

San Jacinto Fault Zone

Frank Vernon

IGPP, UCSD

HPWREN User Group
Meeting

SDG&E Mission Control

13 December 2012





San Jacinto Fault Zone

Oct 3, 2008 1:57 pm

Hemet

Garner Valley

Anza

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image © 2010 DigitalGlobe
Image County of San Bernardino

lat 33.573960 lon -116.642791 elev 4180 ft

©2009 Google™

Eye alt 19475 ft

San Jacinto Fault Zone

Oct 3, 2008 1:57 pm

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Garner Valley

Anza

Data SIO, NOAA, U.S. Navy, NGA, G

Image © 2010 DigitalGlobe
Image County of San Bernardin

lat 33.573960 lon -116.642791 elev 4180 ft

©2009 Google™

Eye alt 19475 ft

San Jacinto Fault Zone

Oct 3, 2008 1:57 pm



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Image © 2010 DigitalGlobe
Image County of San Bernardino
lat 33.580563 lon -116.661274 elev 4361 ft

Eye alt 6511 ft

San Jacinto Fault Zone



Oct 3, 2008 11:57 pm

Dec 31, 2009

Jan 1, 2010

© 2010 Google

Image © 2010 DigitalGlobe

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Imagery Date: Dec 31, 2005
Imagery Date: Dec 31, 2005

lat 33.582999° lon -116.660956° elev 4436 ft
lat 33.582999 lon -116.660956 elev 4436 ft

