

# MODELING GPS DATA ALONG THE SOUTHERN SAN ANDREAS FAULT

2012 SCEC San Gorgonio Pass Workshop

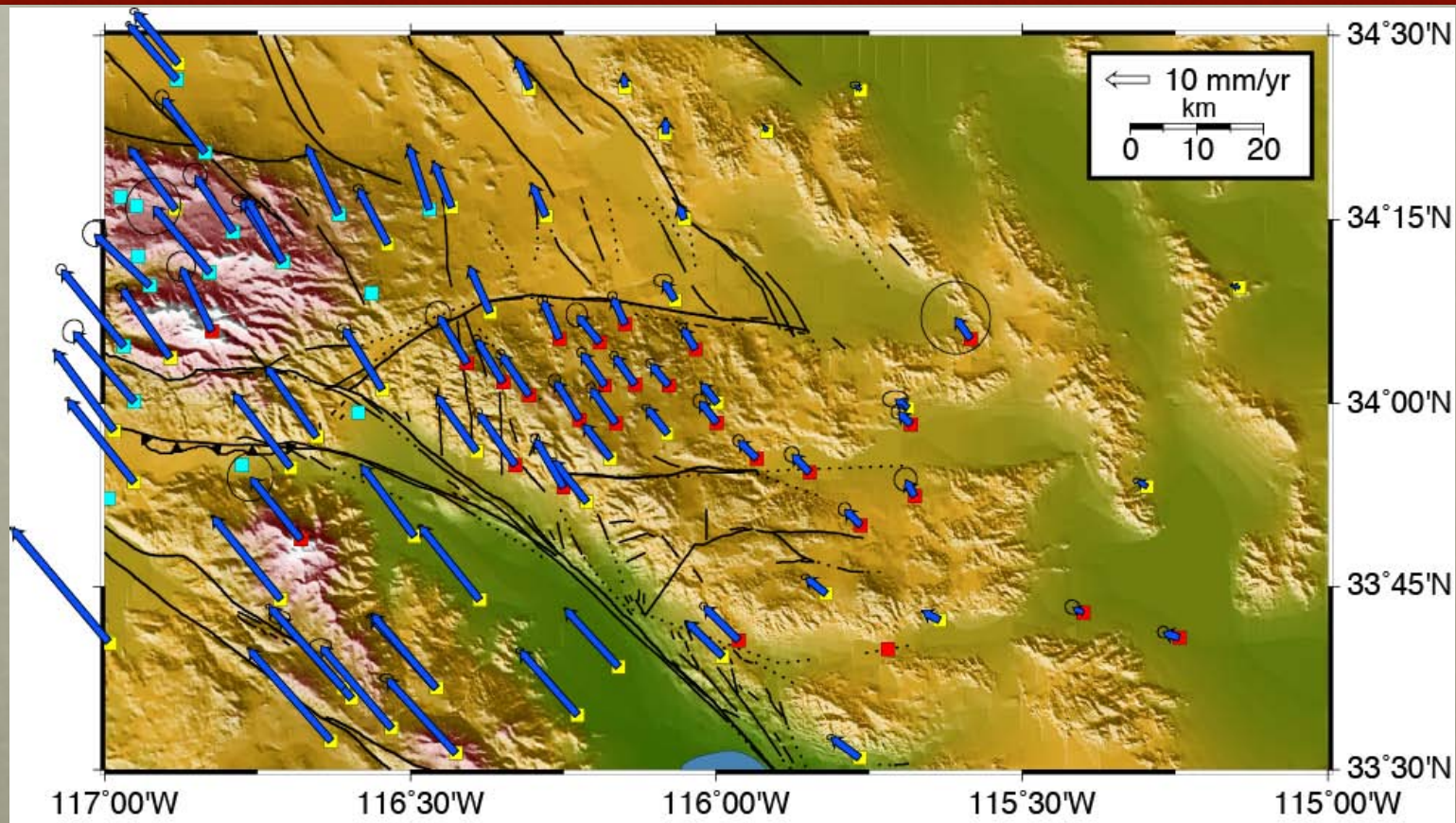
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# OUTLINE

- Modeling GPS data from two regional campaign GPS networks
  - JOIGN - Joshua Tree Integrative GPS Network
    - *See Spinler et al., 2010, JGR, for further information*
  - SBM - San Bernardino Mountains GPS Network
- Current distribution of GPS stations in the San Gorgonio Pass region
- Where do we go from here?

