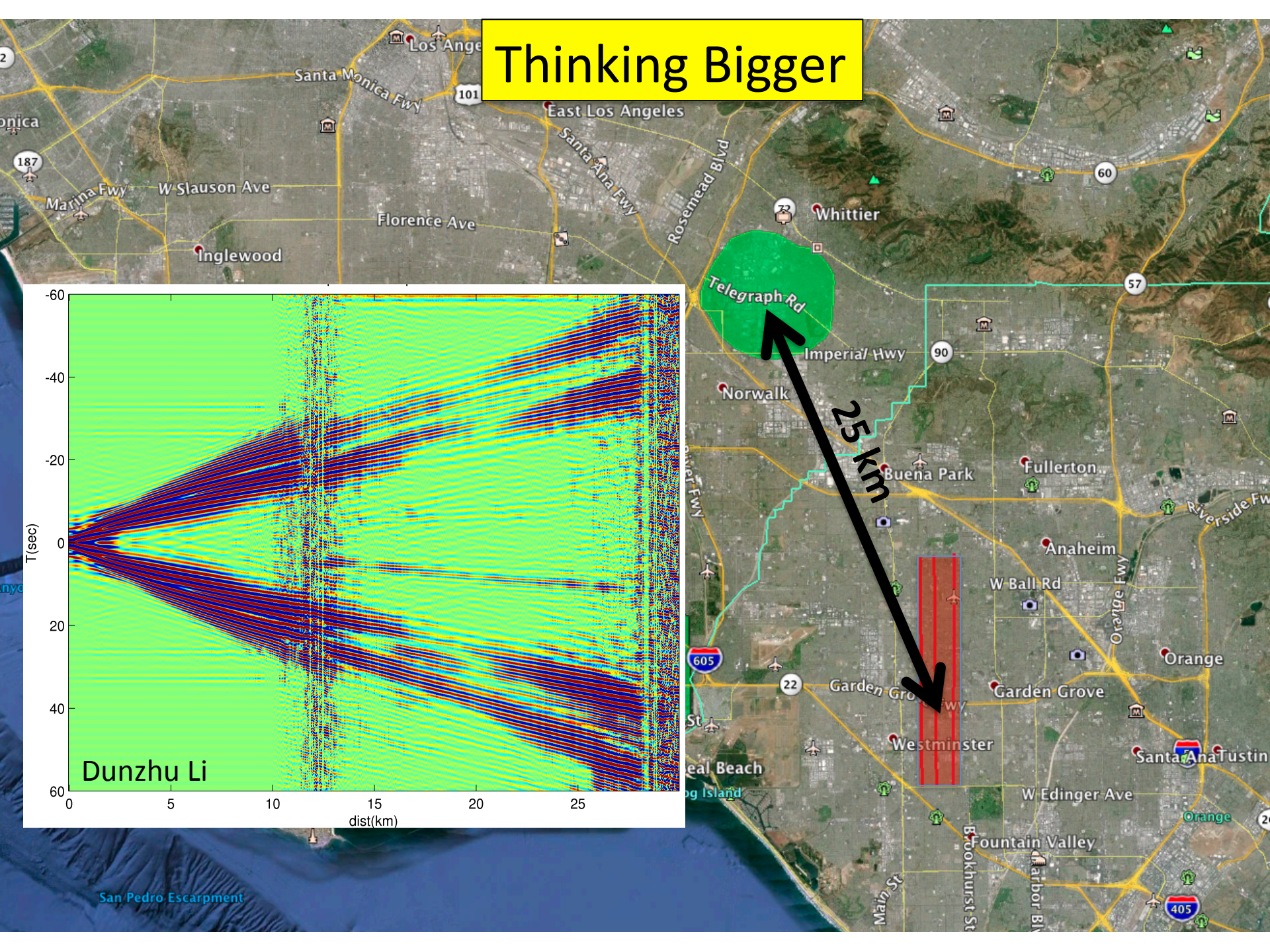
Array Density for Shallow Velocity Estimation



Thinking Bigger



25 km



A Proposal

Los Angeles Basin

1800 km² - 18,000 sensors