Eye alt 6168 ft
Eye alt 6168 ft

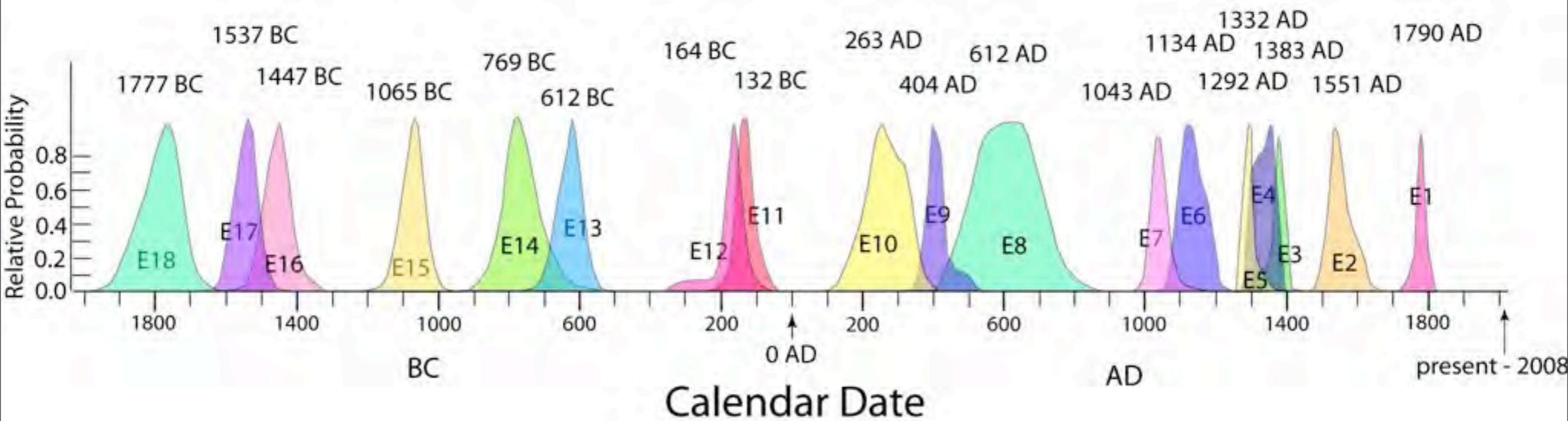
Burnt Valley



Clark Valley

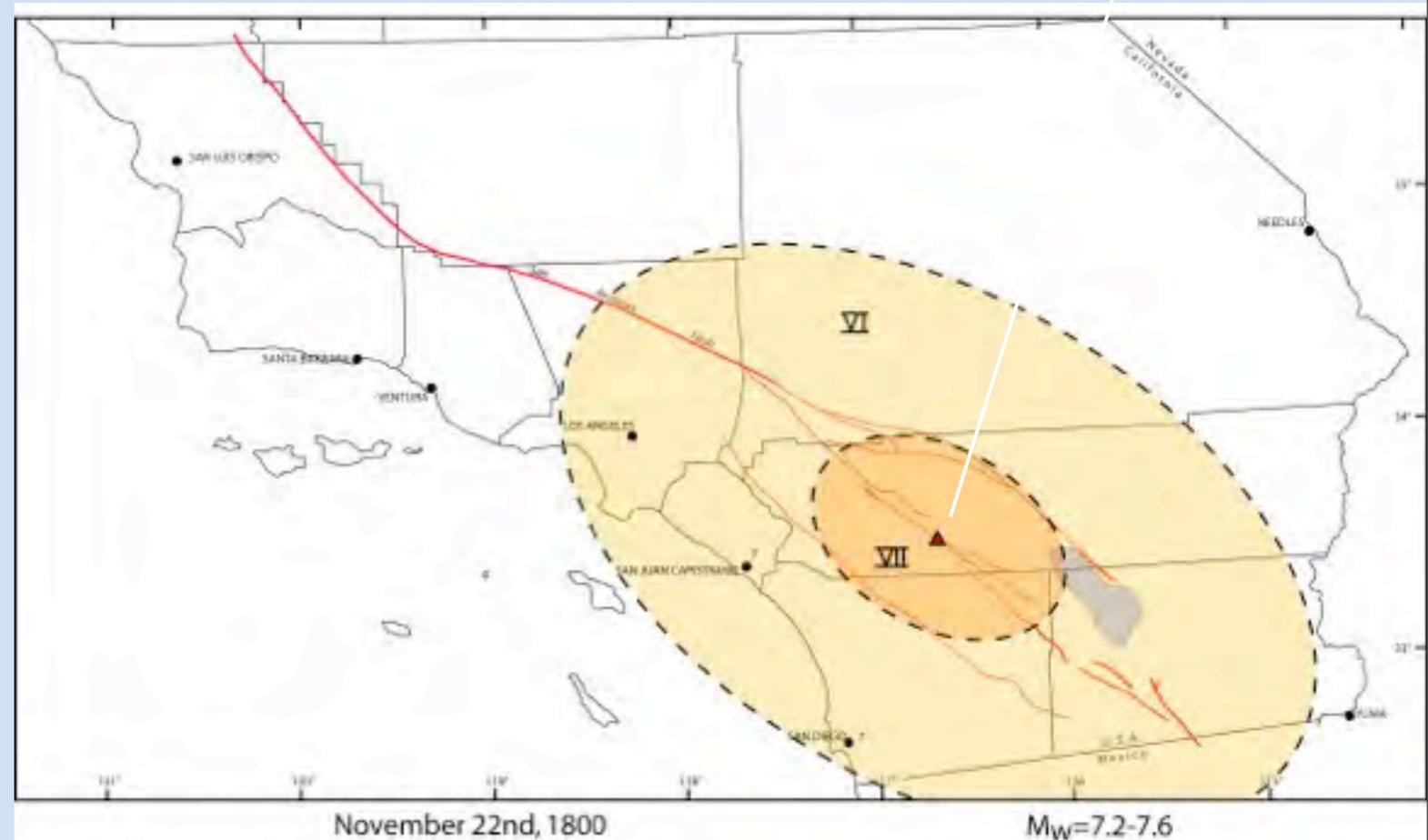


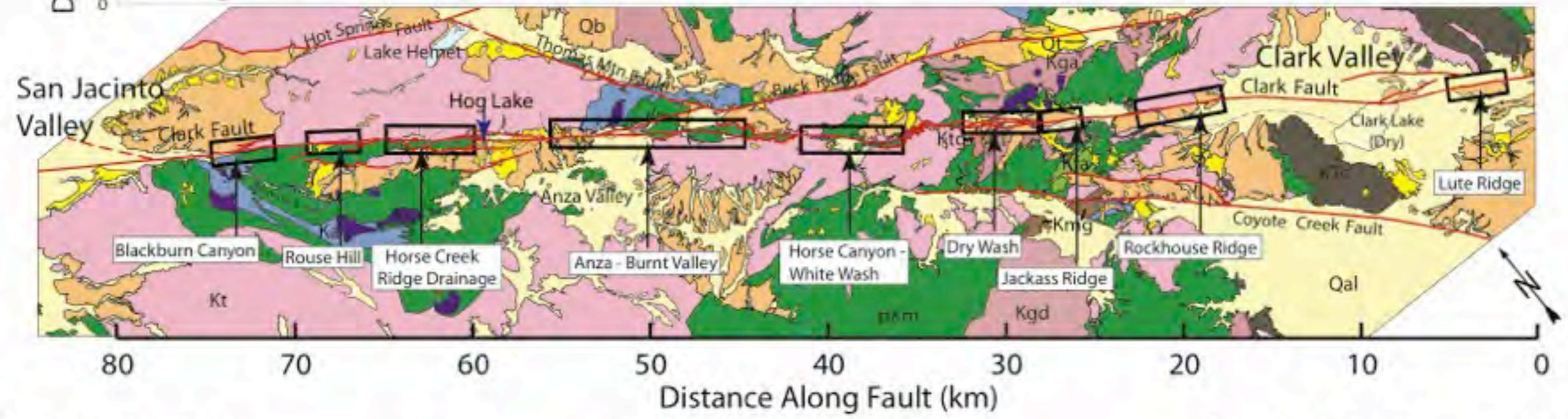
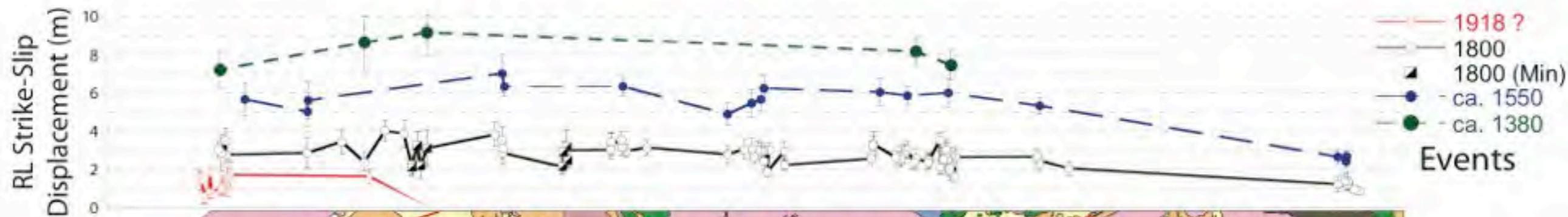
Surface ruptures at Hog Lake



Probability density functions, with calendar year intercepts.

MRE yields a date of ca 1790, which is almost certainly the historically reported earthquake on November 22, 1800





Metamorphic Rocks

Pre-
Mid-Cretaceous

- phn** Banded gneisses, gabbros, pegmatites, migmatites, and other intrusives