# JOIGN GPS VELOCITY FIELD

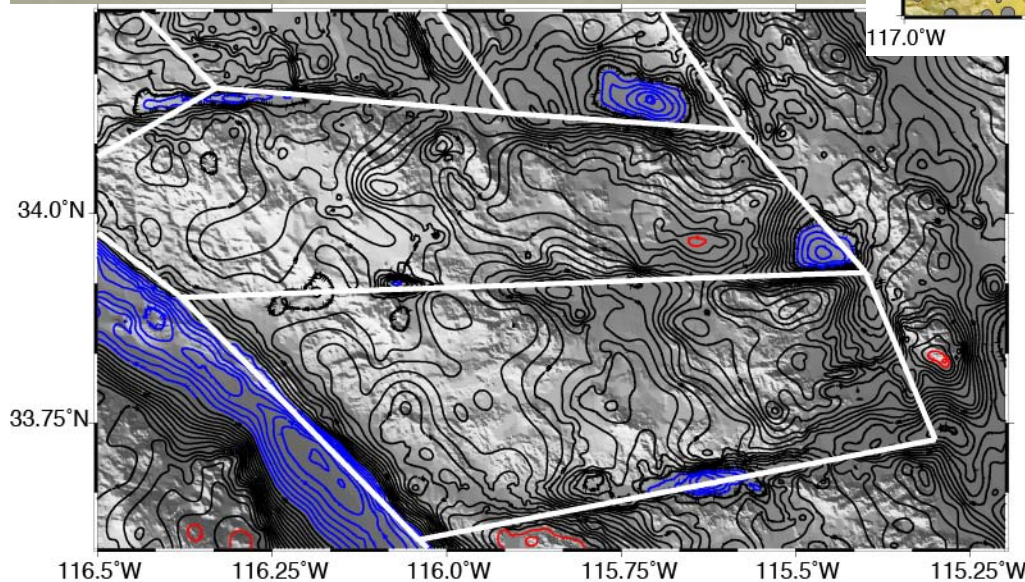
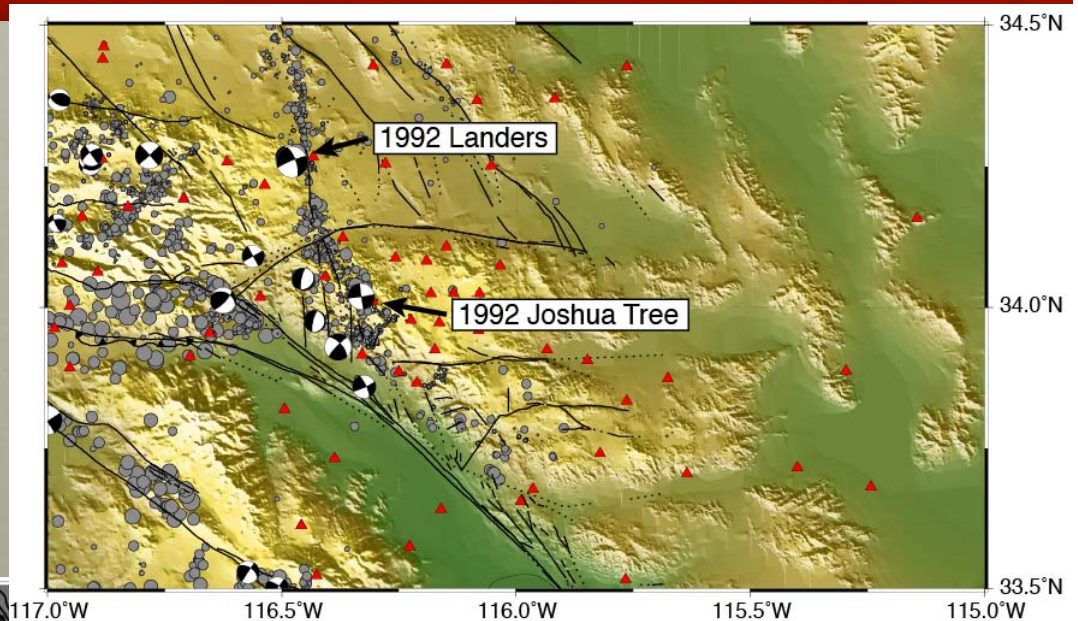


- Network: 36 Campaign GPS sites and 46 Continuous GPS sites
- JOIGN data collected tri-annually between fall 2005 and fall 2008
- SBM data spans 2002-2008, 2-6 observations at each of the 9 sites, roughly annually
- CGPS data spans 1994-2009.5

