

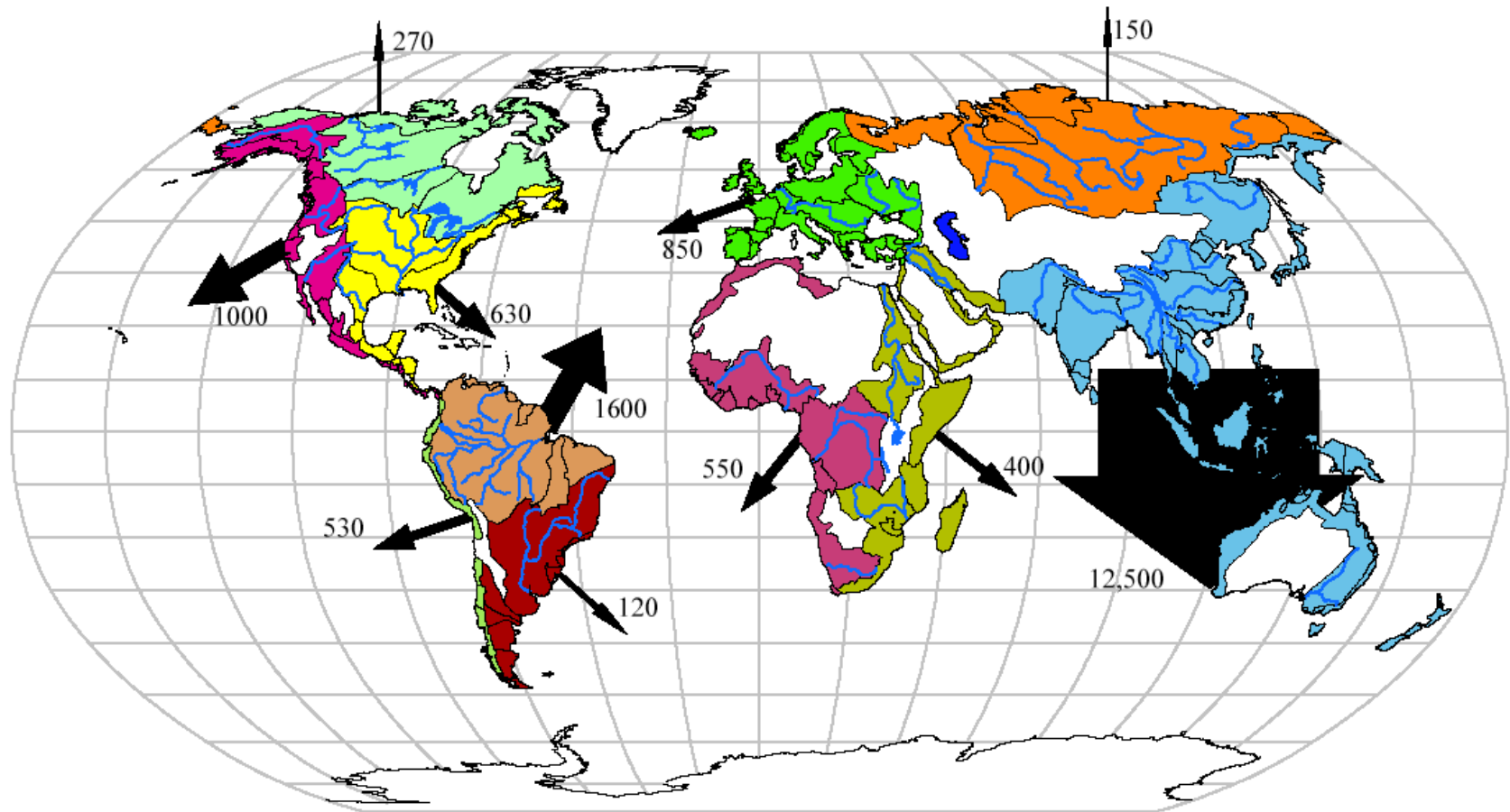
Episodic Events and Their Significance in Sediment Delivery from Small Mountainous Rivers (as Told by a Catastrophist)