Plutonic Rocks

Mid-Cretaceous

- Kgd** Inequigranular granodiorite and adamellite
- Kga** Fine- to medium-grained biotite adamellite
- Ka** Medium-grained adamellite rocks
- Kga** Medium- to coarse-grained garnetiferous adamellite
- Gabbroic rocks**
- Kt** Medium-grained tonalitic rocks
- Ktg** Fine- to medium-grained biotite tonalite and granodiorite
- Kmg** Medium-grained granodioritic rocks

Cataclastic Rocks

Cretaceous or Tertiary

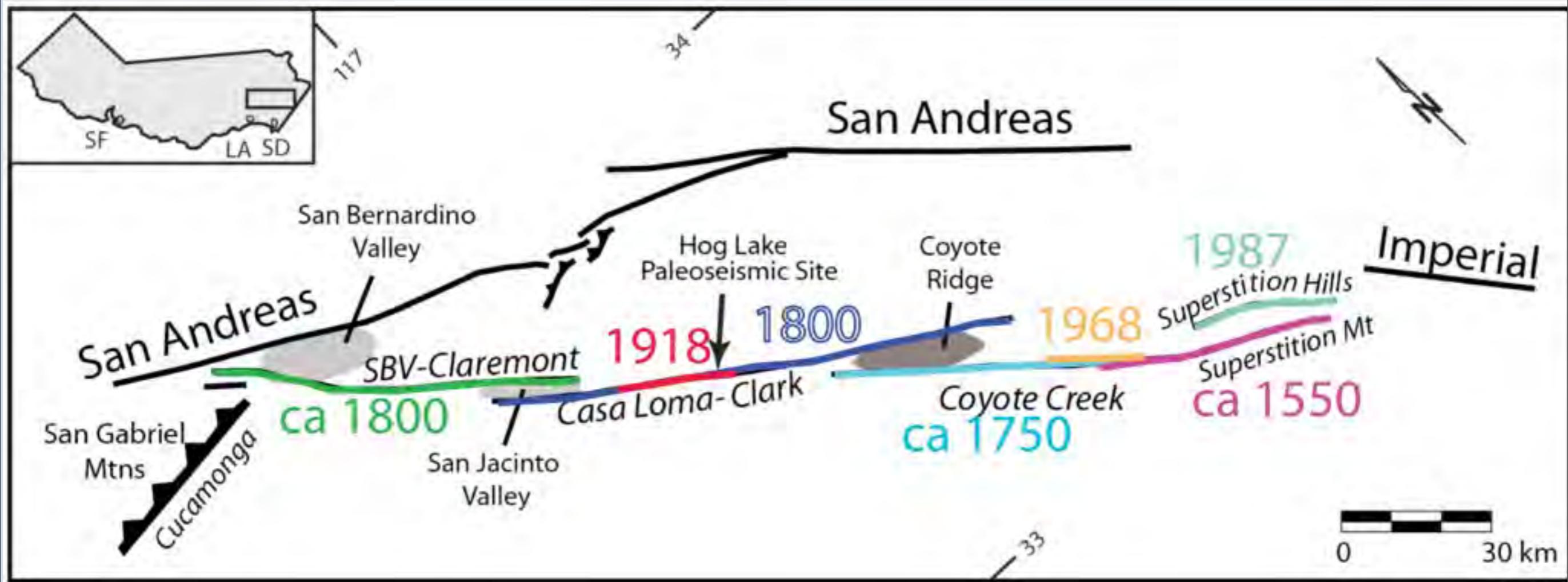
- Adamellite/Tonalitic augen gneiss and mylonite**