*From Spinler et al., 2010 JGR*

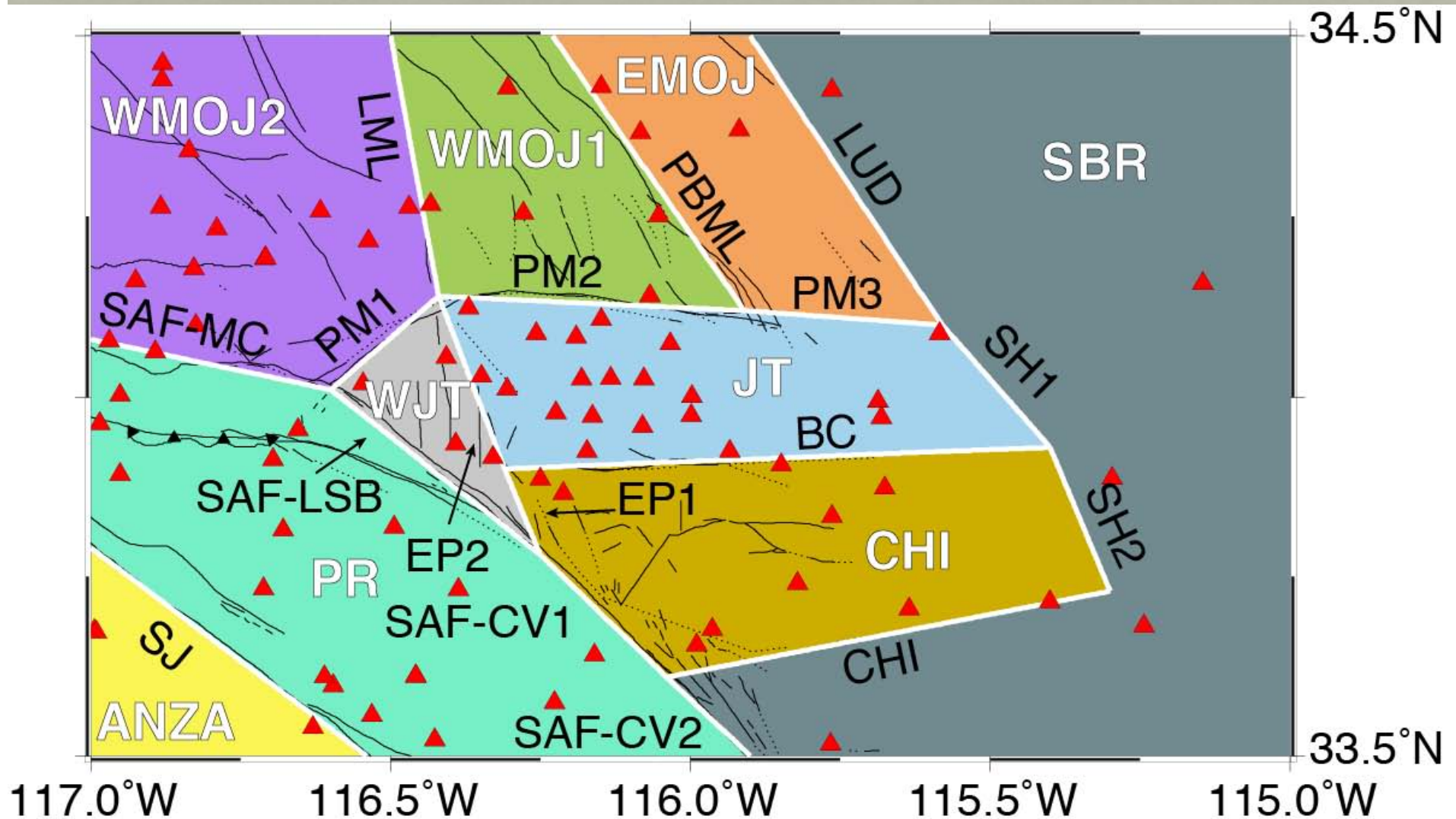
# CRUSTAL BLOCK MODELING

- Selection Criteria for Crustal Blocks:
  - Mapped faults
  - Mapped Gravity anomalies
  - Observed Seismicity

