



A MO native...

BS 1999 SMU



PhD 2004  
UC Santa Cruz



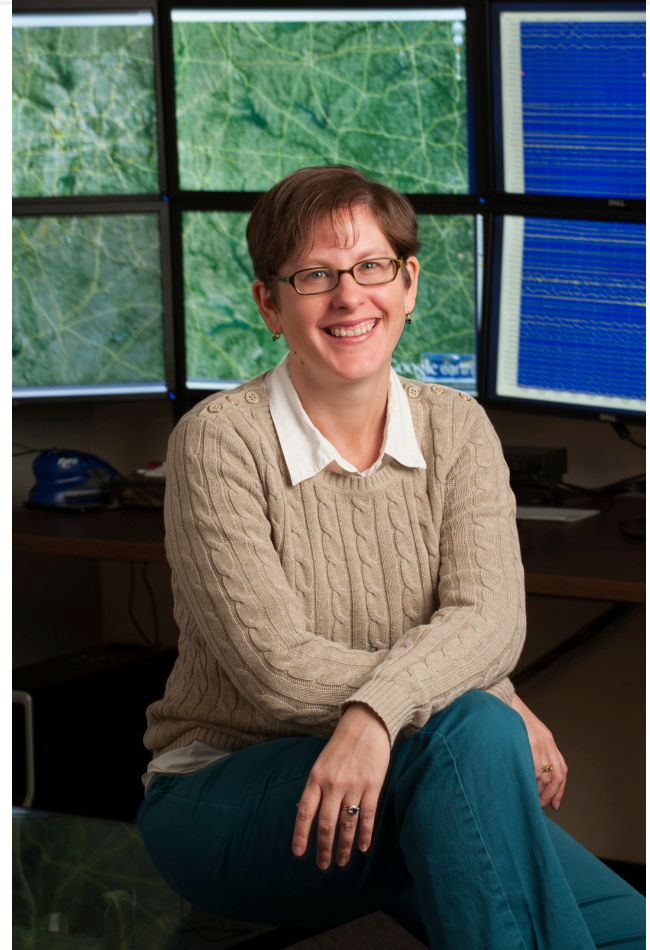
Post-doc @  
U. Wisconsin



2007-2012  
CERI



who loves Dallas



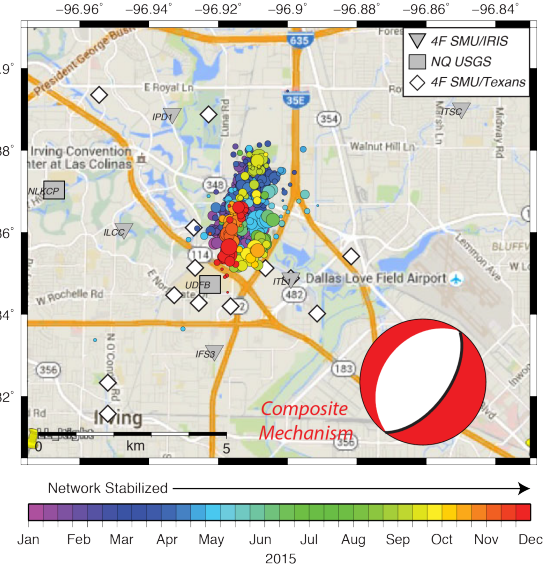
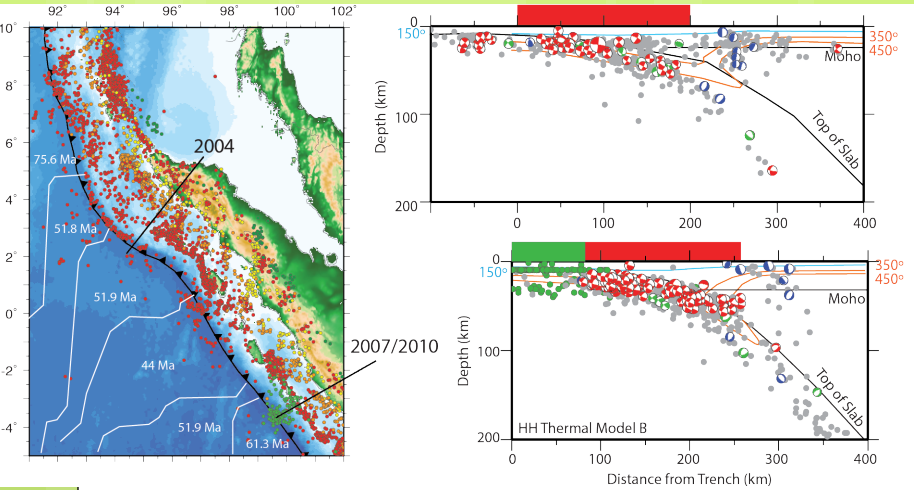
Heather DeShon

Associate Professor

@ SMU since 2012

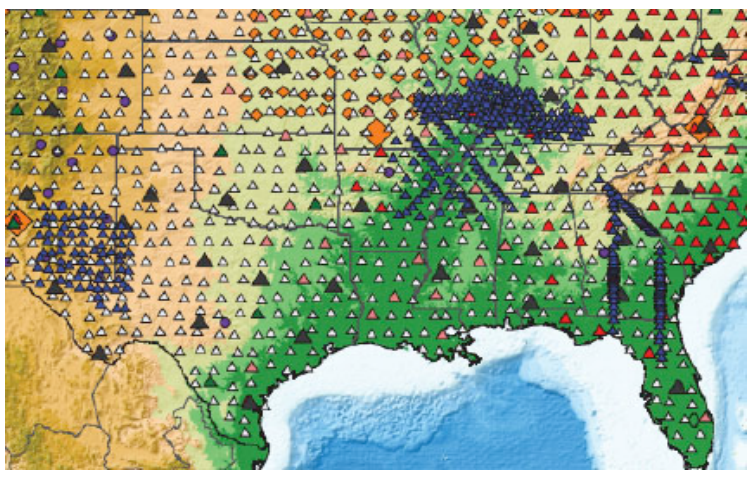
A few of my favorite eq things..