J.D. Milliman¹, T.Y. Lee², S.J. Kao², J.A. Warrick³

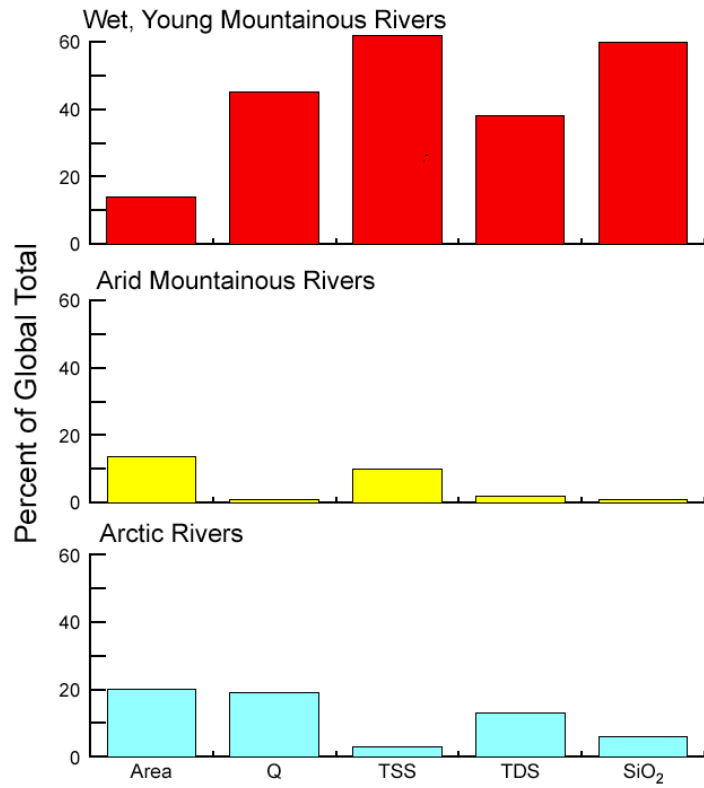
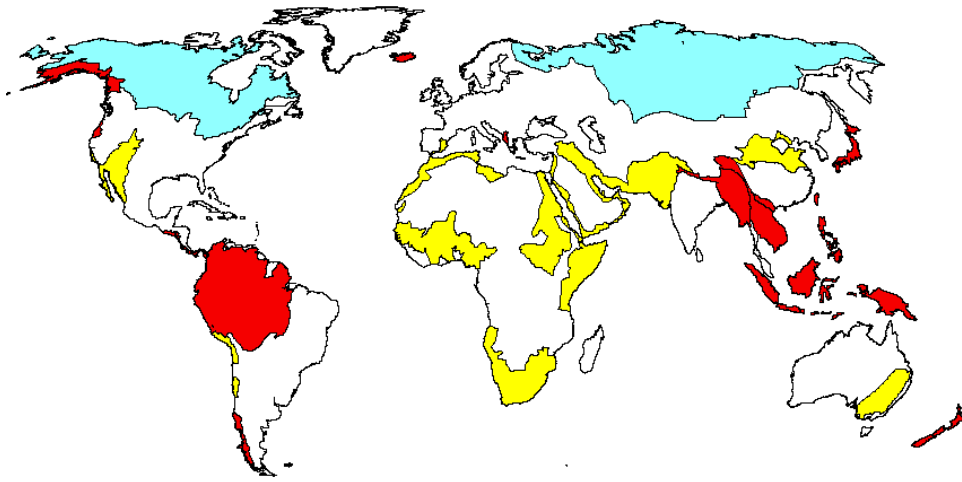
1. VIMS at College of William and Mary
2. Academia Sinica Taiwan, Taipei
3. USGS, Santa Cruz