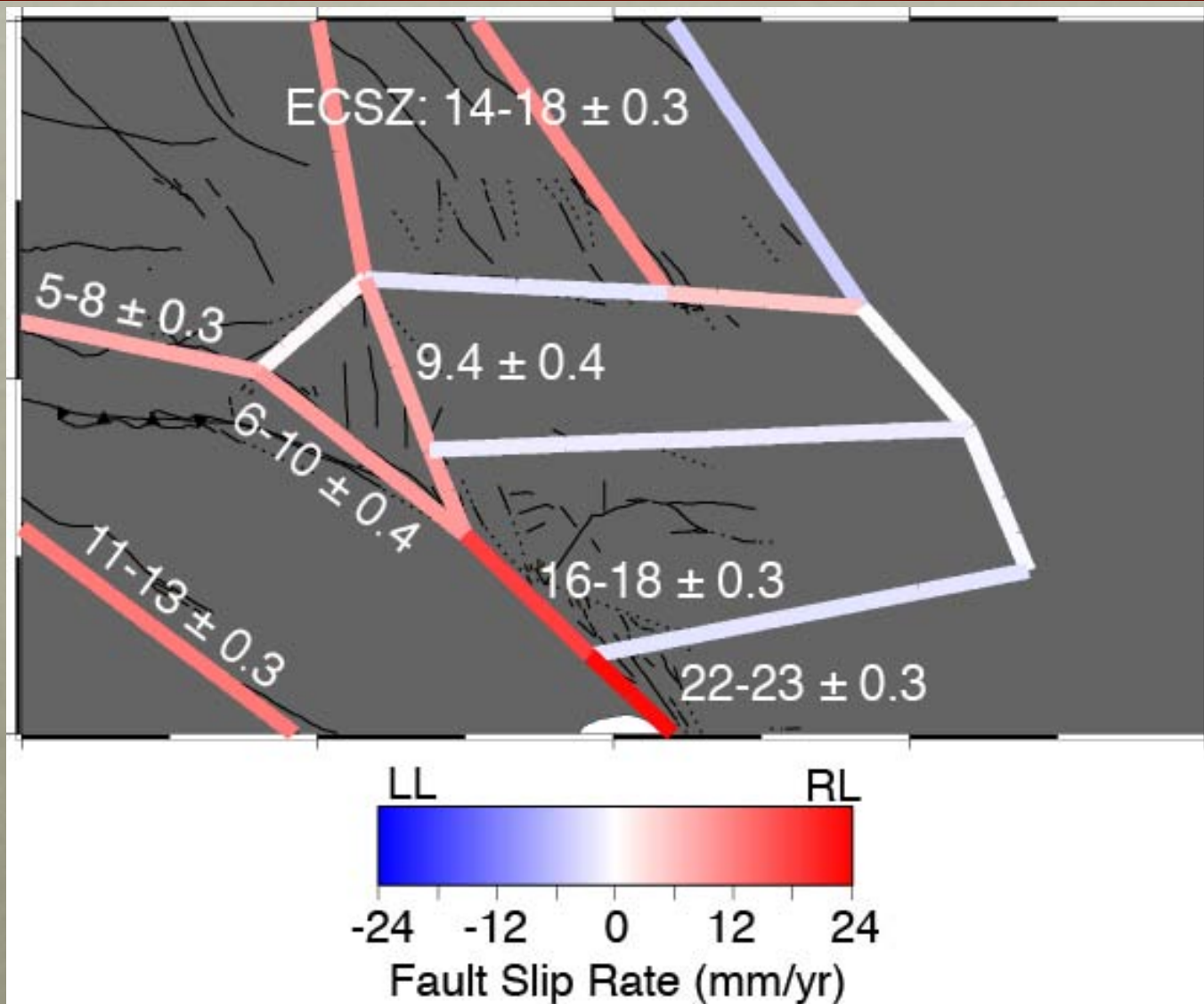


*Gravity data from Langenheim et al., 2007*

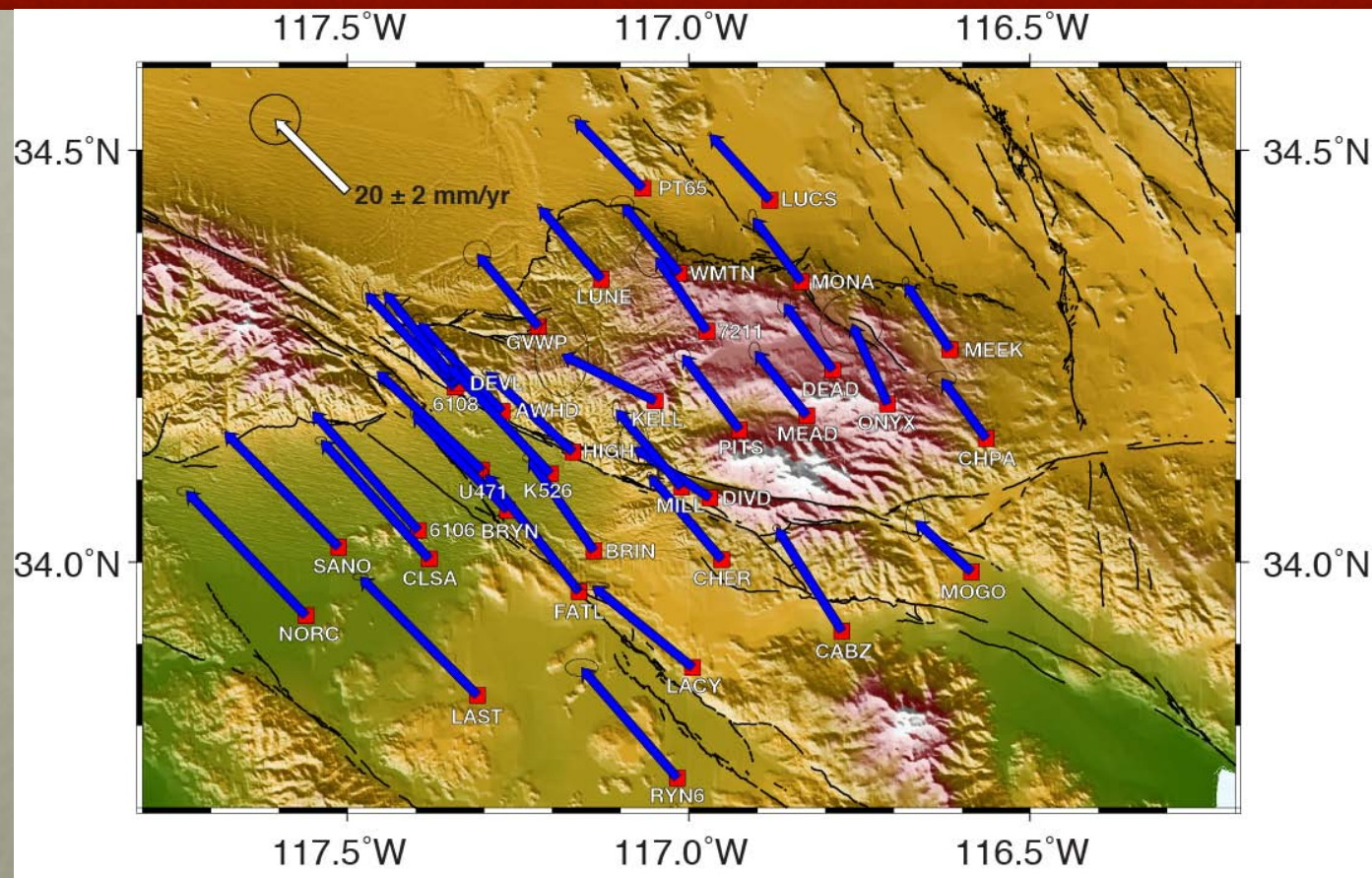
# PREFERRED FAULT MODEL



# FAULT SLIP