# Intraplate & Induced EQs

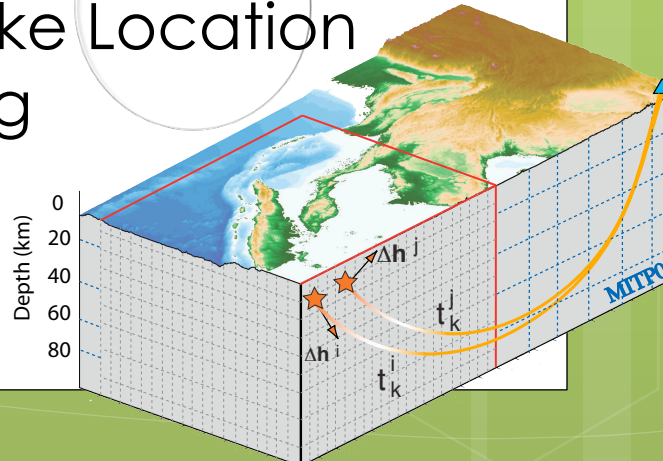


## Subduction Zone Processes

## Field-to-Archive Operations



## Improving Earthquake Location & Imaging





# North Texas Temporary Seismic Networks

Heather DeShon

M. Hornbach, M.B. Magnani,  
C. Hayward and B. Stump

*IRIS Short-course*  
*August 3, 2016*





INSTITUTE FOR GEOPHYSICS



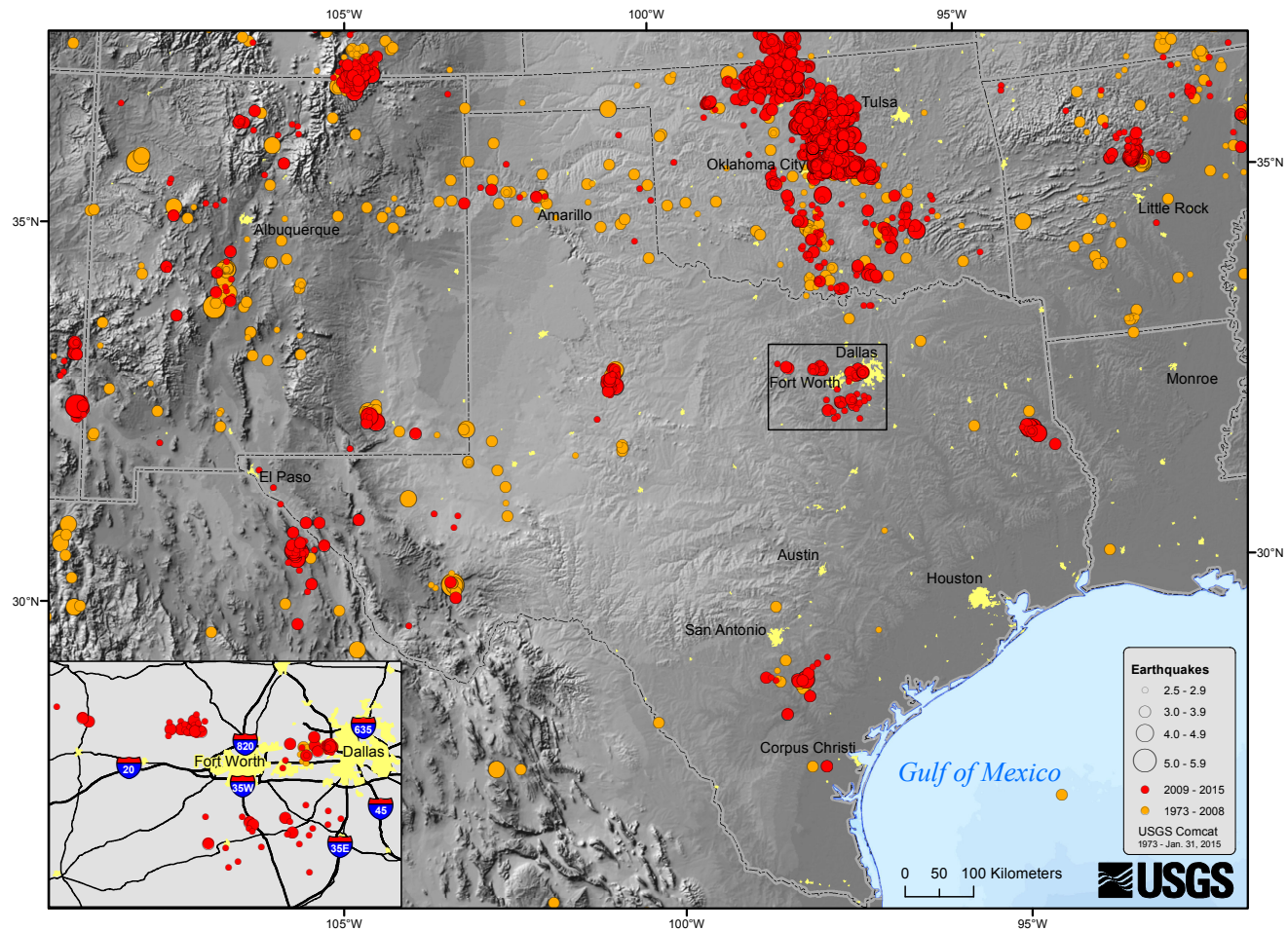
Stanford

**TexNet**  **CISR**





# Texas Earthquakes



DFW Metroplex:  
~6.5 million people

# Earthquakes in the Fort Worth Basin are possibly-plausibly-likely induced

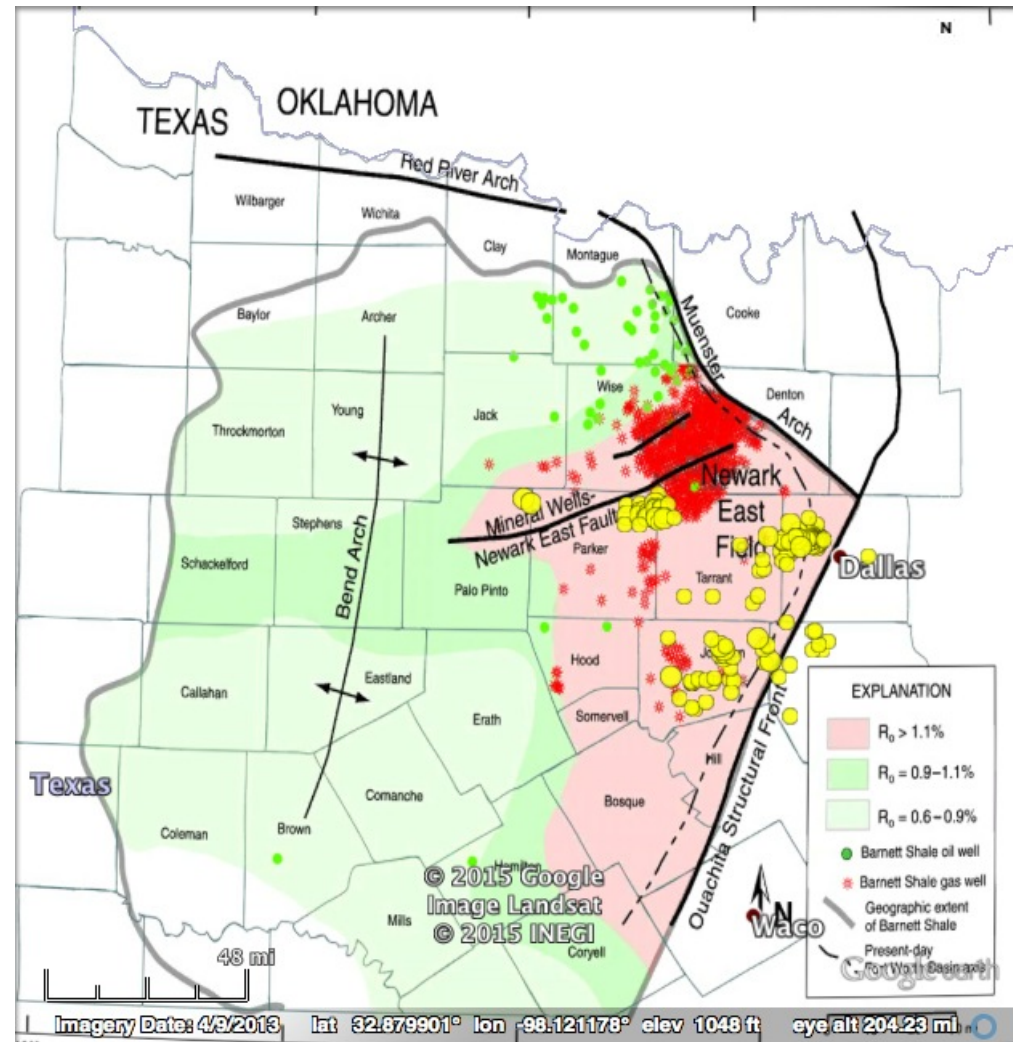
No known earthquakes in this region prior to 2008

Earthquakes are spatially associated with the shale gas play (pink)

