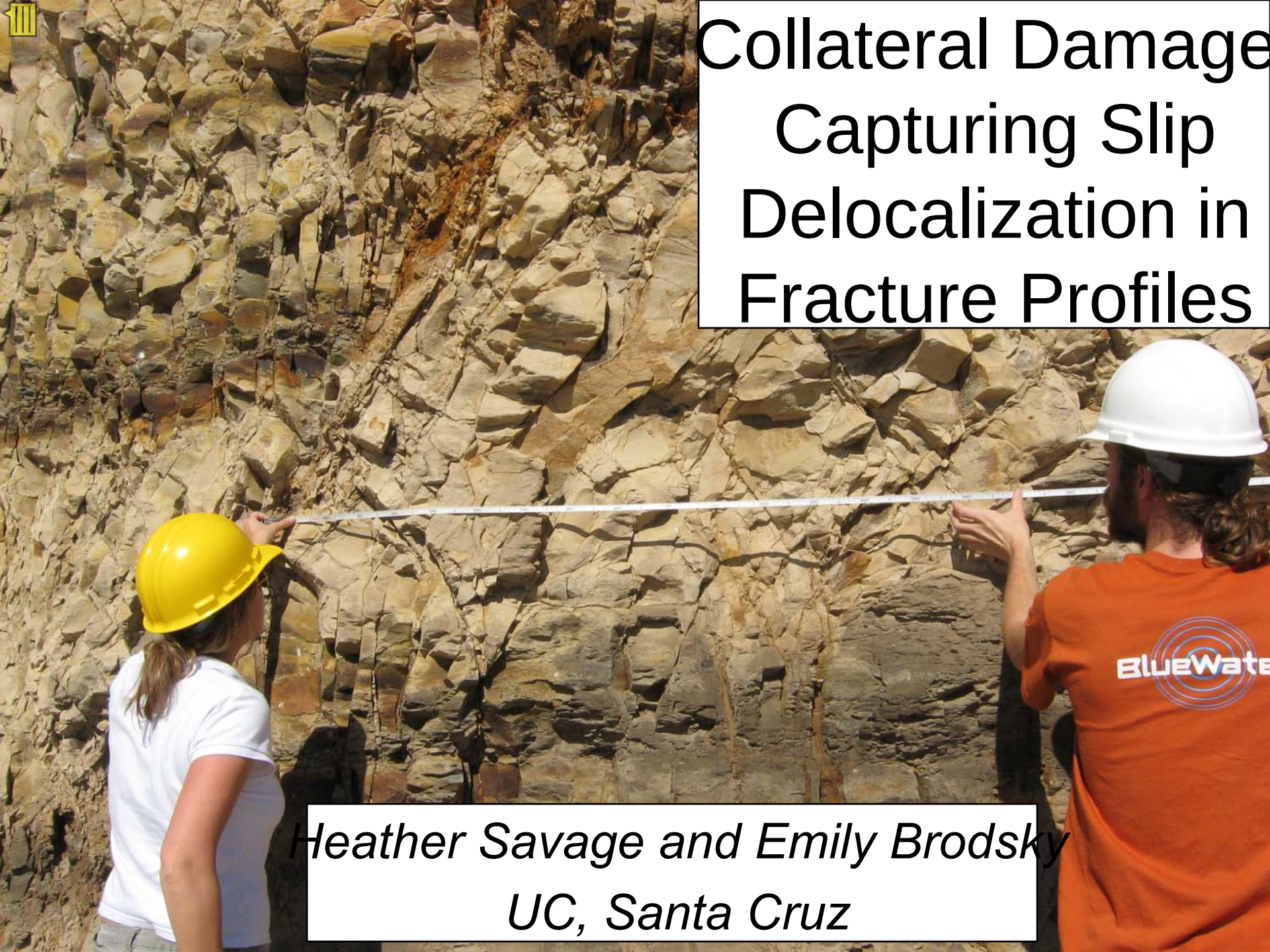
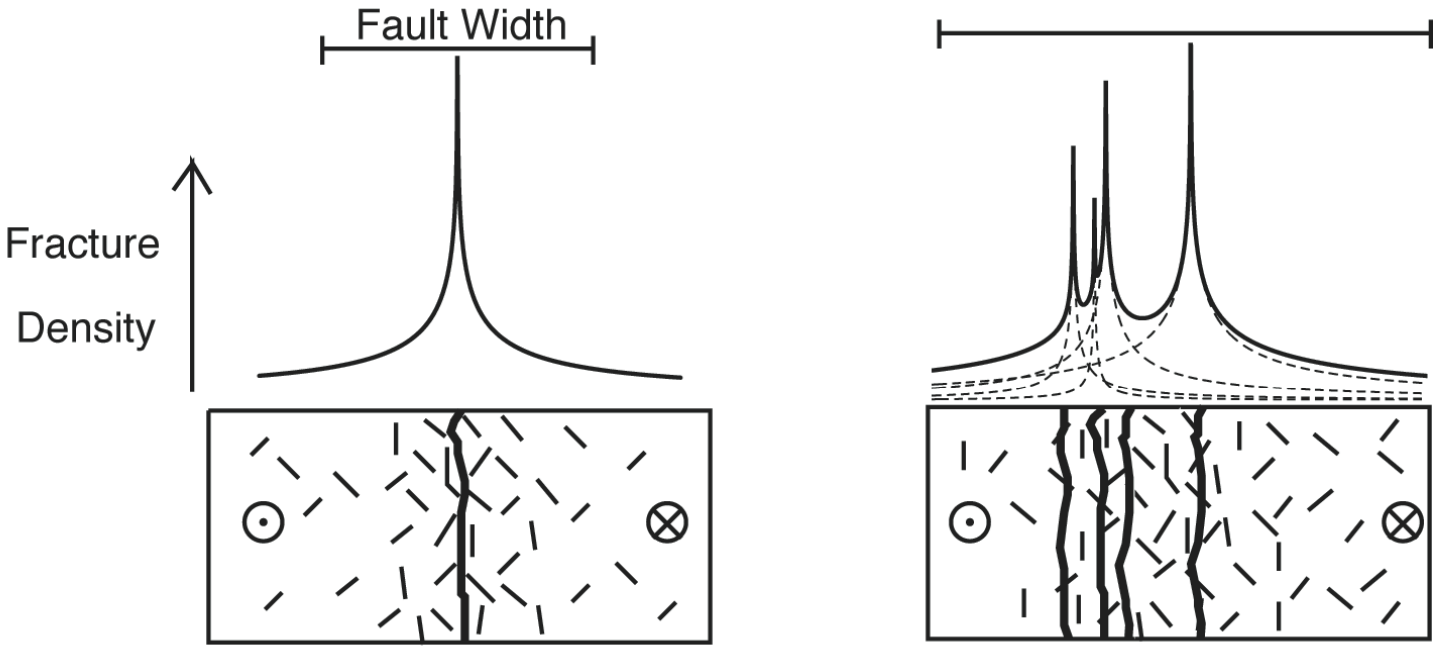
Collateral Damage Capturing Slip Delocalization in Fracture Profiles