Fluvial Discharge of Suspended Sediment to the Coastal Ocean

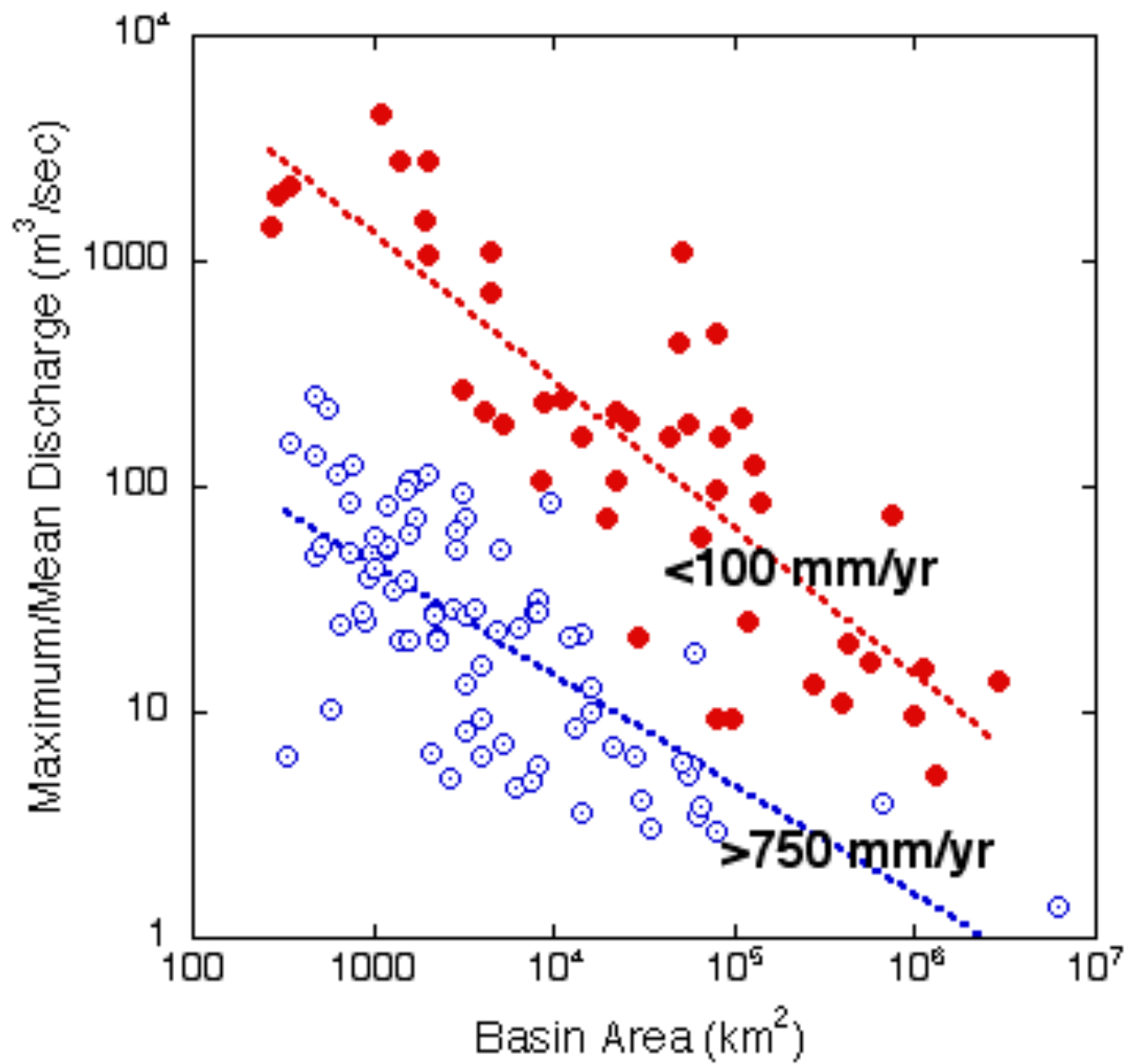