RATE ESTIMATES

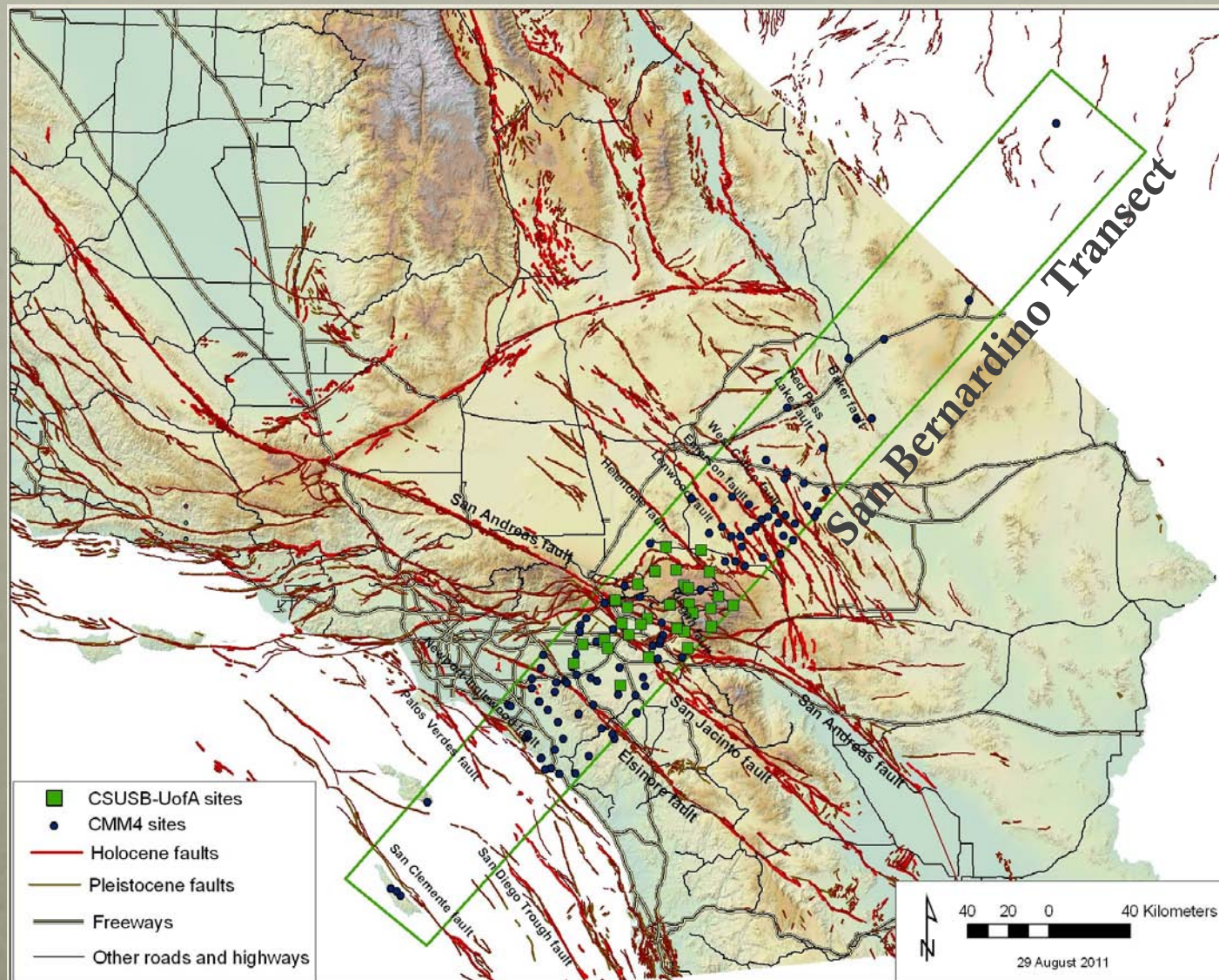


# SBM GPS VELOCITY FIELD

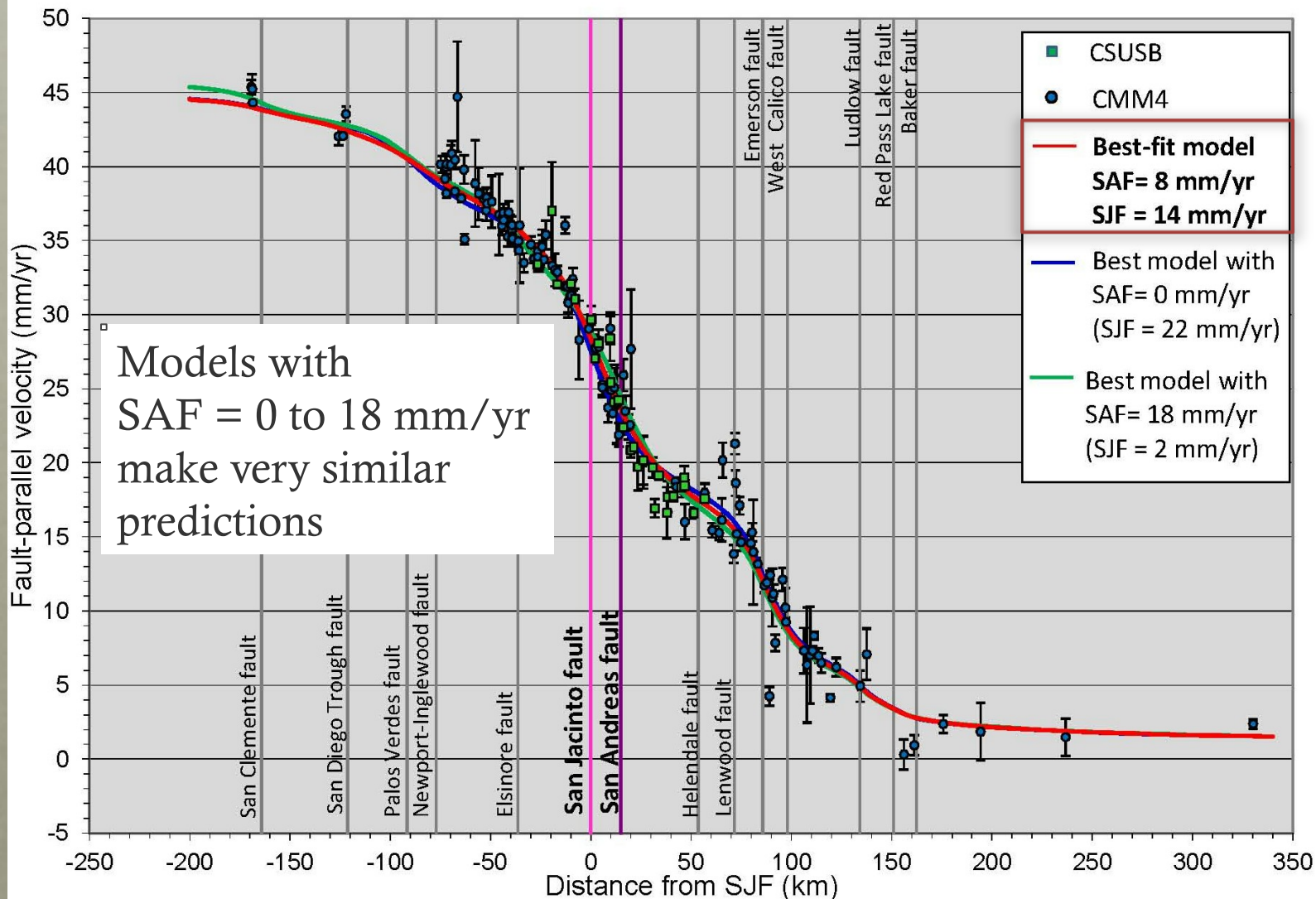


- 35 total campaign sites with at least 2 observations spanning at least 2 years
- Data spans 1993-2011
  - Most data collected in 2 periods: 2002-2005 (NW transect) and 2008-2011 (SBM and SE transect)