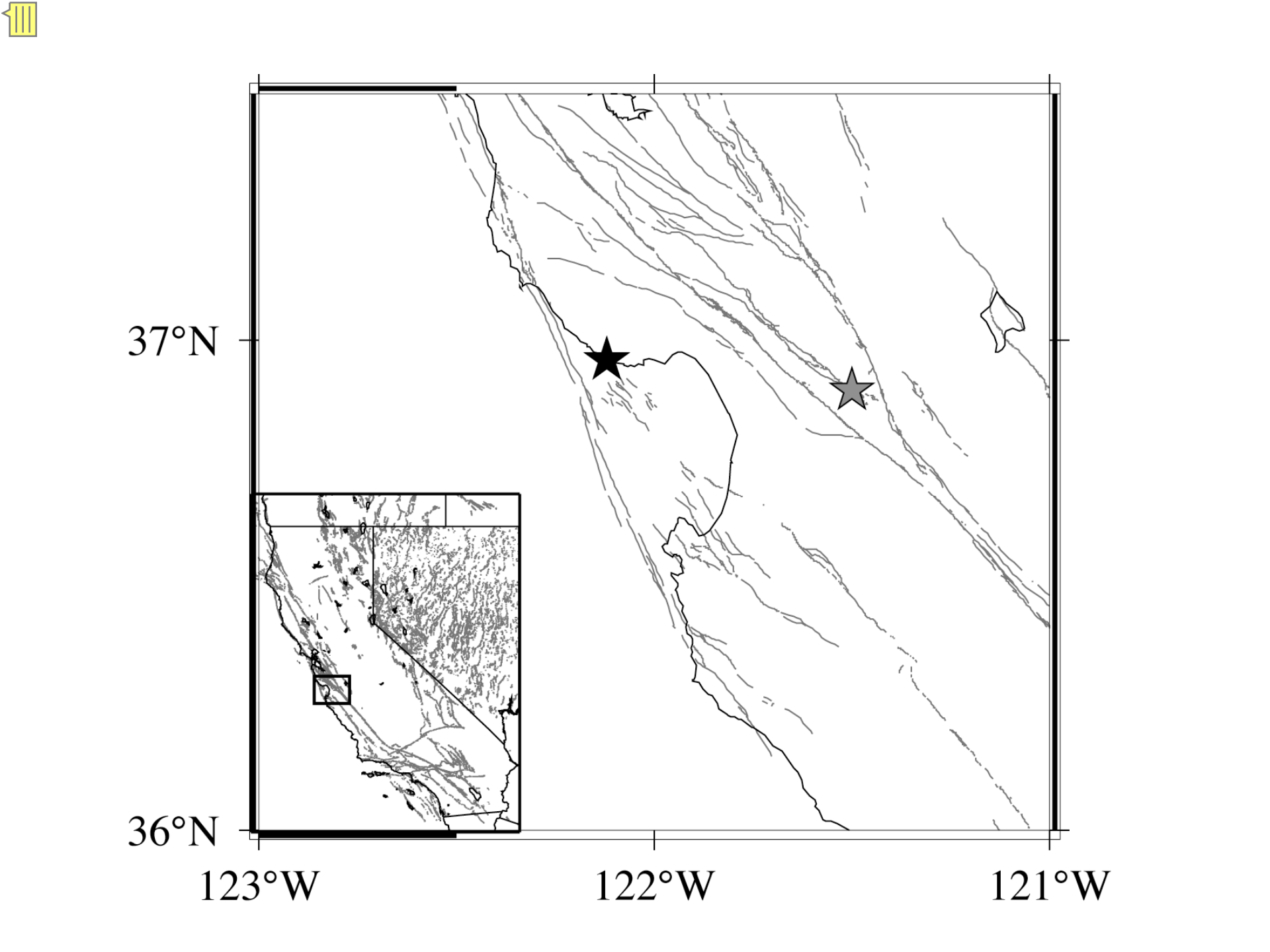


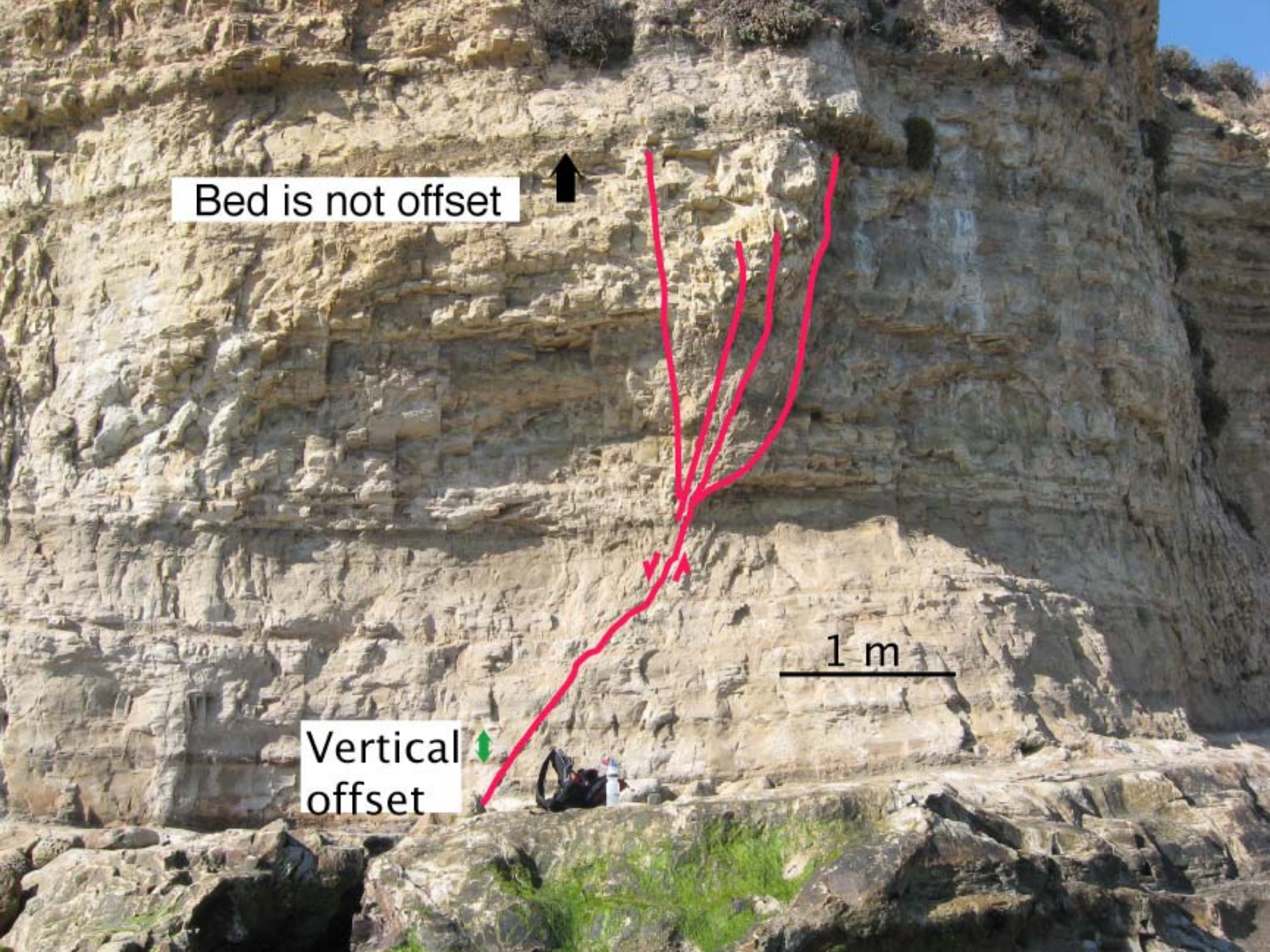
Heather Savage and Emily Brodsky

UC, Santa Cruz

Idealized Fault Zone Growth

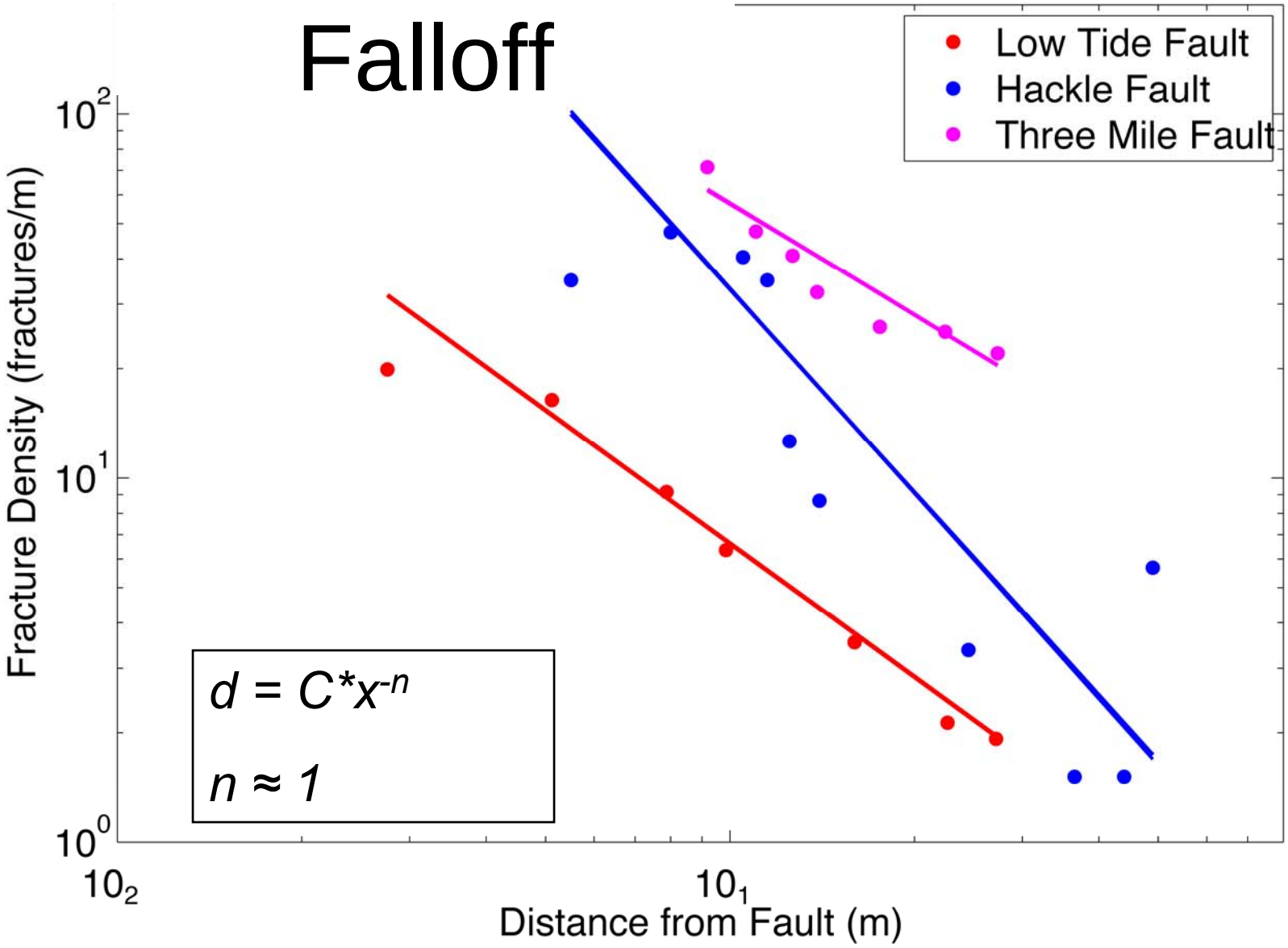



37°N
36°N
123°W
122°W
121°W