North Texas: >200 USGS NEIC earthquakes

32  $\geq$ M3.0

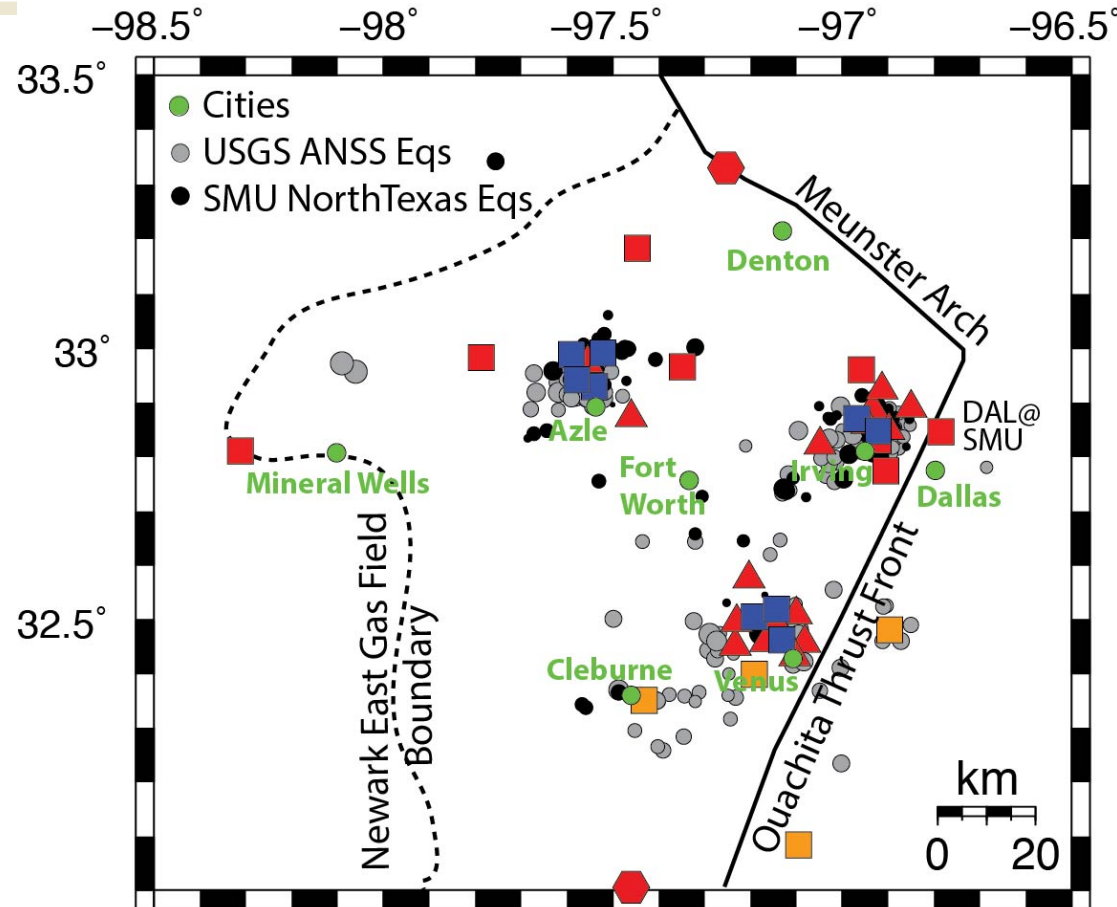
1 M4.0





# North Texas Seismic Network(s)

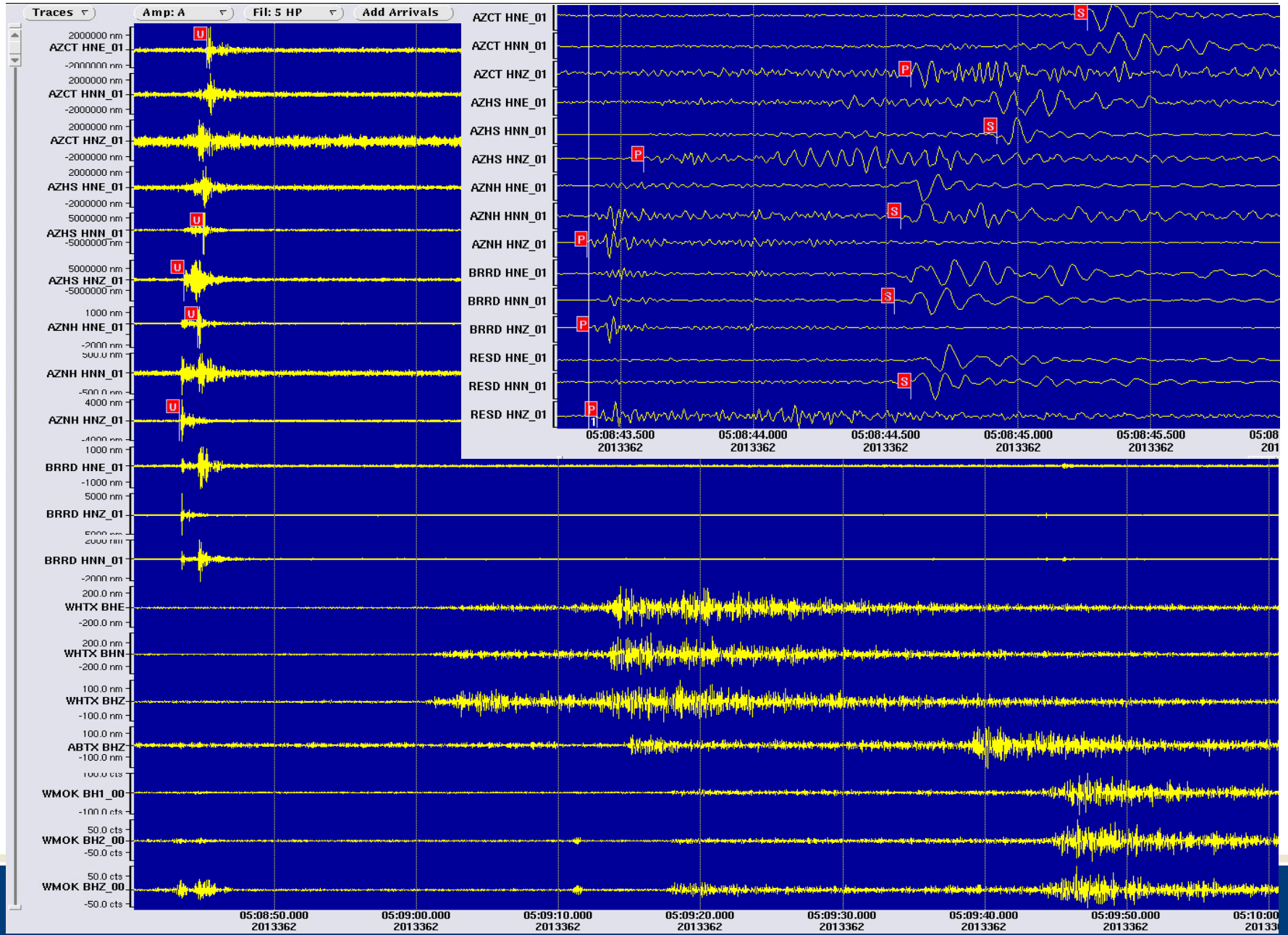
- Networks developed in response to earthquake swarms
- >1300 earthquakes in SMU catalog from 2013-present
- Current Network
  - 9 USGS stations
  - 26 SMU stations