Total = $19,000 * 10^6$ t/yr

Milliman and Farnsworth, 2011

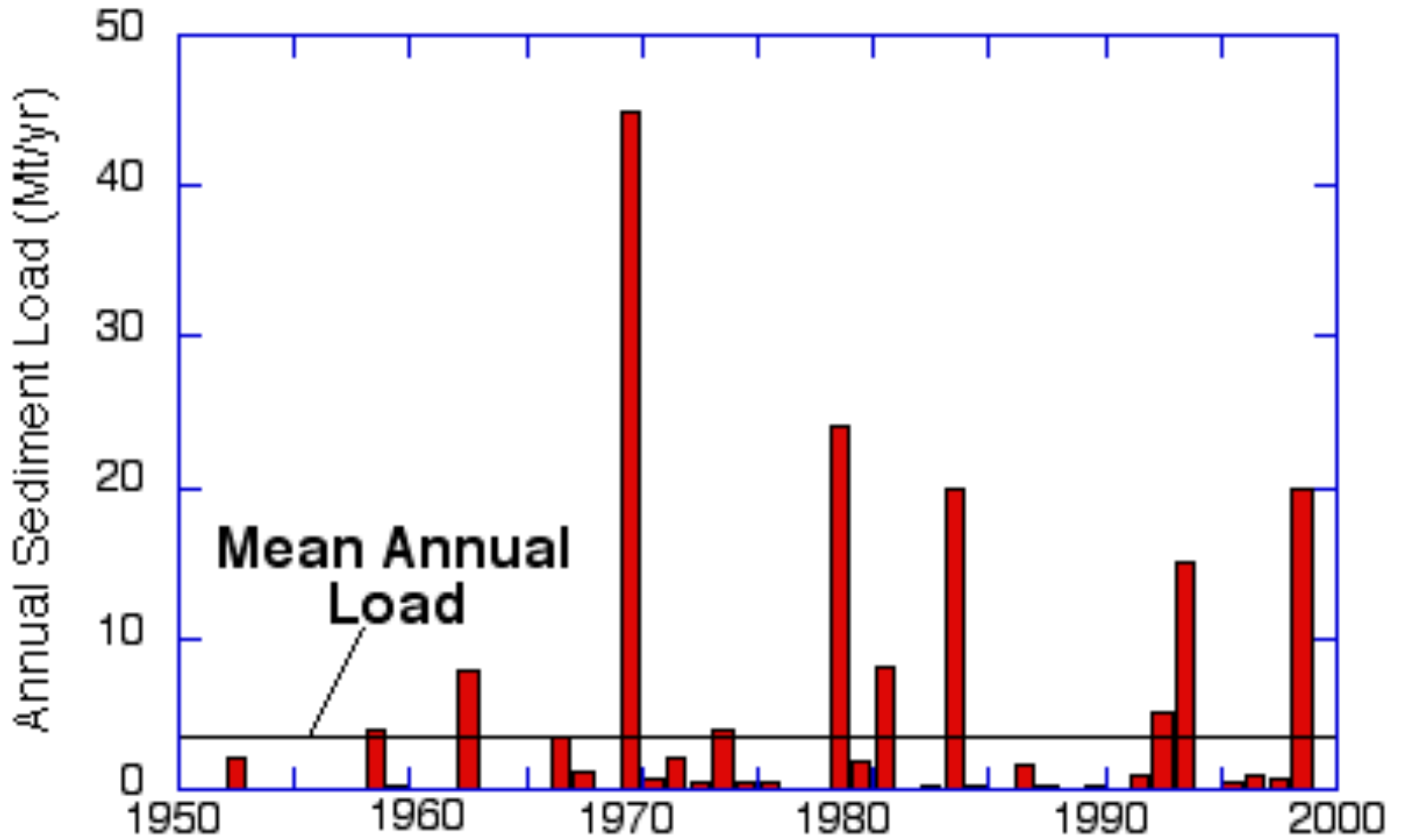


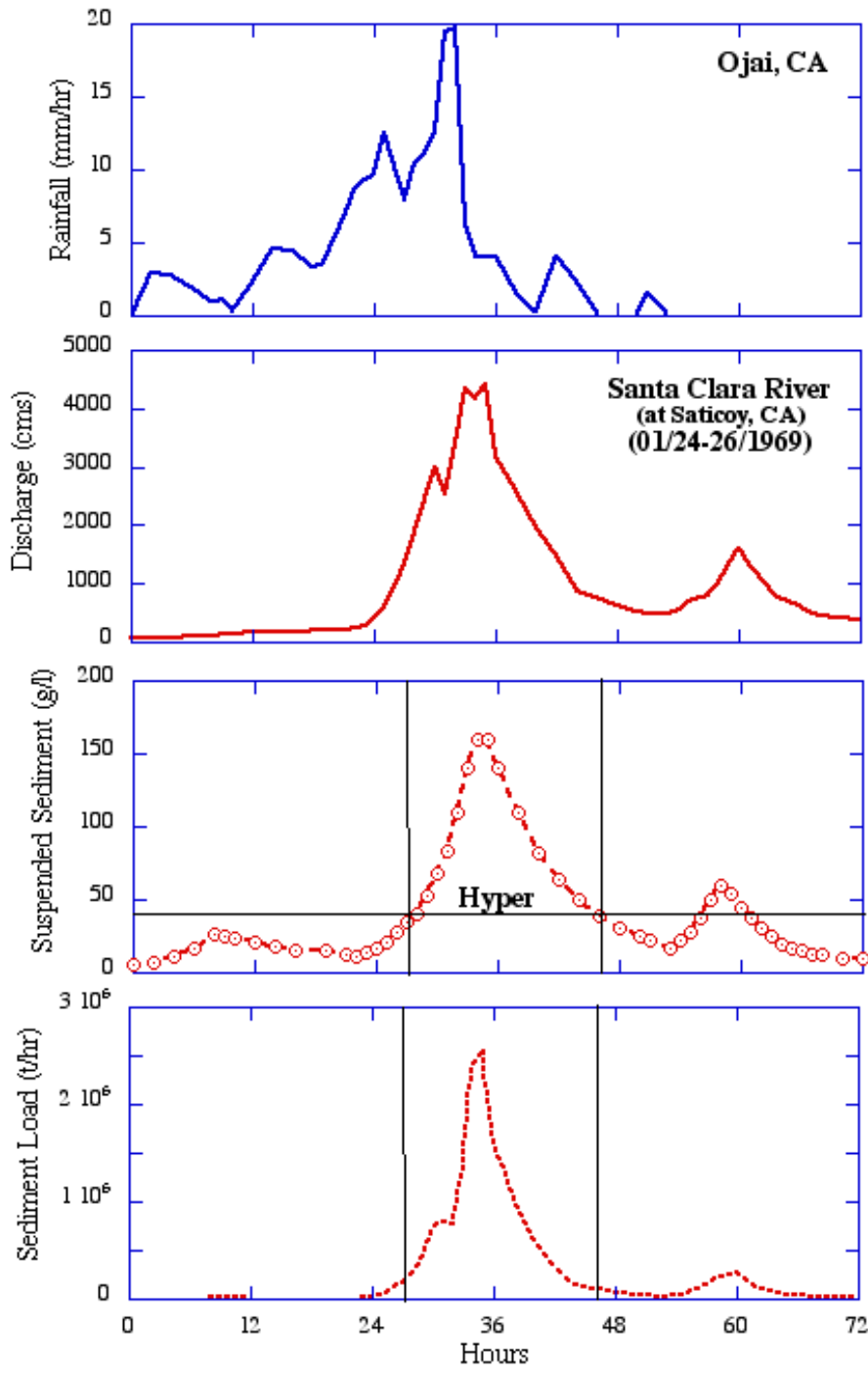
Milliman and Farnsworth, 2011