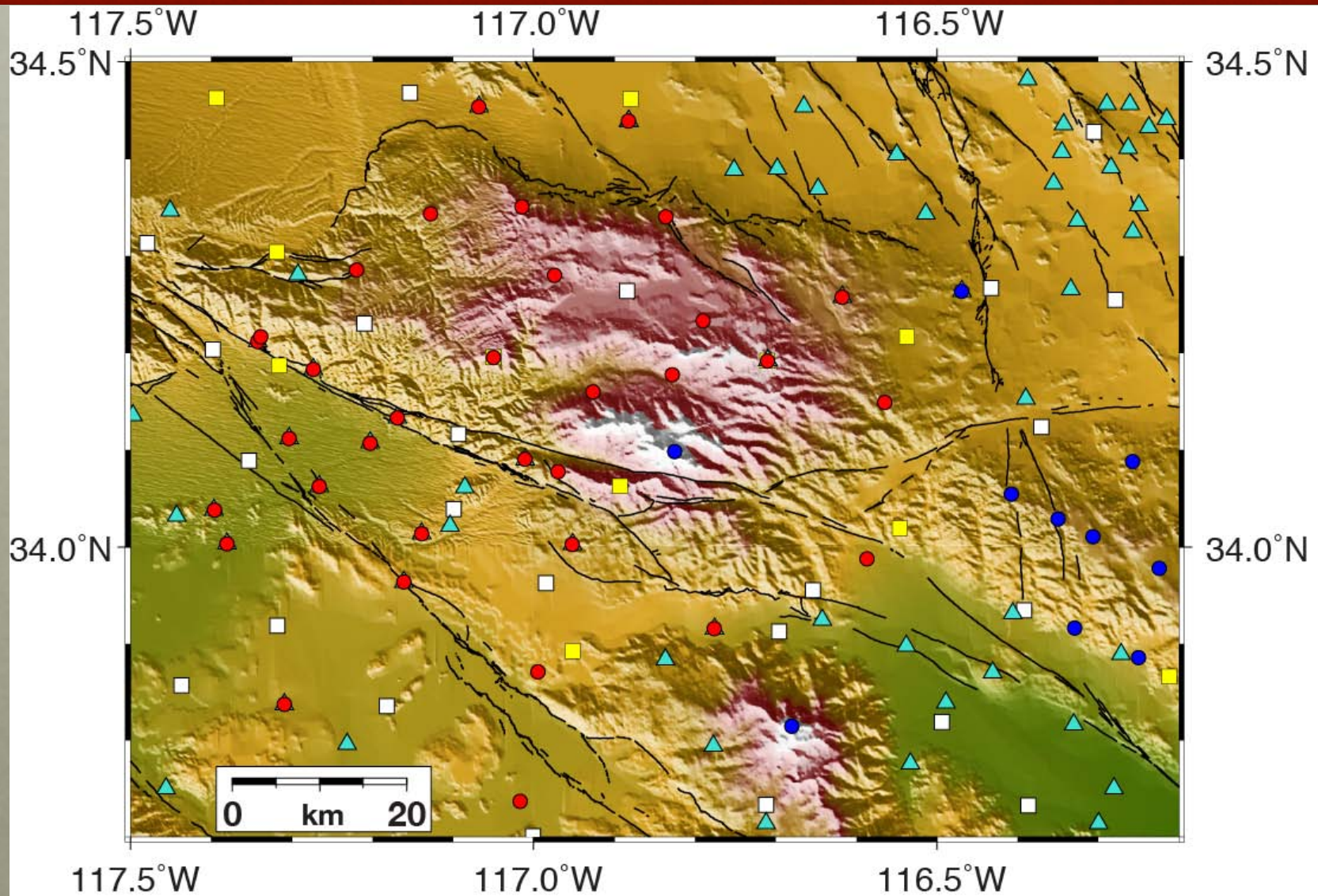
# 1D FAULT MODELING



# SAN BERNARDINO TRANSECT



# GPS SITES

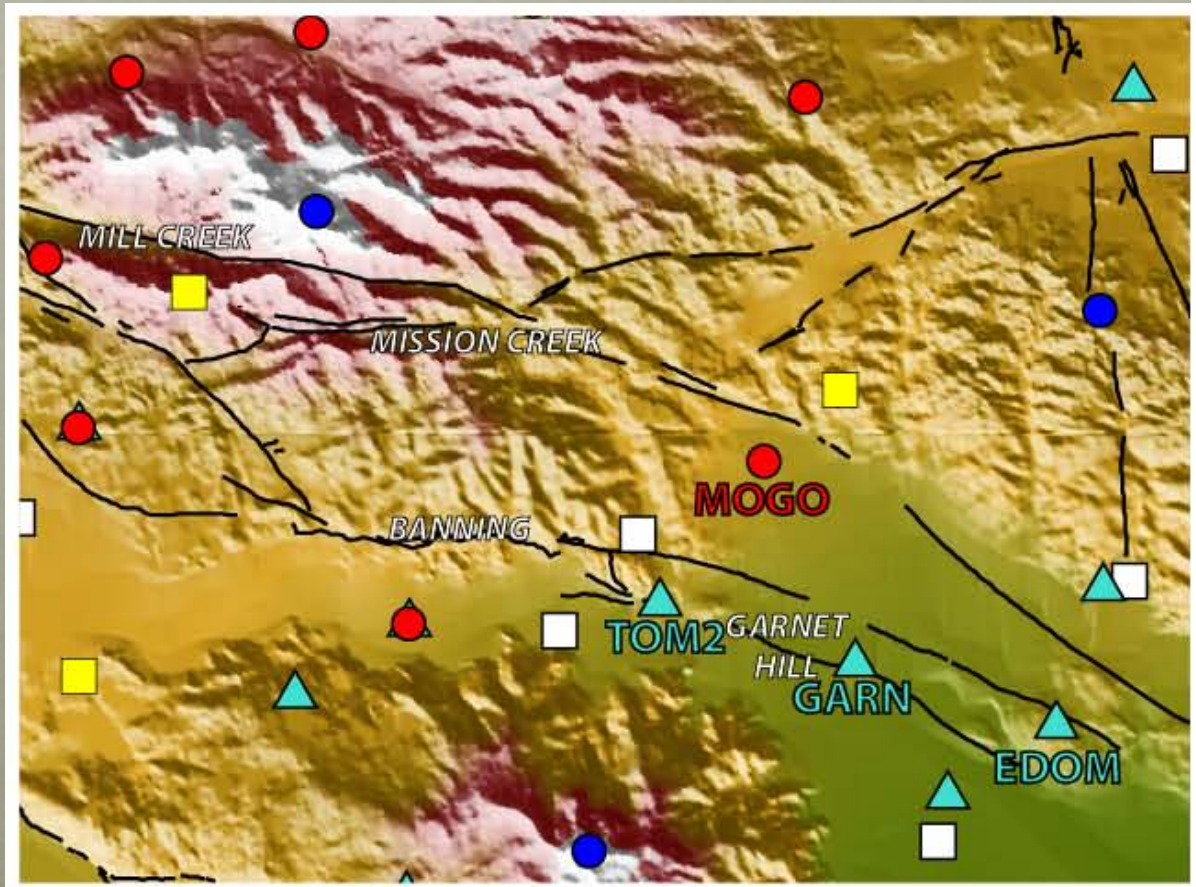


# DISCUSSION POINTS

- **Need more campaign sites to better resolve slip distribution within the San Gorgonio Pass region**
  - Mission Creek vs. Banning strands
  - Banning vs. Garnet Hill faults
- Investigate transfer of strain between the San Andreas and San Jacinto faults in the Crafton Hills/San Timoteo Badlands region
- More observations are needed to apply campaign datasets to studies of vertical deformation

# SGP REGION

- Currently only 2 sites between Banning and Mission Creek strands of the San Andreas fault in SGP region