  - 4 UTIG stations



Current Instrumentation

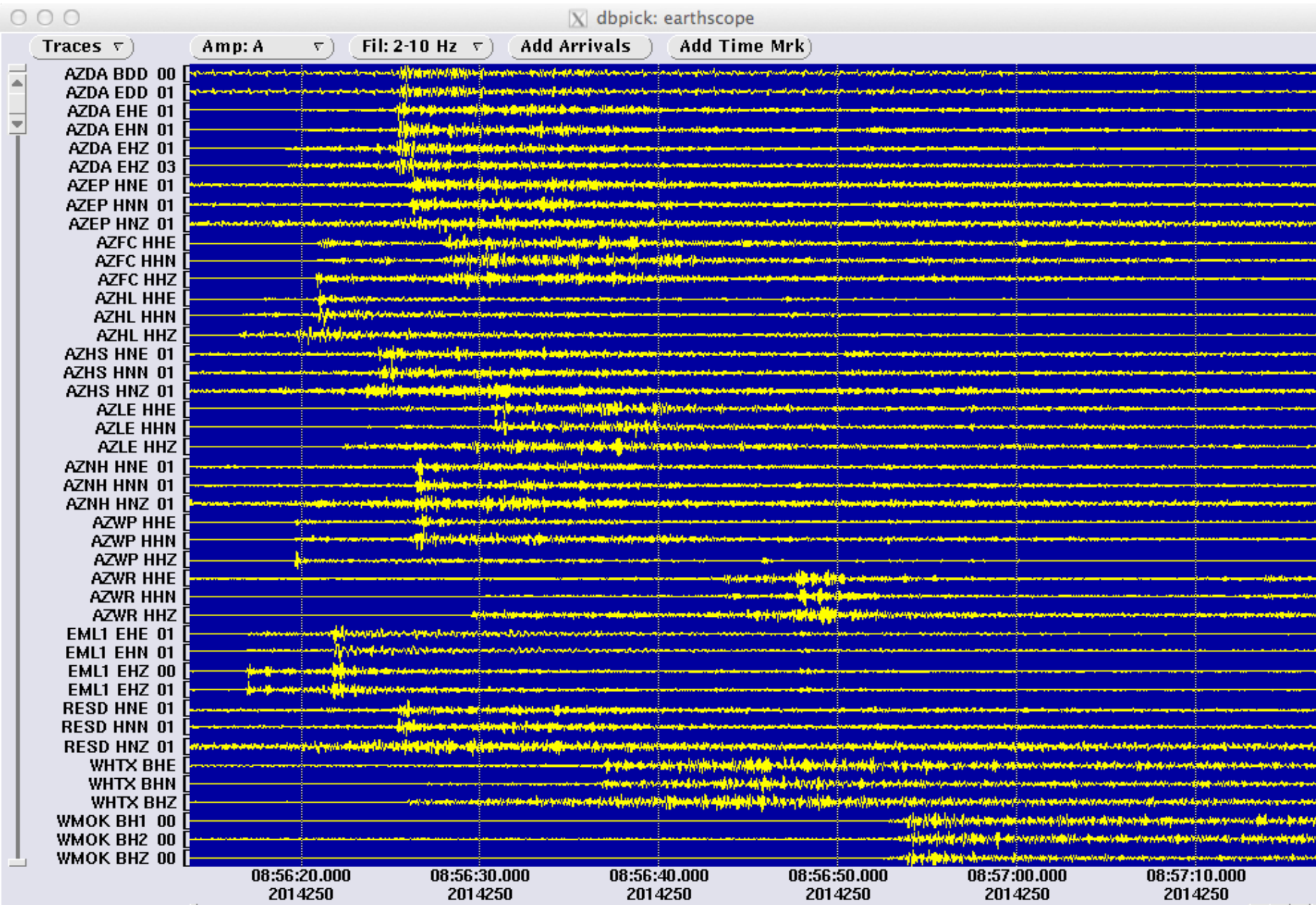
- |             |              |               |                   |
|-------------|--------------|---------------|-------------------|
| Red Diamond | Regional BB  | Red Triangle  | SMU/IRIS SP or BB |
| Blue Square | NetQuakes SM | Orange Square | UTIG BB           |