Santa Clara River

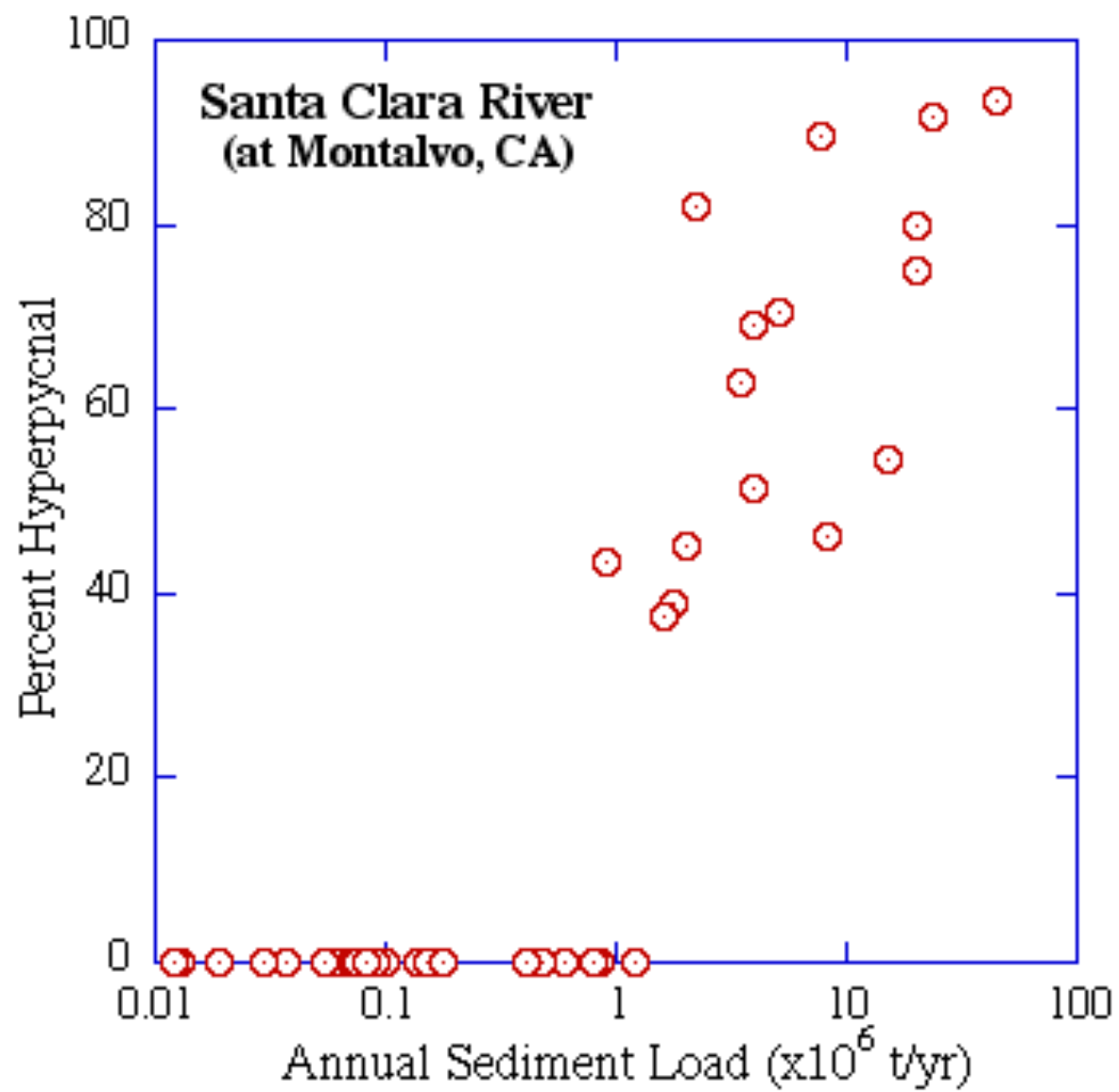
(at Montalvo, CA)