  - MOGO has 4 observations between 2008-2011
- Four campaign sites located near Garnet Hills/Banning fault zones
  - Sites TOM2 and EDOM have multiple observations between 1993-2000
  - Site GARN only has observations in 1993

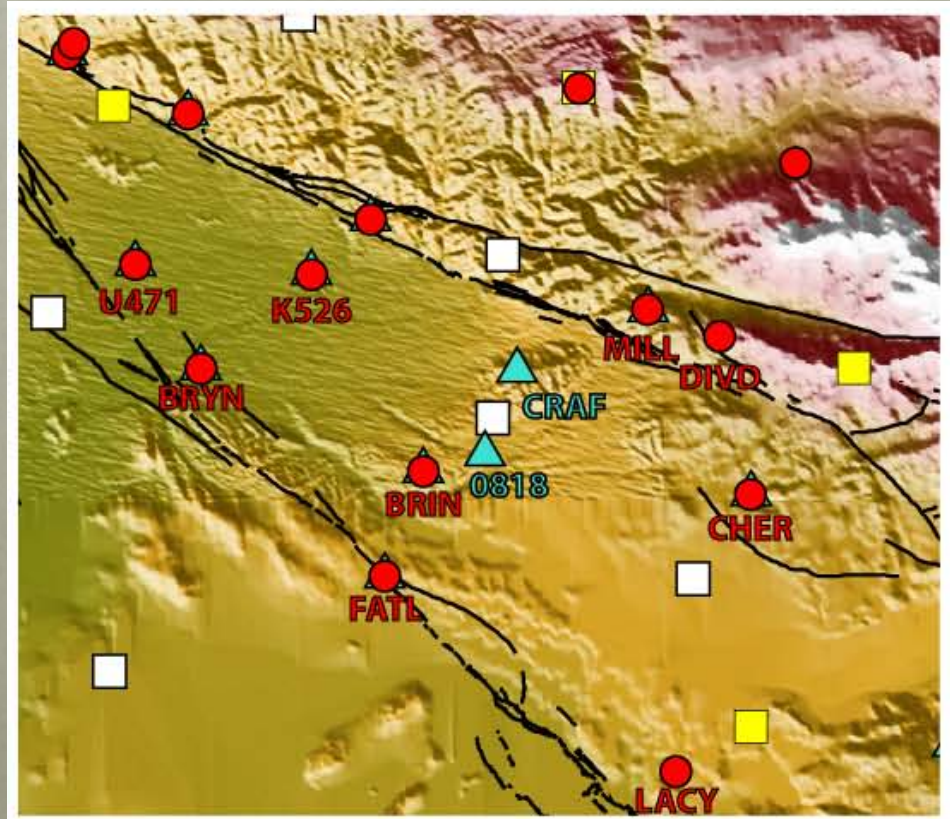


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# CRAFTON HILLS / SAN TIMOTEO BADLANDS

- Currently have 2+ years of data from sites in the **SBM** network
  - Data primarily spans 2002-2005 and 2008-2011
- Site **0818** has 17 observations between 1993-2000
- Site **CRAF** hasn't been observed since 1993



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# VERTICAL VELOCITY