Sediments

Tertiary Quaternary

- Qal** Alluvium
- Qt** Terrace sands and gravels
- Qb** Bautista beds
- Unconformity**

Geology (Simplified from Sharp, 1967)

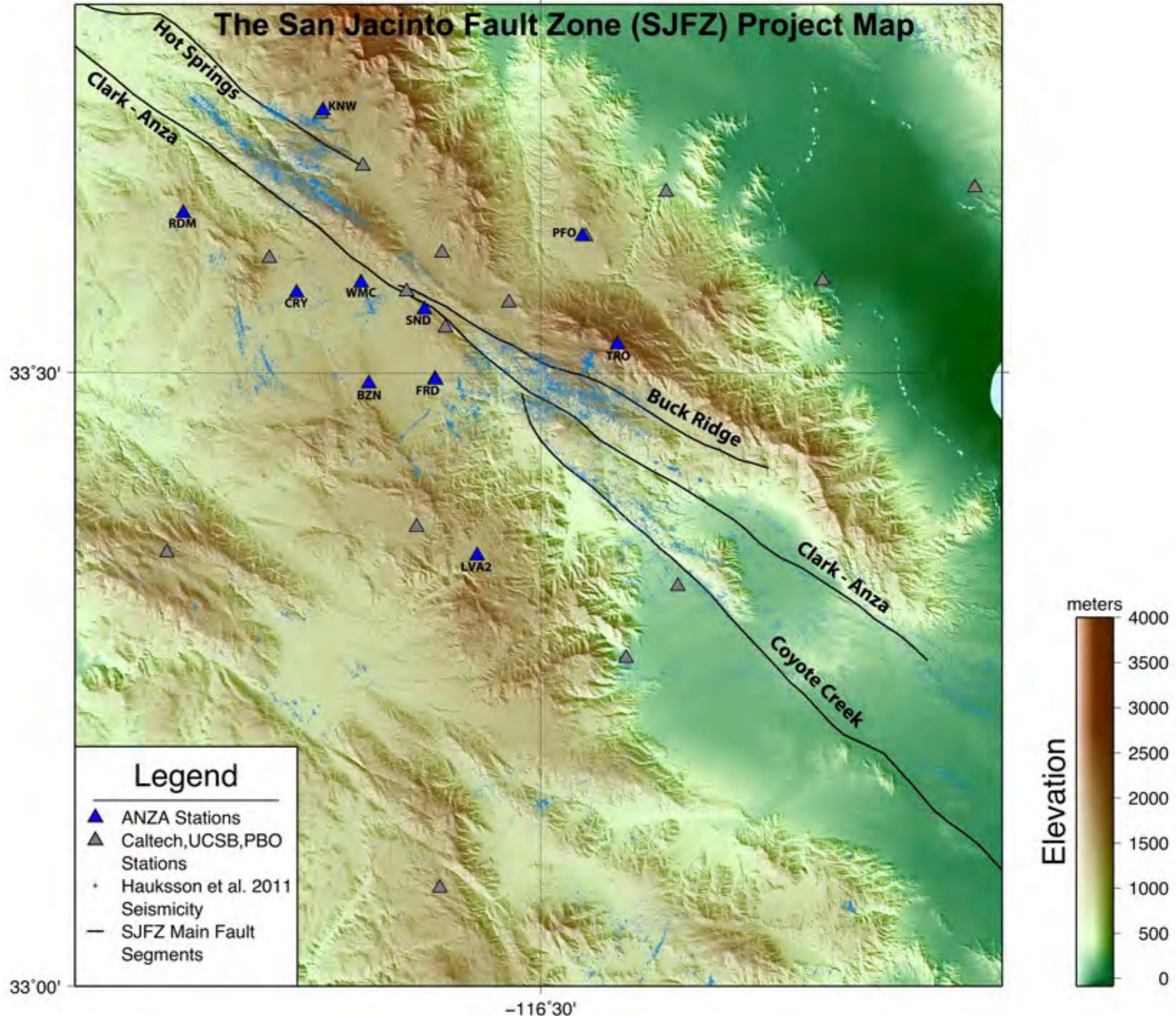


San Jacinto Fault Zone Experiment

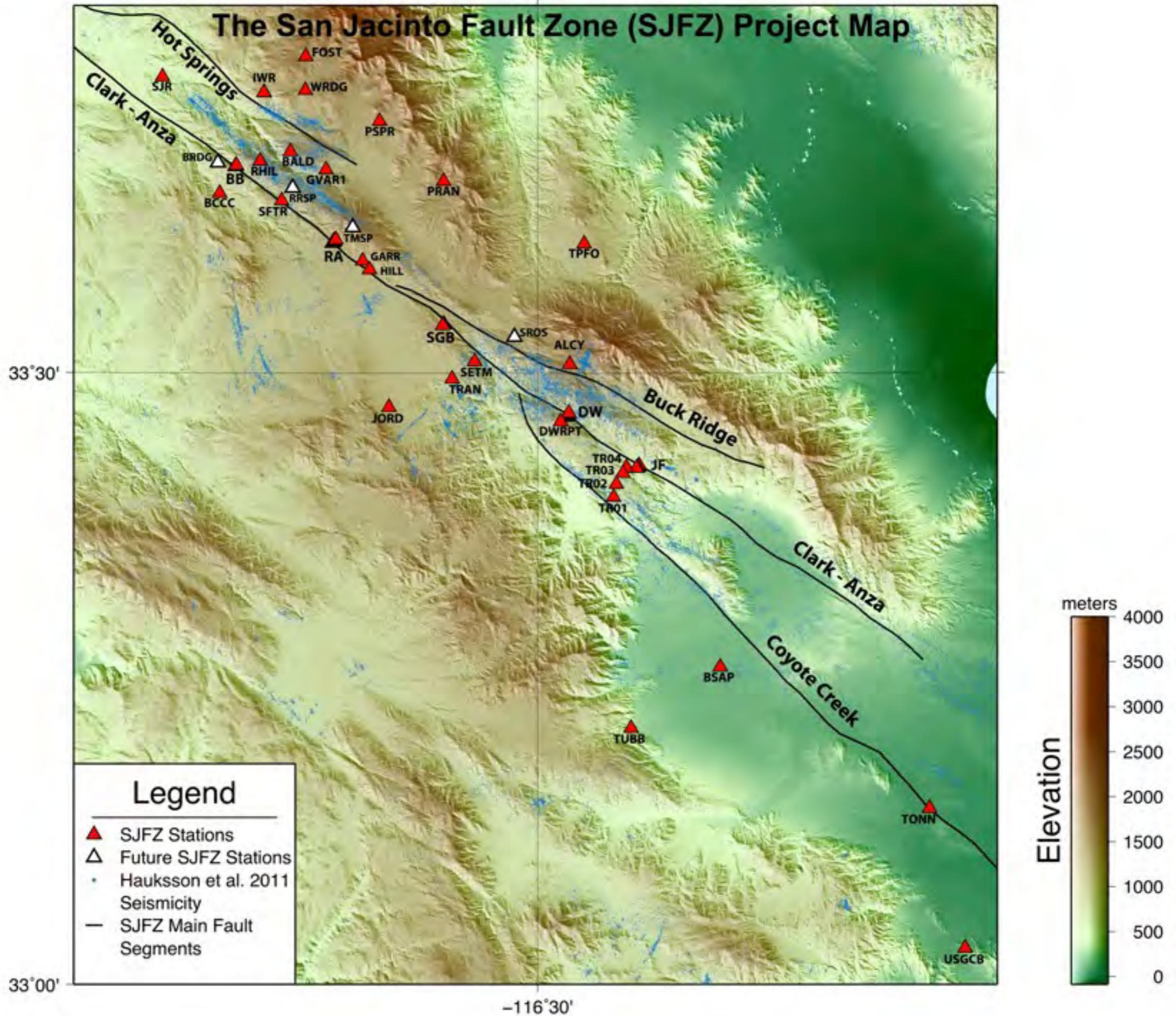
- What is the structure of the fault at depth?
- Why is there not an obvious fault plane?
- Do these earthquakes have a preferred direction of rupture?
- Is there a spatial and/or temporal relationship between these local earthquakes?



