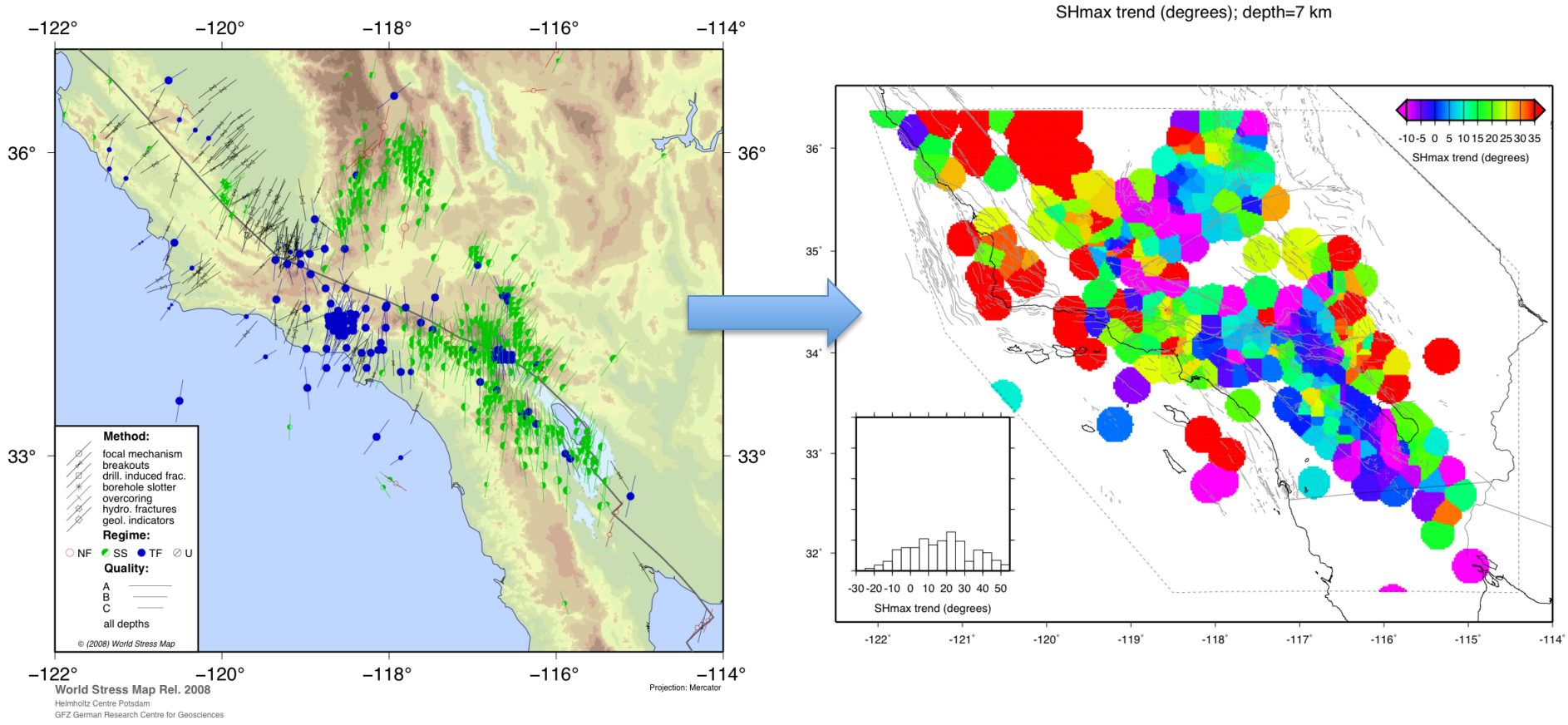
Model 1: The World Stress Map (WSM) with minimal outlier adjustment.

- Outliers in the WSM data are identified, and adjusted as far as possible (within their WSM error estimates) to agree better with their neighbors.
- Points are assigned the SHmax orientation of the nearest WSM data point, up to 20 km distance.
- SHmax only, varies only slightly with depth, spatial resolution varies with WSM data spacing.
- Assumption: the WSM data and uncertainty are correct.



Model 2: Stress Inversion from Focal Mechanisms.

- Focal mechanisms from Southern California (Yang et al., BSSA 2012), Central California Coast (Hardebeck, BSSA 2010), and Parkfield area (Thurber et al., BSSA 2006) earthquakes.
- Earthquakes binned in cubes of variable size depending on the earthquake density, side of cubes range exponentially from 2 km to 32 km.
- Earthquakes are inverted with damping between adjacent bins (SATSI: Hardebeck and Michael, JGR 2006) to minimize spatial stress variations not strongly required by the data. SATSI code adapted to allow damping between adjacent bins of different sizes.
- Uncertainty from bootstrap resampling, including switching nodal planes.