# Local and Regional Recordings of Azle Earthquakes



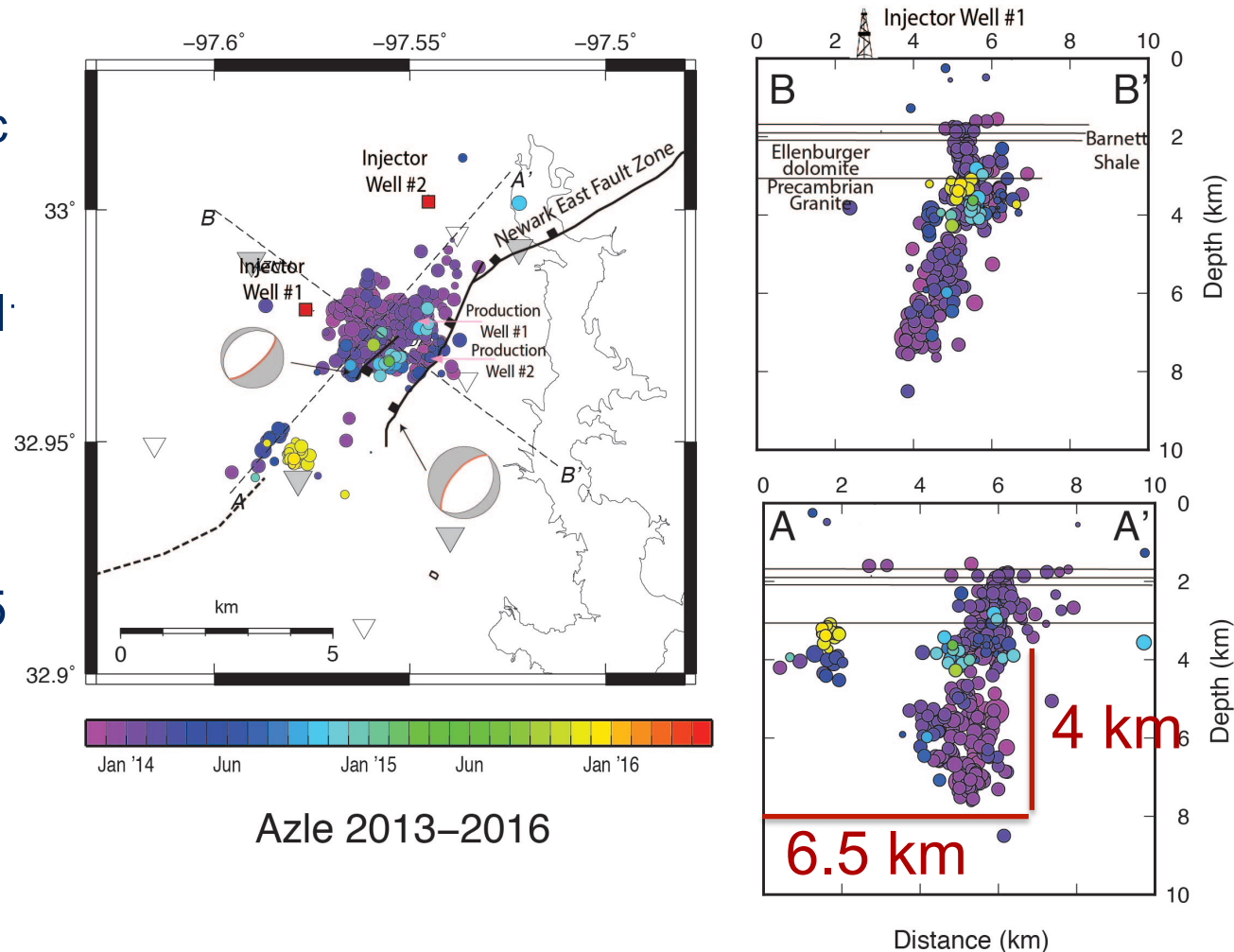


# Early Sept. 2014 Arlington Earthquake



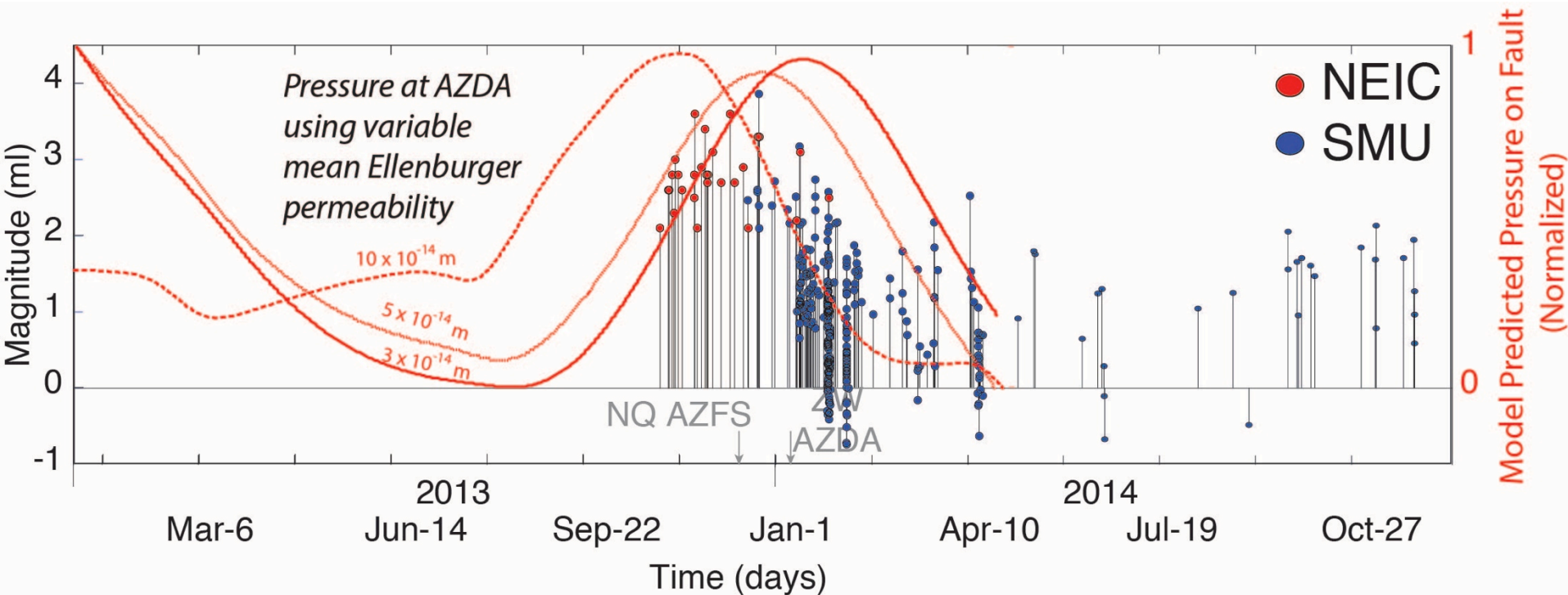
# Azle Earthquake Swarm 2013-2015

- Series of M3.4+ events in Nov/Dec 2013