The San Jacinto Fault Zone (SJFZ) Project Map



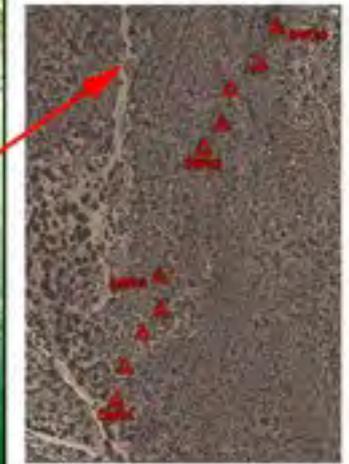
The San Jacinto Fault Zone (SJFZ) Project Map



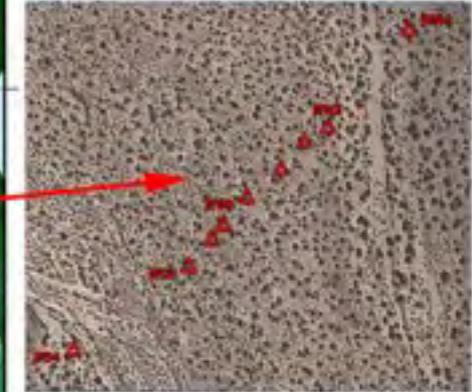
BlackBurn Array



Dry Wash Array



Jackass Flat Array



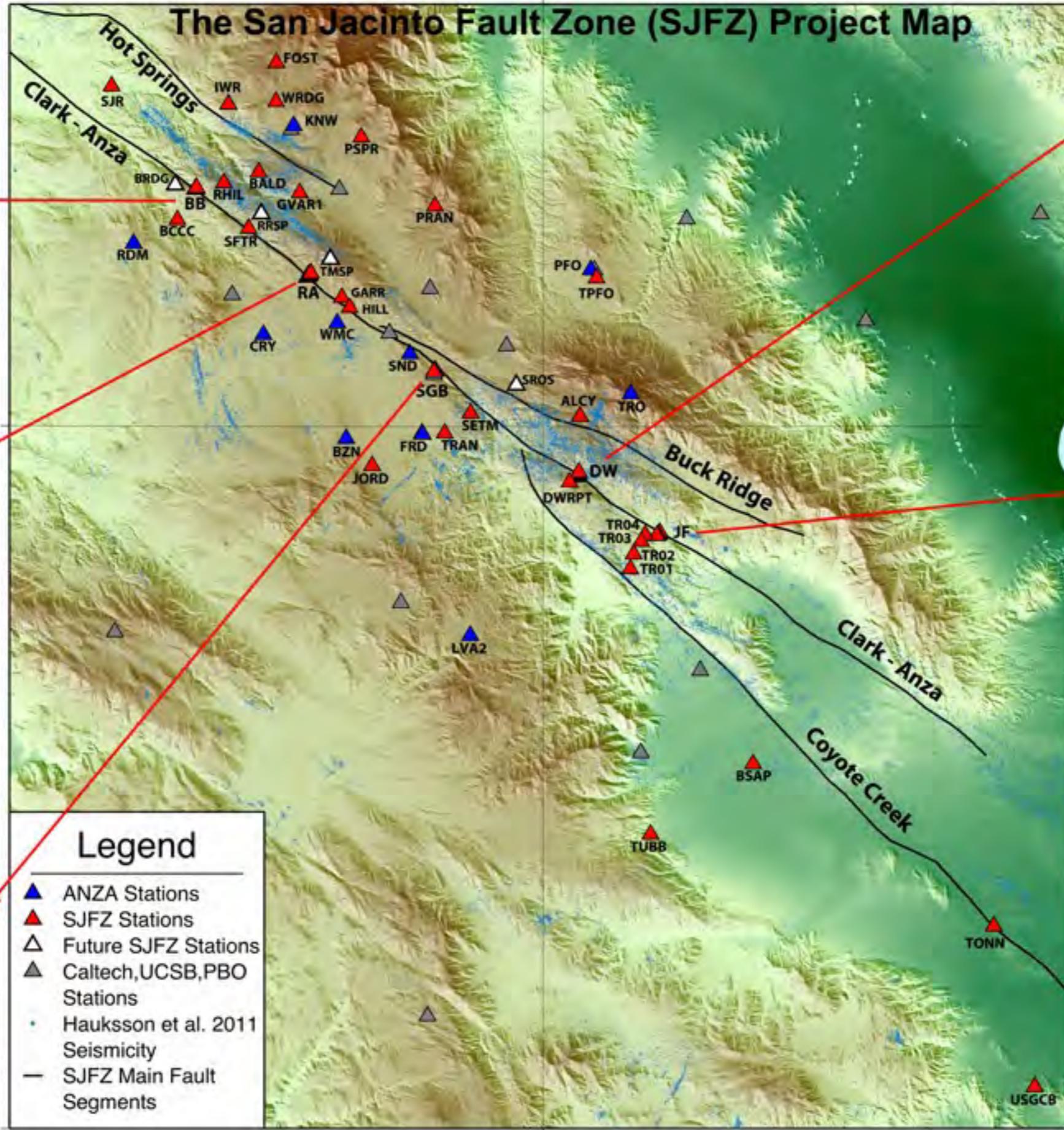
Ramona Array



Sage Brush Array



The San Jacinto Fault Zone (SJFZ) Project Map



Jackass Flat Linear Array



Dry Wash Linear Array



Sage Brush Linear Array



Hill Street SBEPI



HSSP

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Image County of San Bernardino
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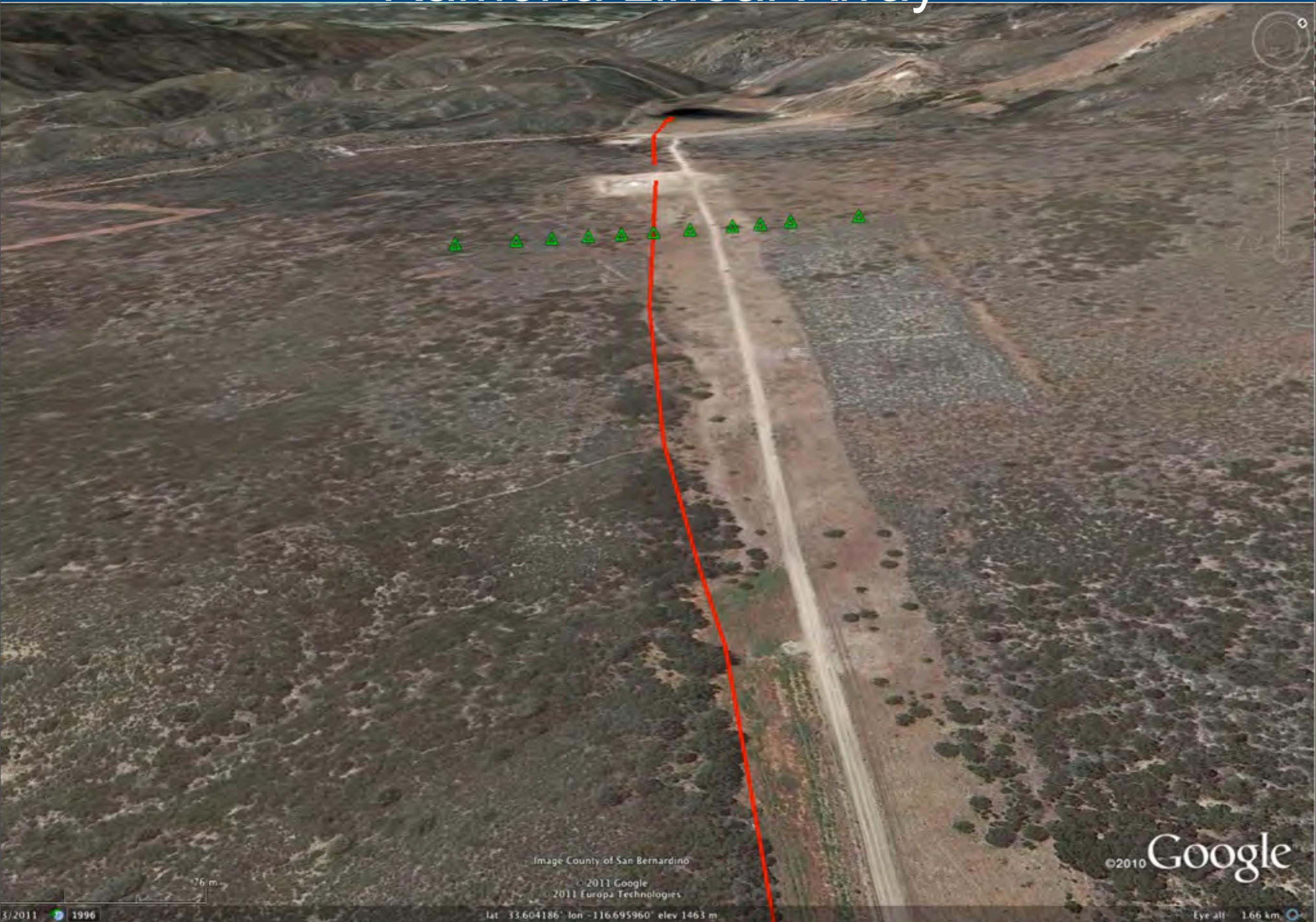
lat: 33.587084 lon: -116.664447 elev: 1407 m