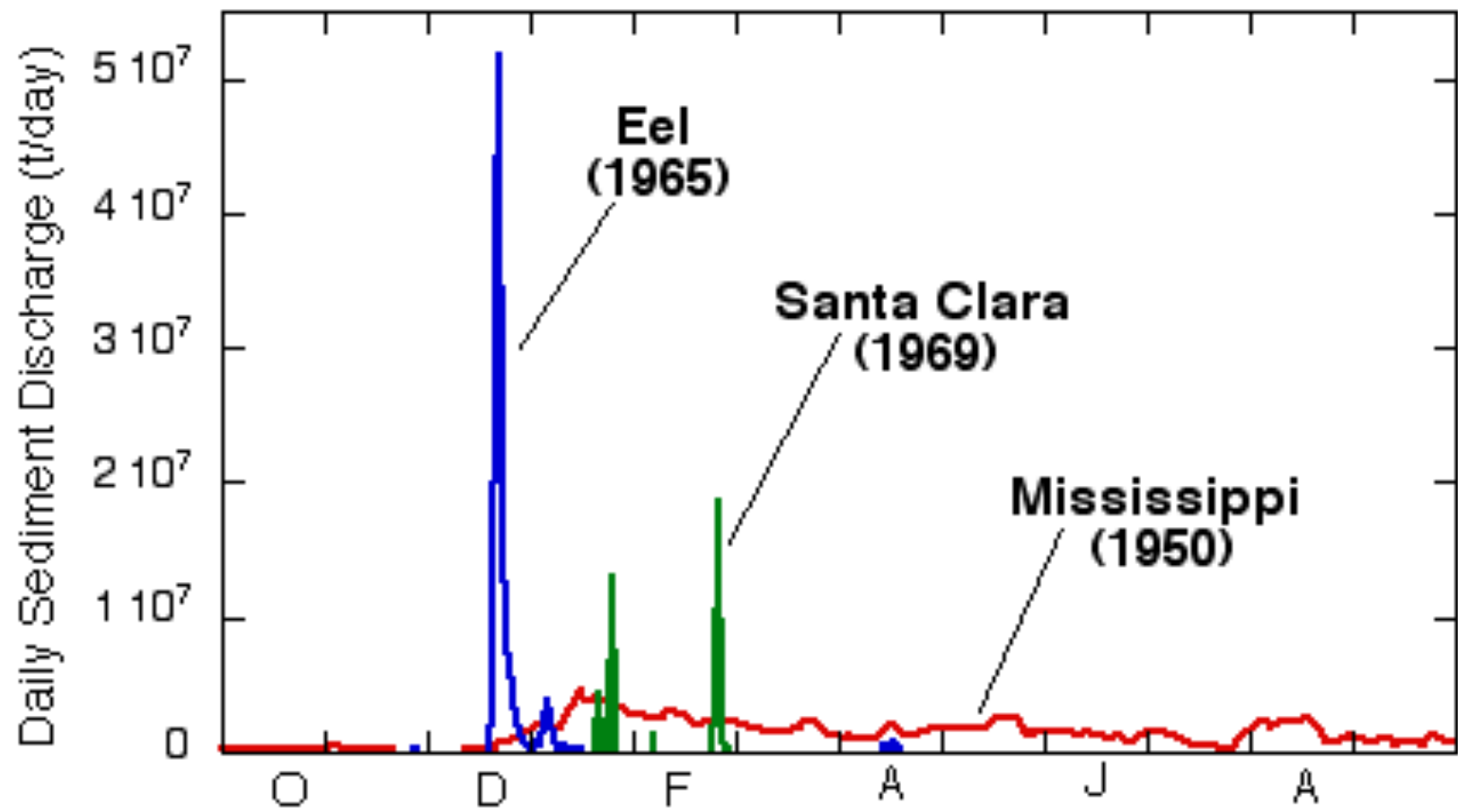


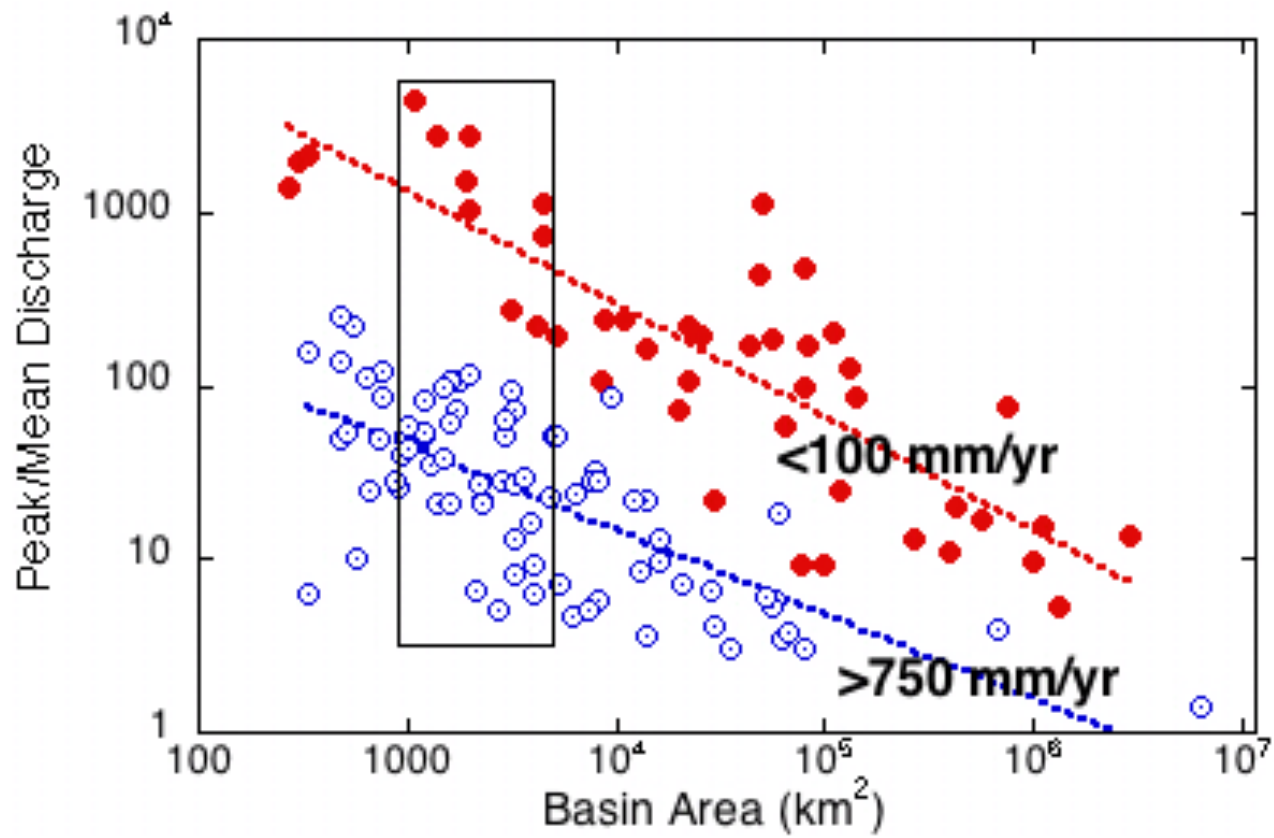