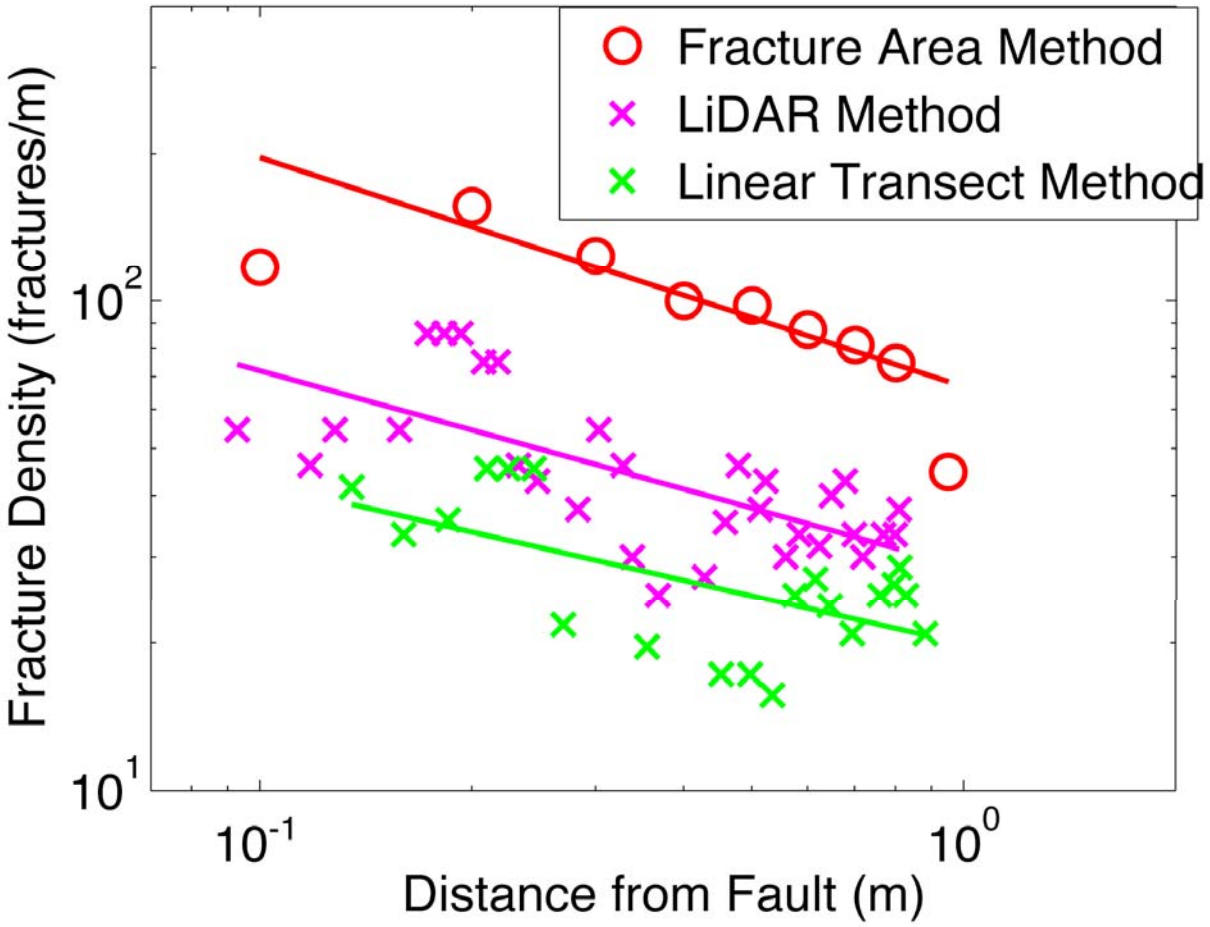

Bed is not offset
1 m
Vertical offset


BlueWater
BlueWater

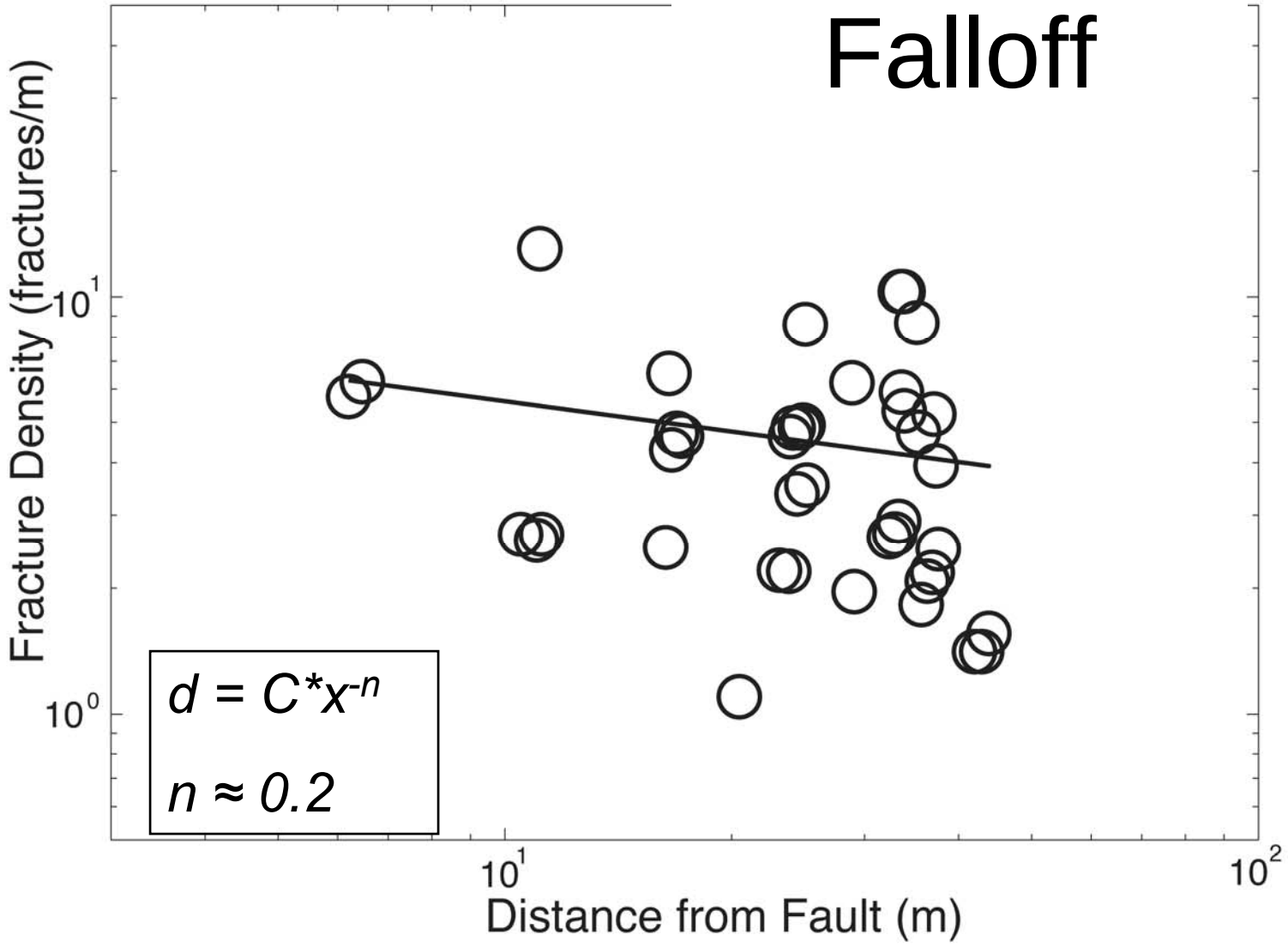
Small Fault Falloff



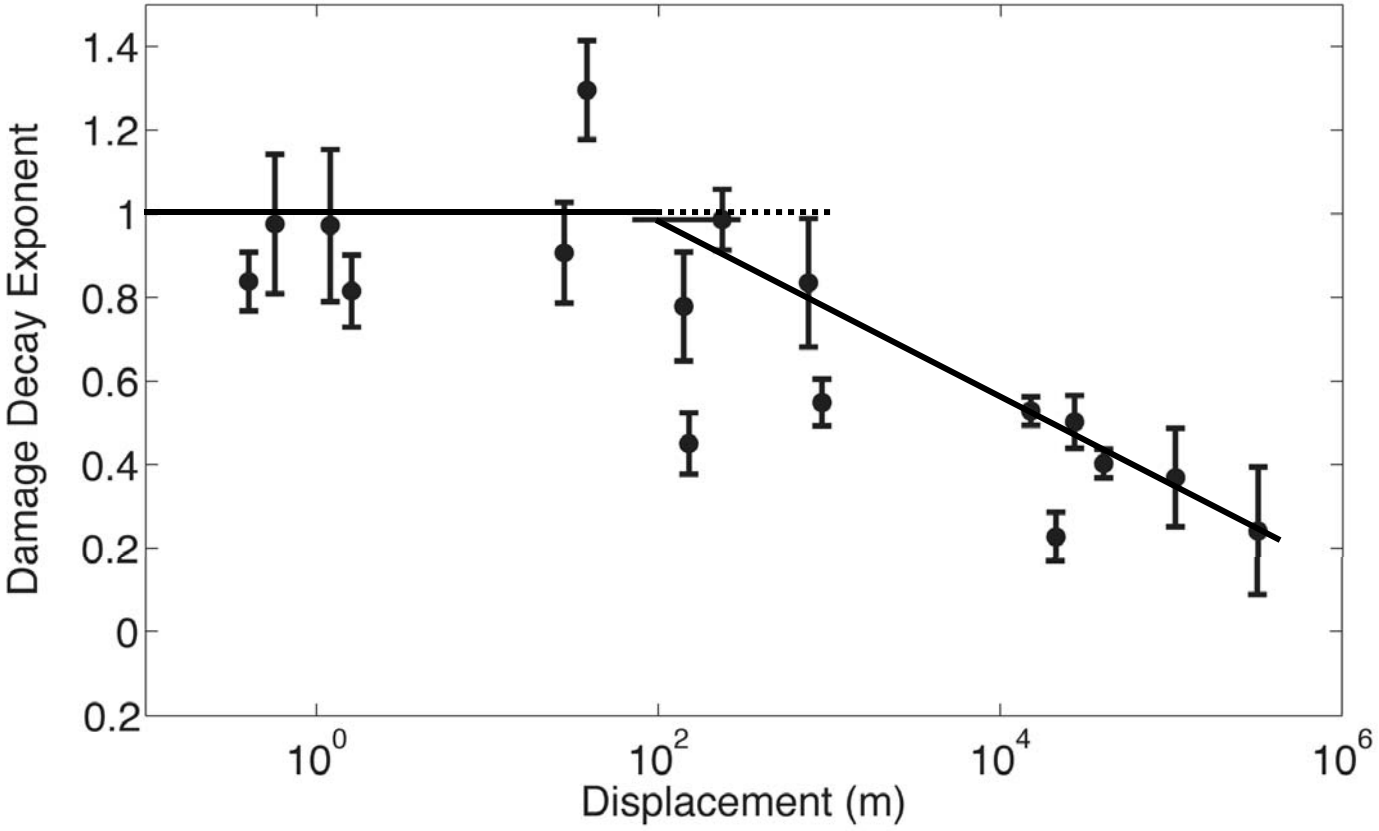
LiDAR Calibration



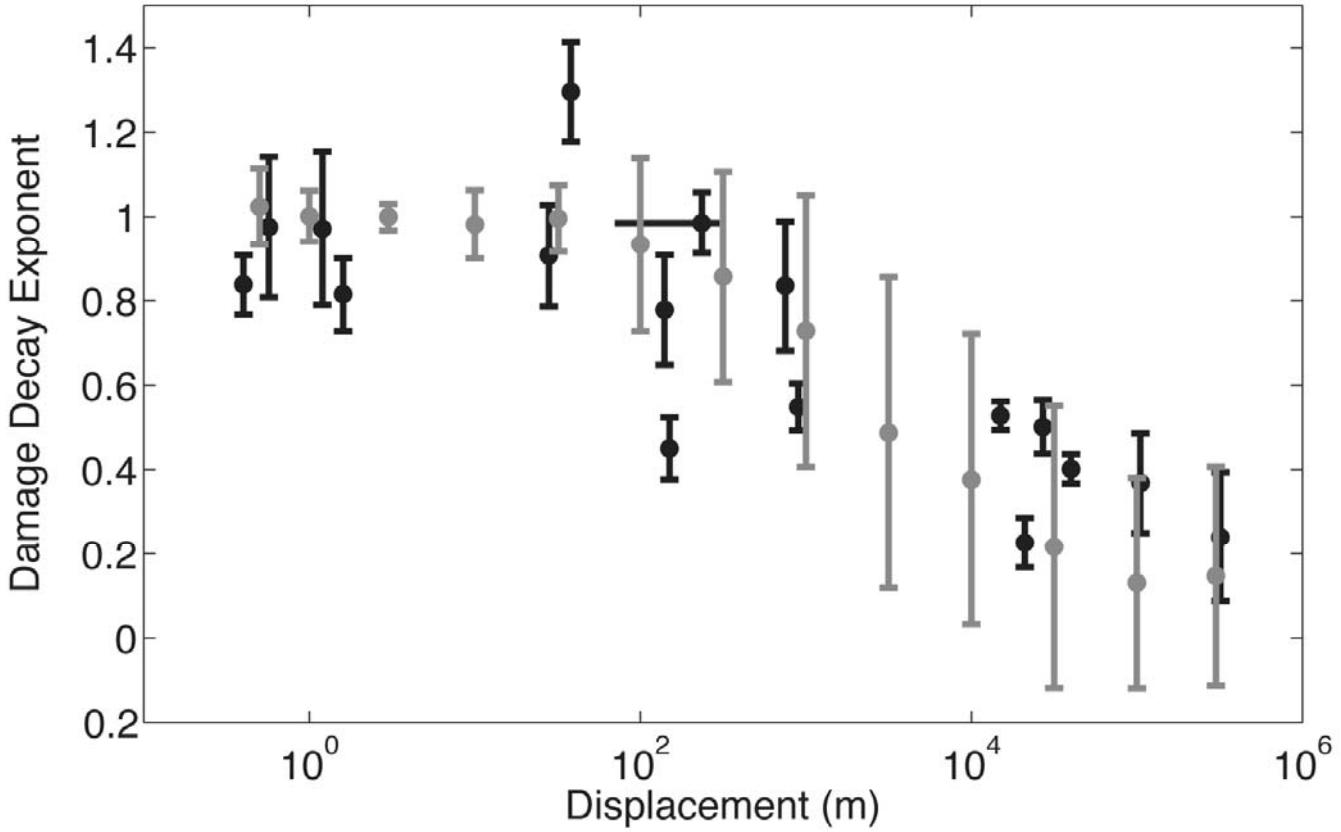