112 m

5/2011 1996

Eye all 1.72 km

Ramona Linear Array



Blackburn Linear Array





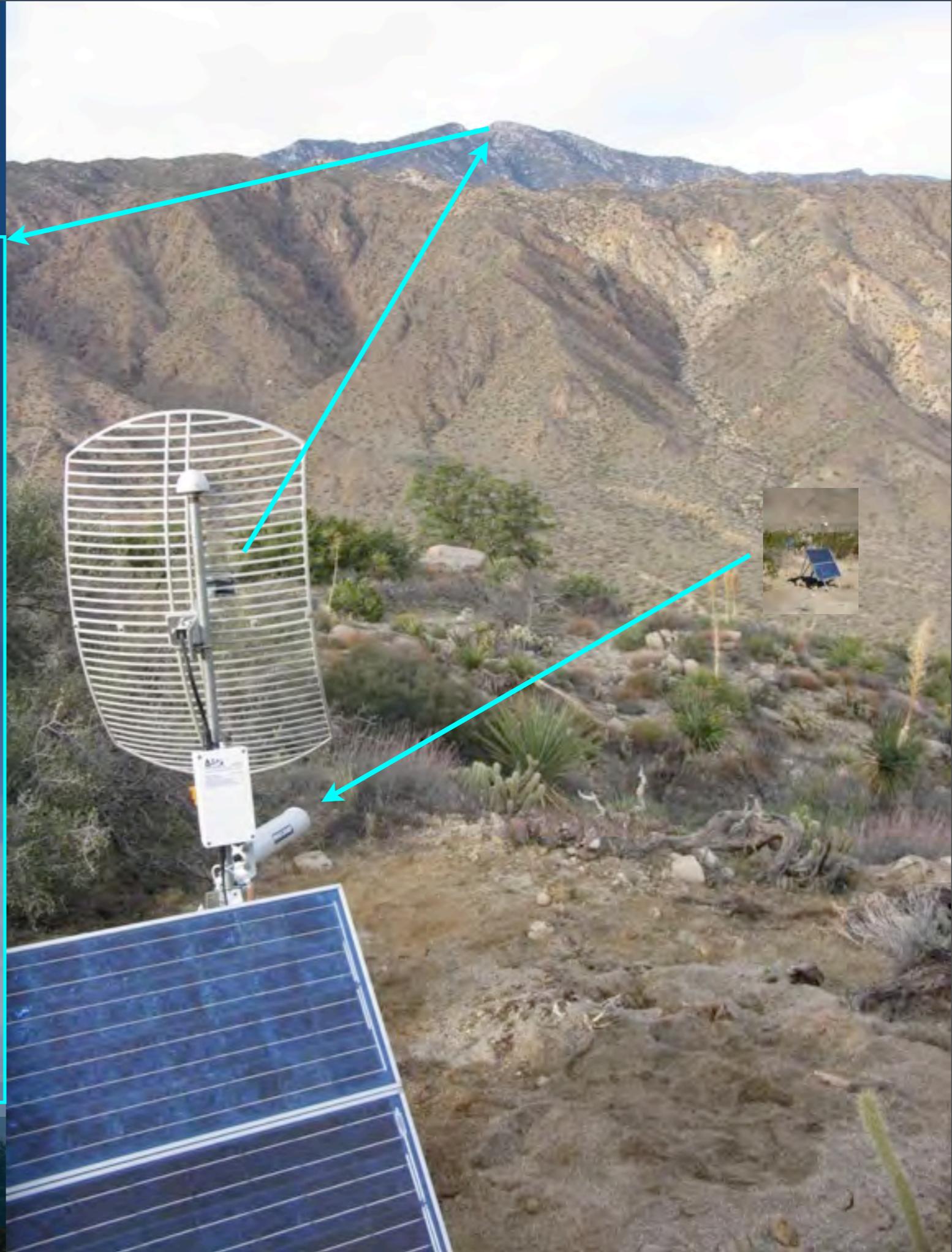


PASSCAL Ad Hoc Telemetry



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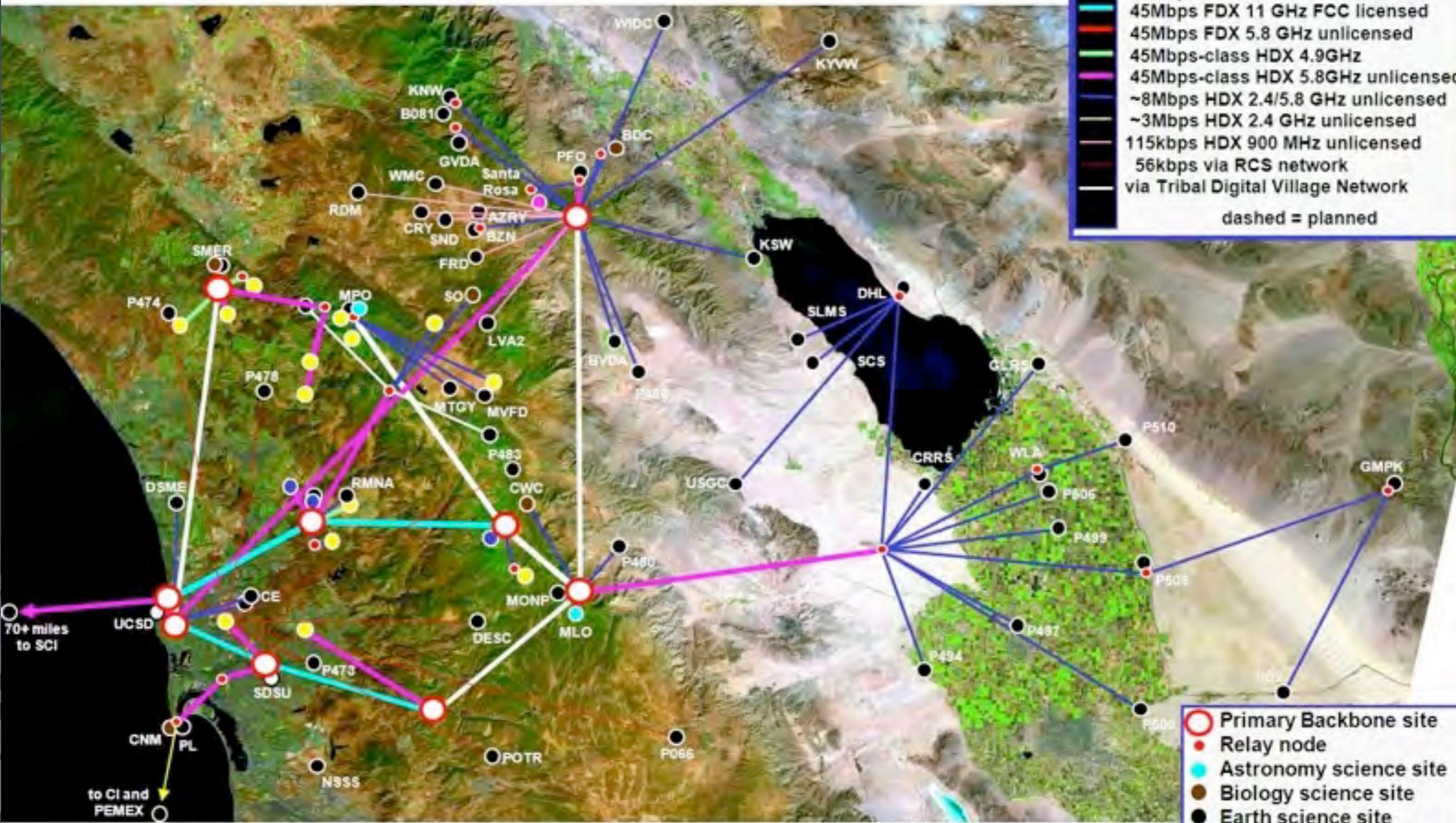
PASSCAL Ad Hoc Telemetry



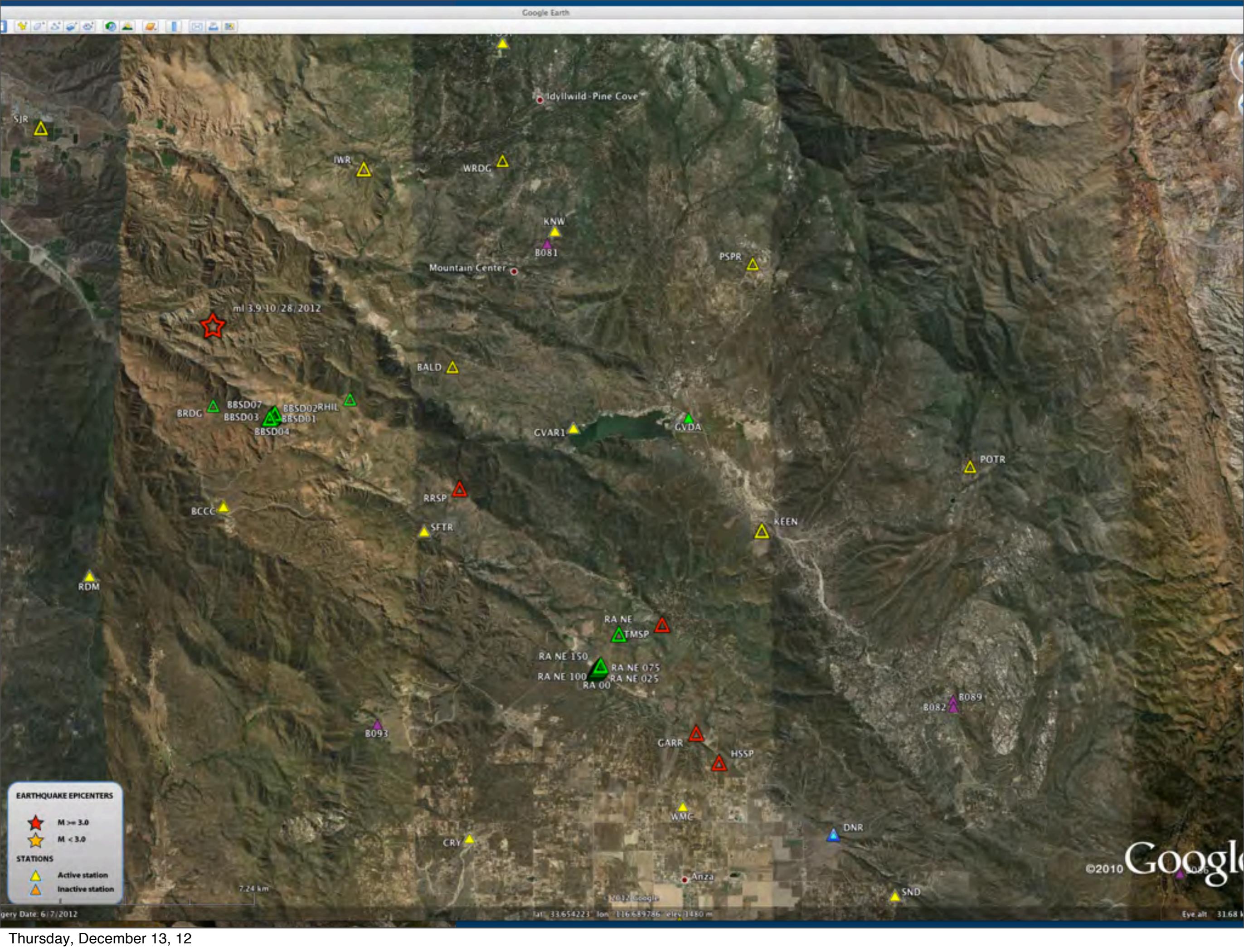
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HPWREN topology – January 2012