- The last widely felt event was Jan 28<sup>th</sup>, 2014
- Last EQ recorded in December 2015
- Over 500 events in SMU catalog
- Complex faulting



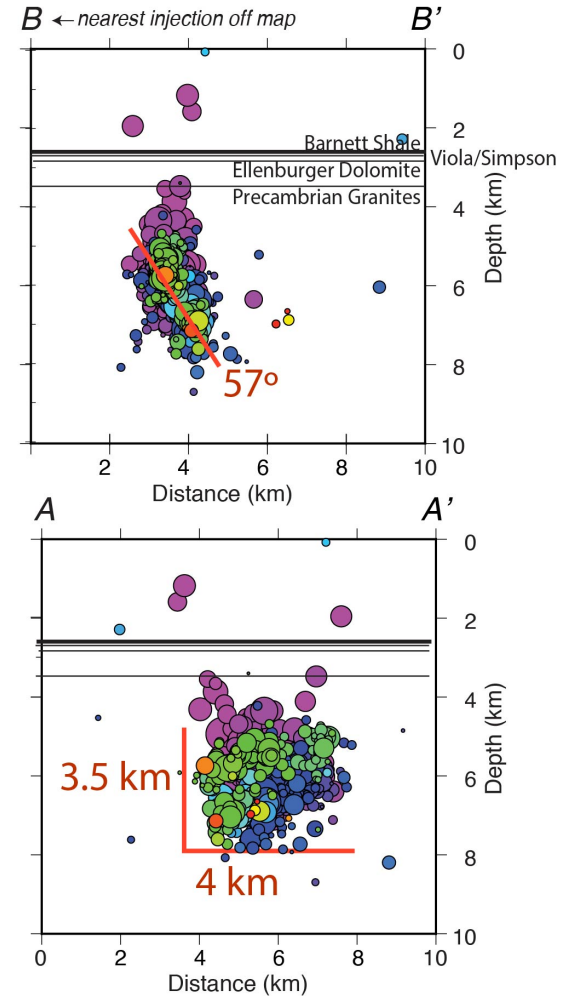
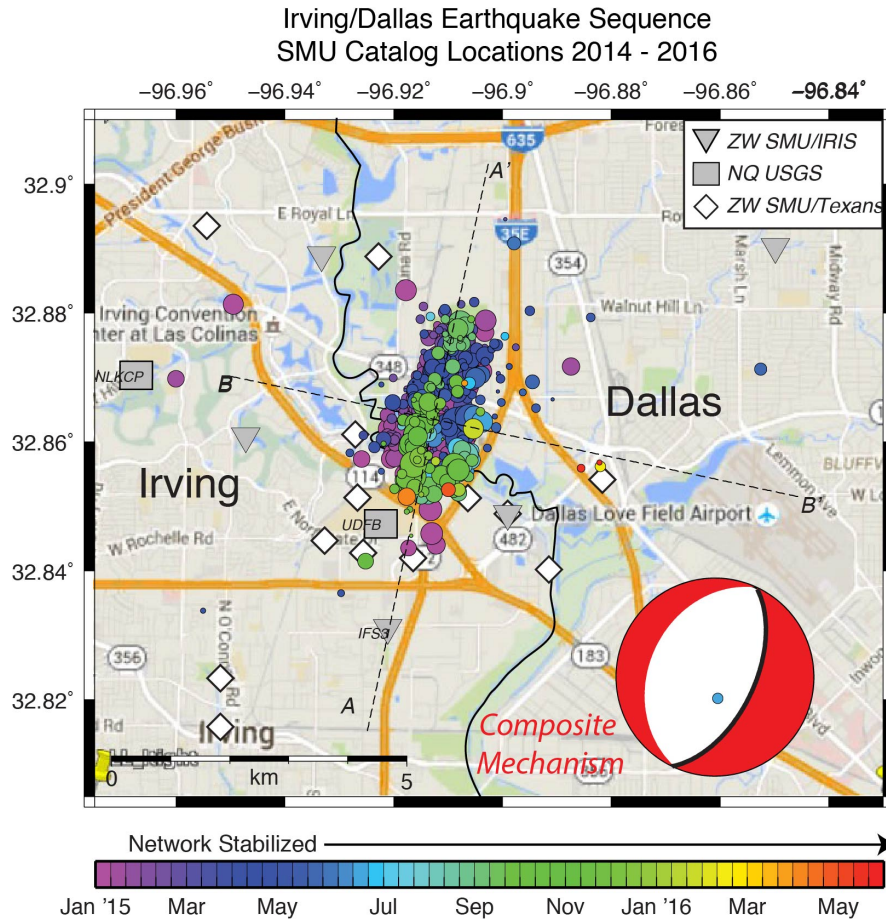