Large Fault Falloff



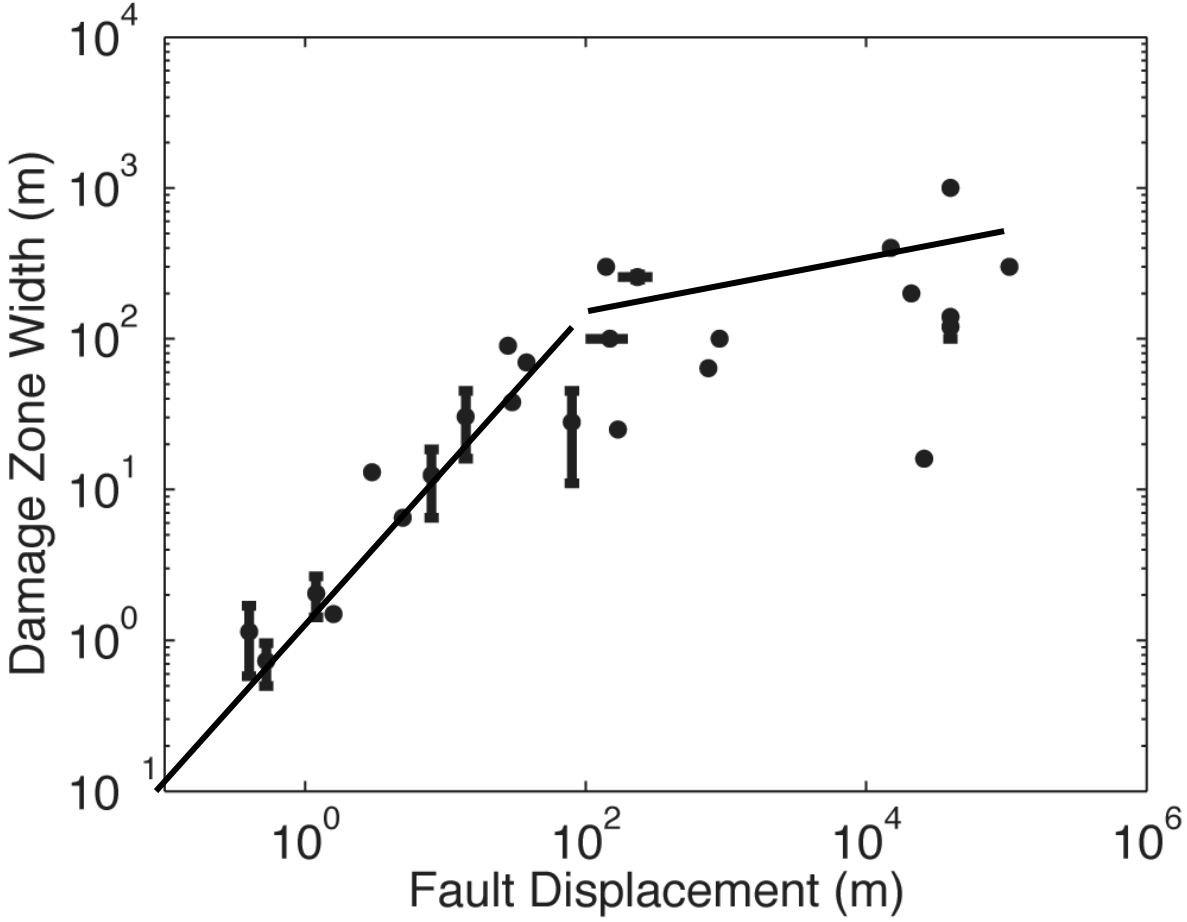
Falloff of Damage is a Function of Displacement



Stochastic Model of Damage Zone Creation



Damage Zone Width Stops Changing With Displacement



Conclusions

- Fracture density decay becomes more gradual with increasing fault displacement
- Small faults fracture more host rock per unit of slip than large faults
- The presence of a damage zone facilitates strand formation but limits further widening of the damage zone

References

Fault Name	*Reference*
Glass	Davatzes et al. 2003
Bartlett	Berg and Skar 2005
North	Davatzes et al. 2003
Helike	Micarelli et al. 2003
Lemont	Fletcher and Savage 2007
Ninety Fathom	Knott 1994
Pirgaki	Micarelli et al. 2003
Kern Canyon	Chester2001
Muddy Mountain	Brock and Engelder 1977, Fleck 1970
Flower	Sagy and Brodsky 2009
Punchbowl	Chester and Logan 1986, Wilson et al 2003
Arava	Janssen et al. 2004

Continued	
San Gabriel	Chester et al. 2004
14m	de Joussineau and Aydin, 2007
8m	de Joussineau and Aydin, 2007
Aigion	Micarelli et al. 2003
Caleta Coloso	Faulkner et al. 2008
Carboneras	Faulkner et al. 2003
Lonewolf	de Joussineau and Aydin 2007
Naqb Budra	Du Bernard et al. 2002
Punchbowl	Schulz and Evans 2000
Wadi Araba	Du Bernard et al. 2002