- 155Mbps FDX 6 GHz FCC licensed
 - 155Mbps FDX 11 GHz FCC licensed
 - 45Mbps FDX 6 GHz FCC licensed
 - 45Mbps FDX 11 GHz FCC licensed
 - 45Mbps FDX 5.8 GHz unlicensed
 - 45Mbps-class HDX 4.9GHz
 - 45Mbps-class HDX 5.8GHz unlicensed
 - ~8Mbps HDX 2.4/5.8 GHz unlicensed
 - ~3Mbps HDX 2.4 GHz unlicensed
 - 115kbps HDX 900 MHz unlicensed
 - 56kbps via RCS network
 - via Tribal Digital Village Network
- dashed = planned



- Primary Backbone site
- Relay node
- Astronomy science site
- Biology science site
- Earth science site
- University site
- Researcher location
- Native American site
- Public Safety site

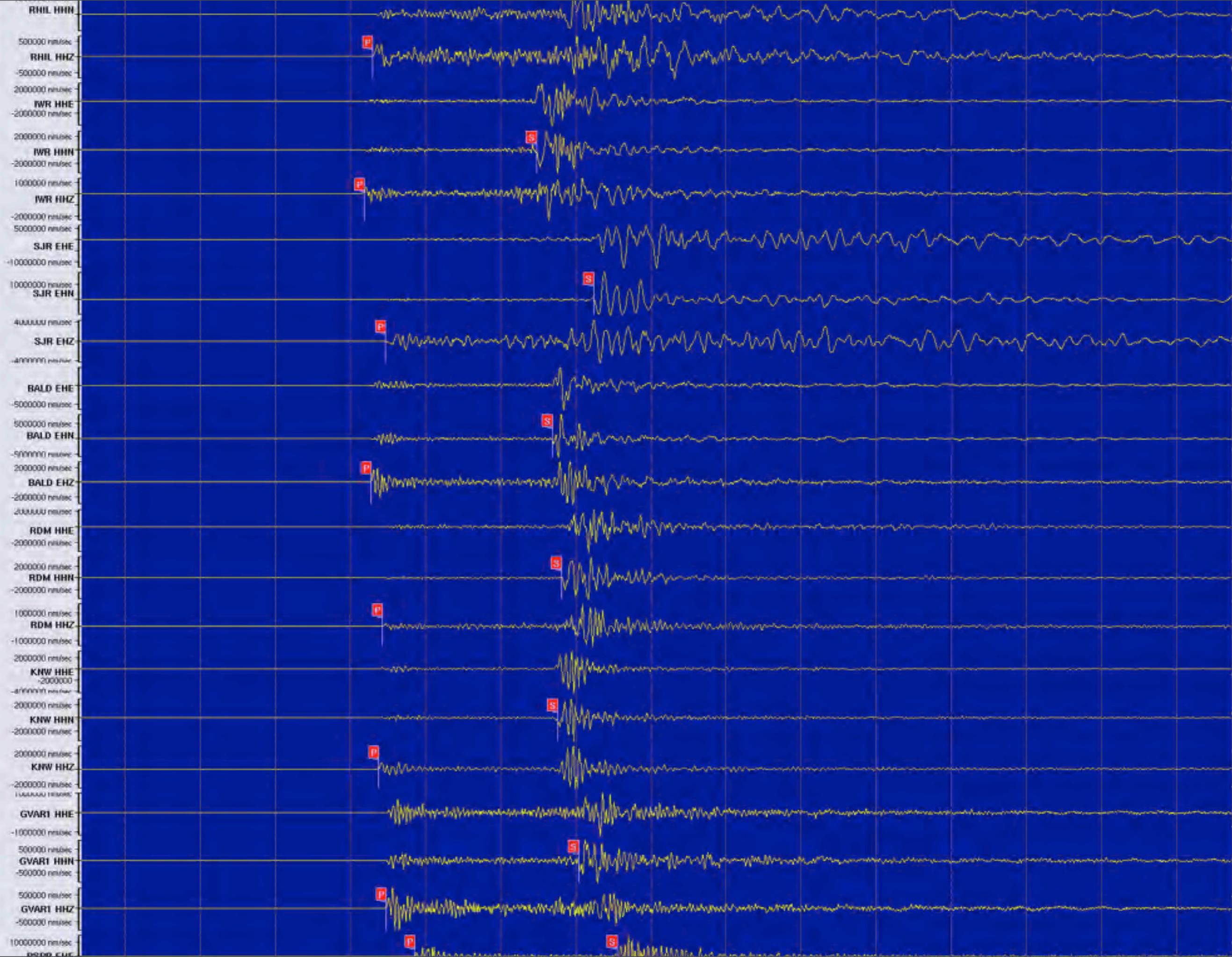


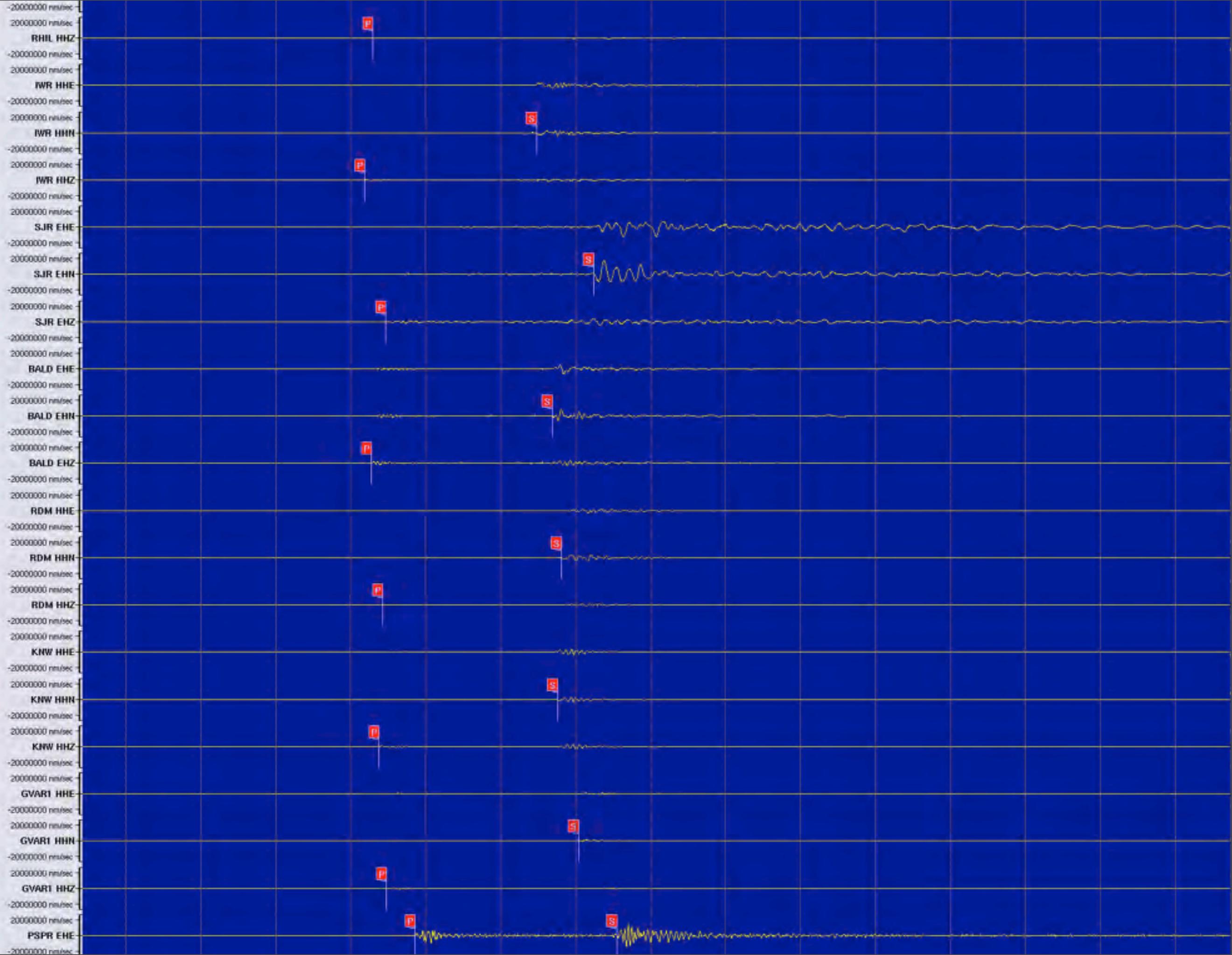
EARTHQUAKE EPICENTERS

- $M \geq 3.0$
- $M < 3.0$

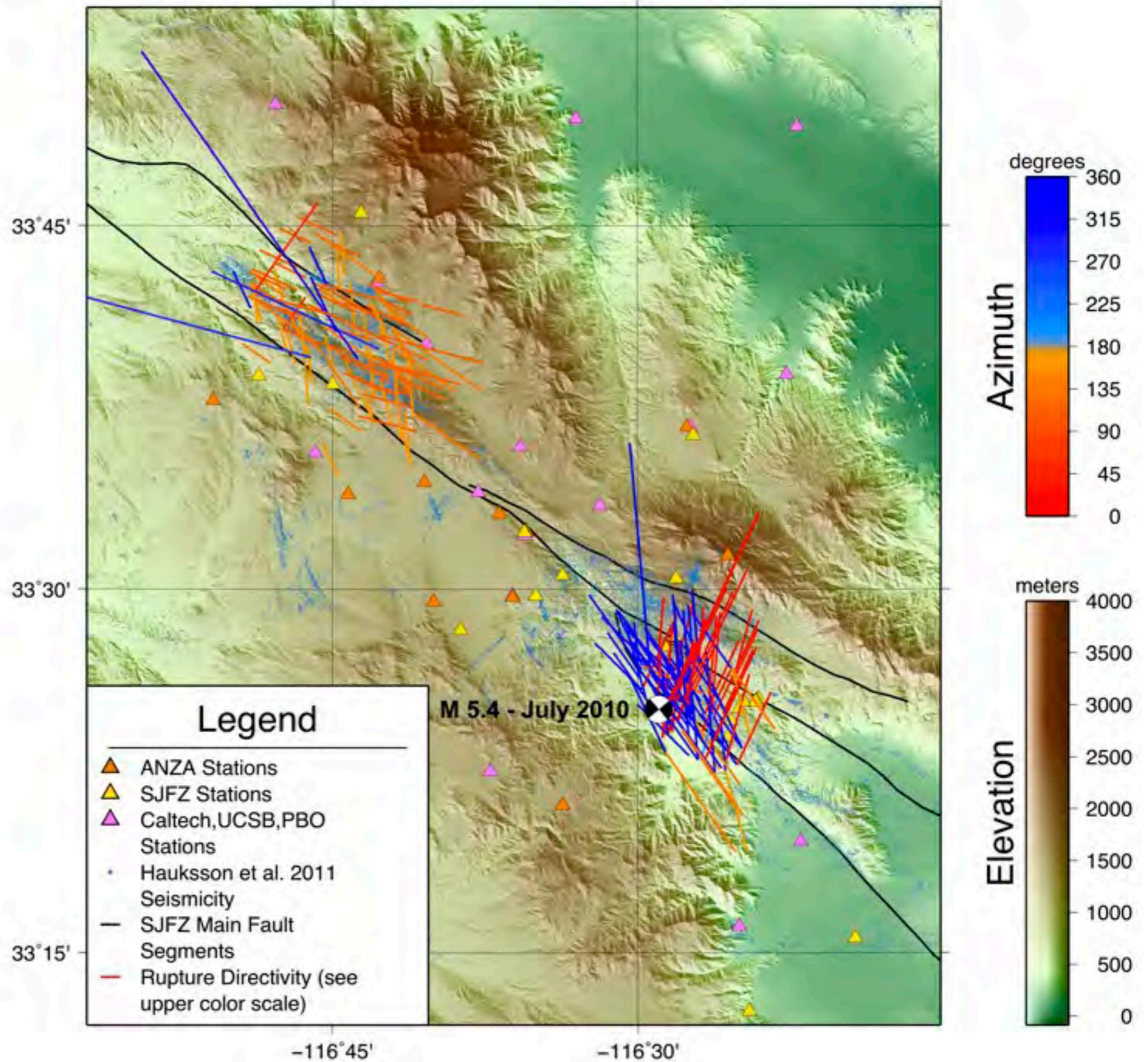
STATIONS

- Active station
- Inactive station





Revealing the directivity of rupture



Acknowledgements

Anza-Borrego Desert State Park

San Jacinto Ranger District,
San Bernardino National Forest

Many local private landowners

National Science Foundation

HPWREN!