# Azle Earthquake Swarm



**Conclusion: Most likely induced by stress changes due to wastewater disposal paired with brine production**

# Irving/Dallas Earthquake Swarm



Irving 2015-2016

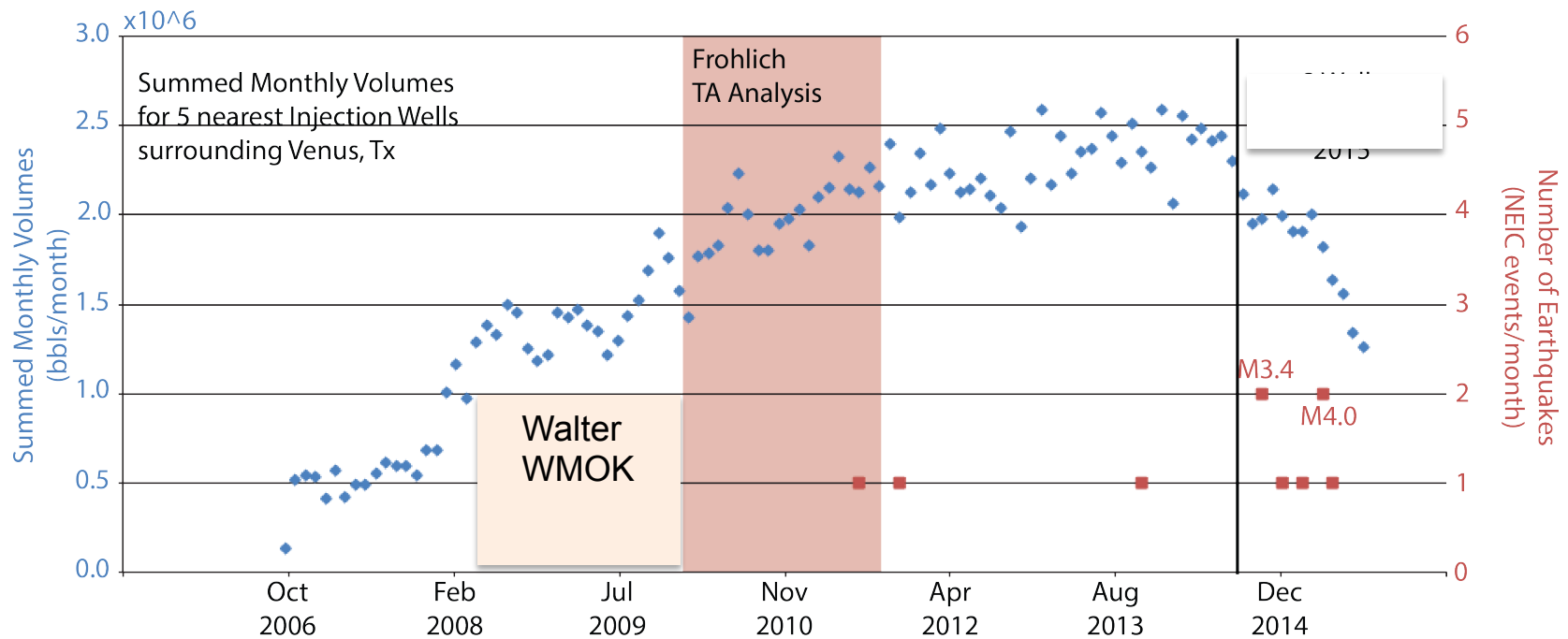


# Venus sequence: long-lived activity

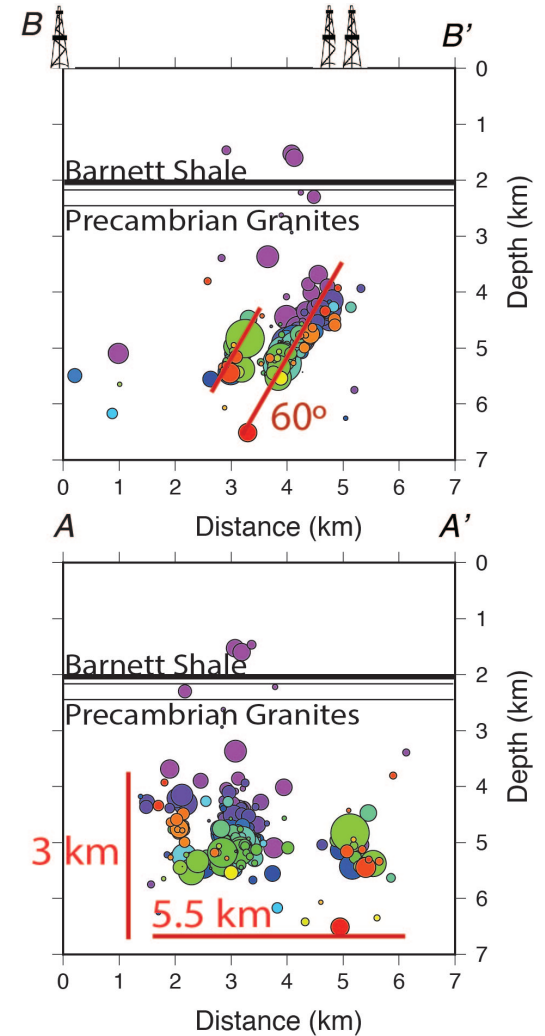
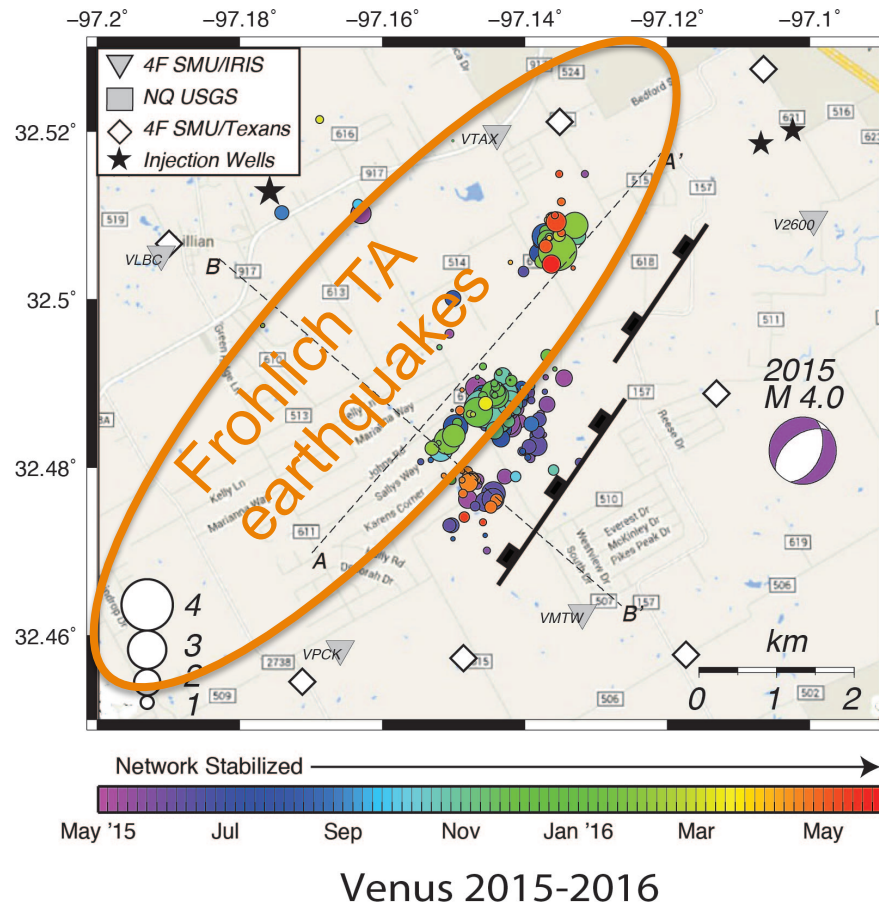
10 NEIC felt earthquakes in the region