Model Characteristics:

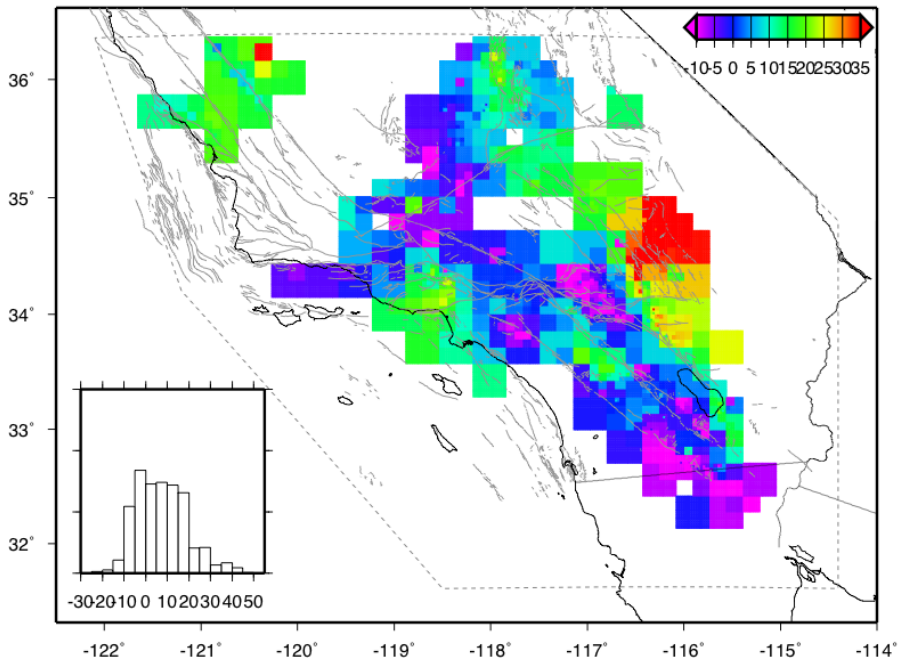
- A 3D model, but varies only slightly with depth.
- Stress tensor reported, but only the orientations of the axes and the stress ratio phi=(σ2-σ3)/(σ1-σ3) are meaningful. No stress magnitude information.
- Variable resolution, varies with density of seismicity. Bin size 2-32 km, but damping means that actual resolution may be larger.

Assumptions & Sensitivity:

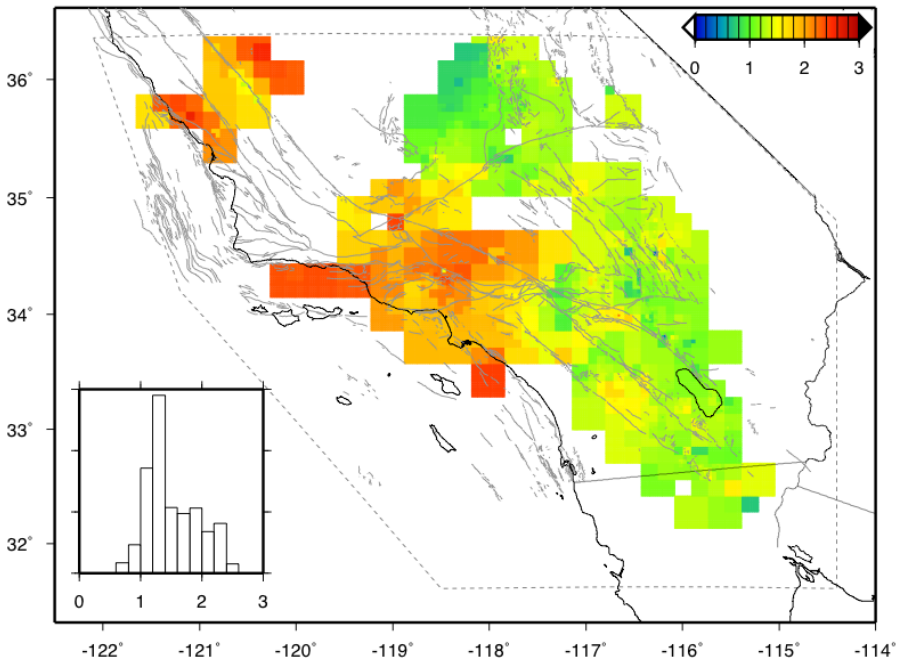
- Assume small earthquakes slip in the direction of applied shear stress on their fault plane.
- Assume relatively homogeneous stress field over the temporal duration of the catalogs and the spatial extent of the bins. As long as any heterogeneity is of smaller amplitude than the average stress, stress inversion returns average stress tensor (Michael, JGR 1991). Michael (1991) developed misfit threshold to test for too much heterogeneity, this model is below the threshold.
- These types of models are not very sensitive to binning choices (Hardebeck and Michael, JGR 2004).

Model 2: Stress Inversion from Focal Mechanisms.

SHmax trend (degrees); depth=7 km



A_phi; depth=7 km



phi=(σ2-σ3)/(σ1-σ3)

Aphi=phi	0-1 : normal faulting (σ1 most vertical)
Aphi=2-phi	1-2 : strike-slip faulting (σ2 most vertical)
Aphi=2+phi	2-3 : reverse faulting (σ3 most vertical)