May 2015 M4 mainshock is the largest felt event in N. TX

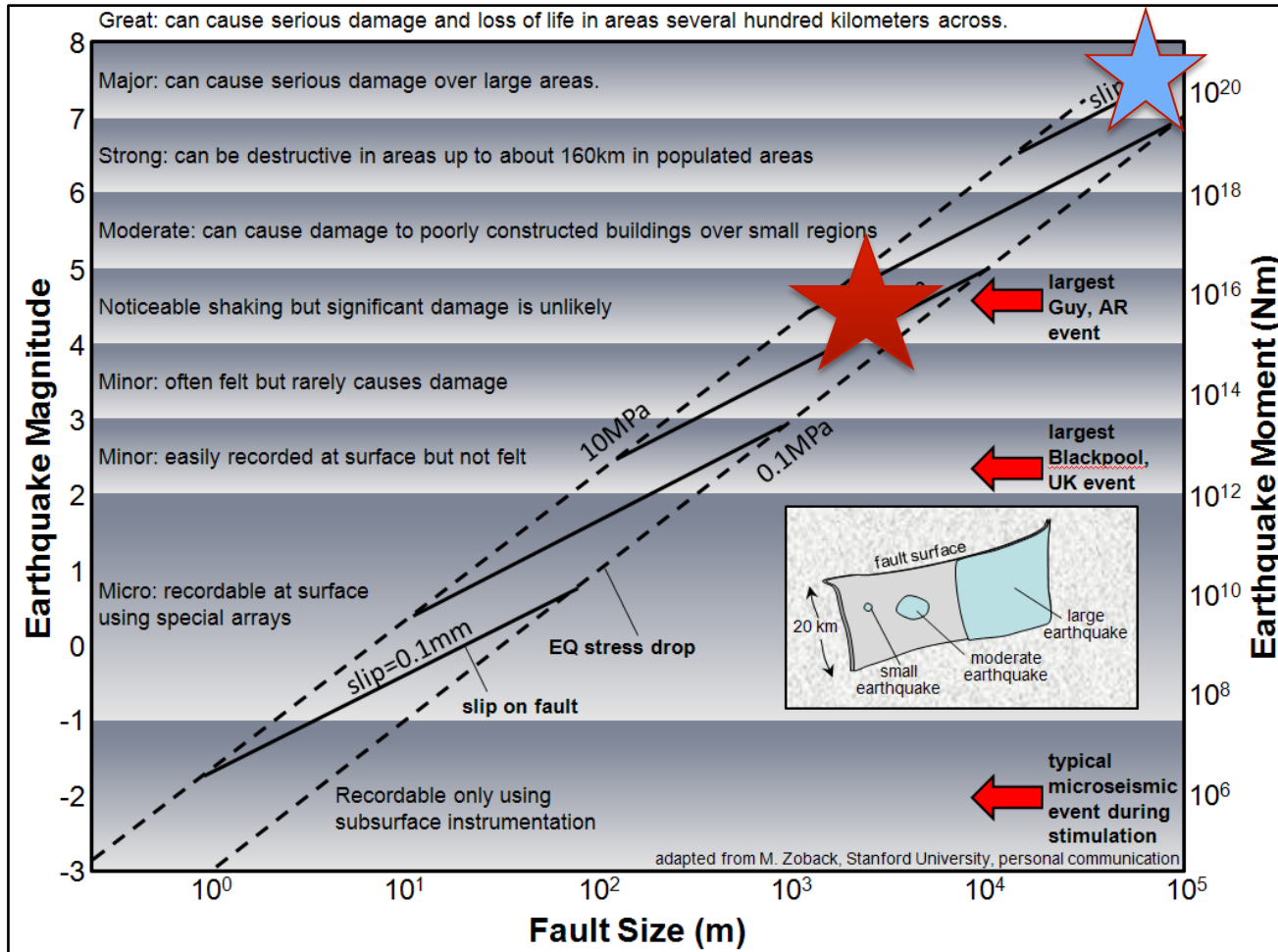
5 large volume injection wells <10 km



# Venus sequence: long-lived activity



# What does fault length reveal?



New Madrid 1811-1812

Timpson, TX M4.8  
 Venus, TX M4.0  
 Irving-Dallas, TX M3.6