Warrick and Milliman, 2003

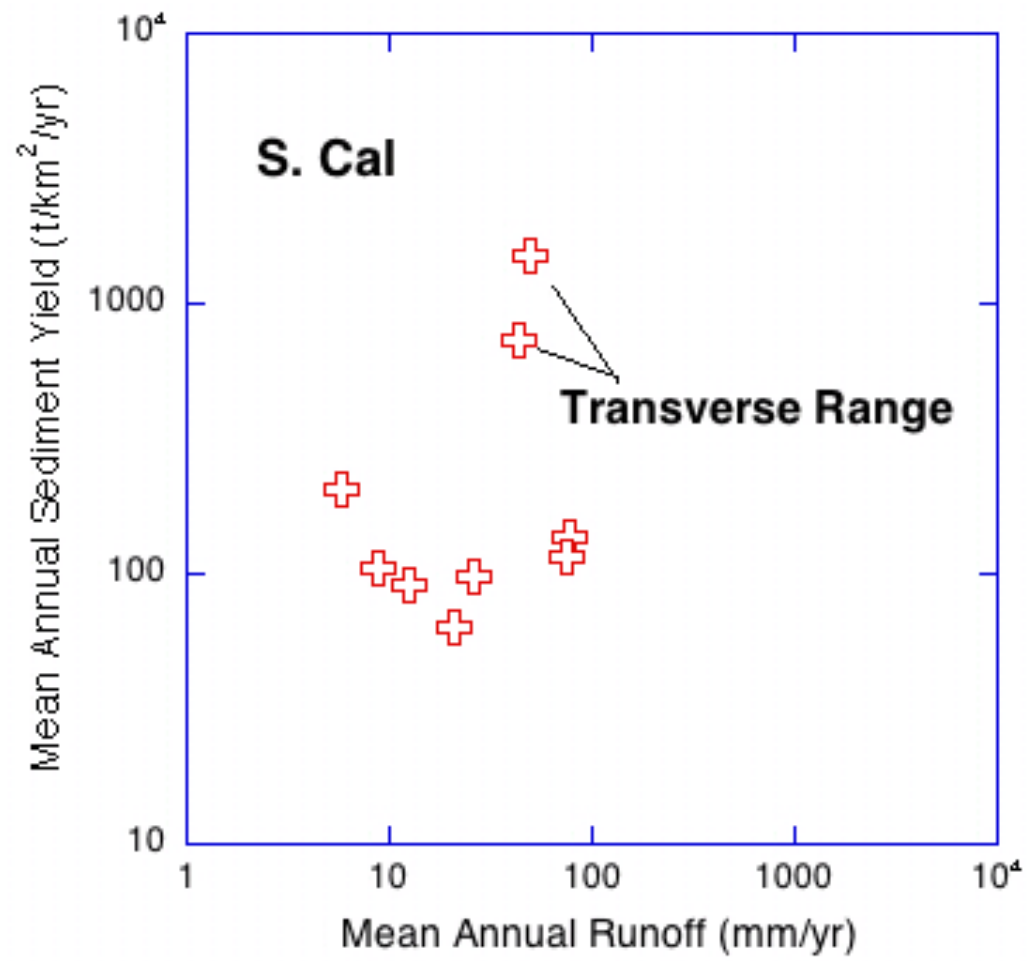


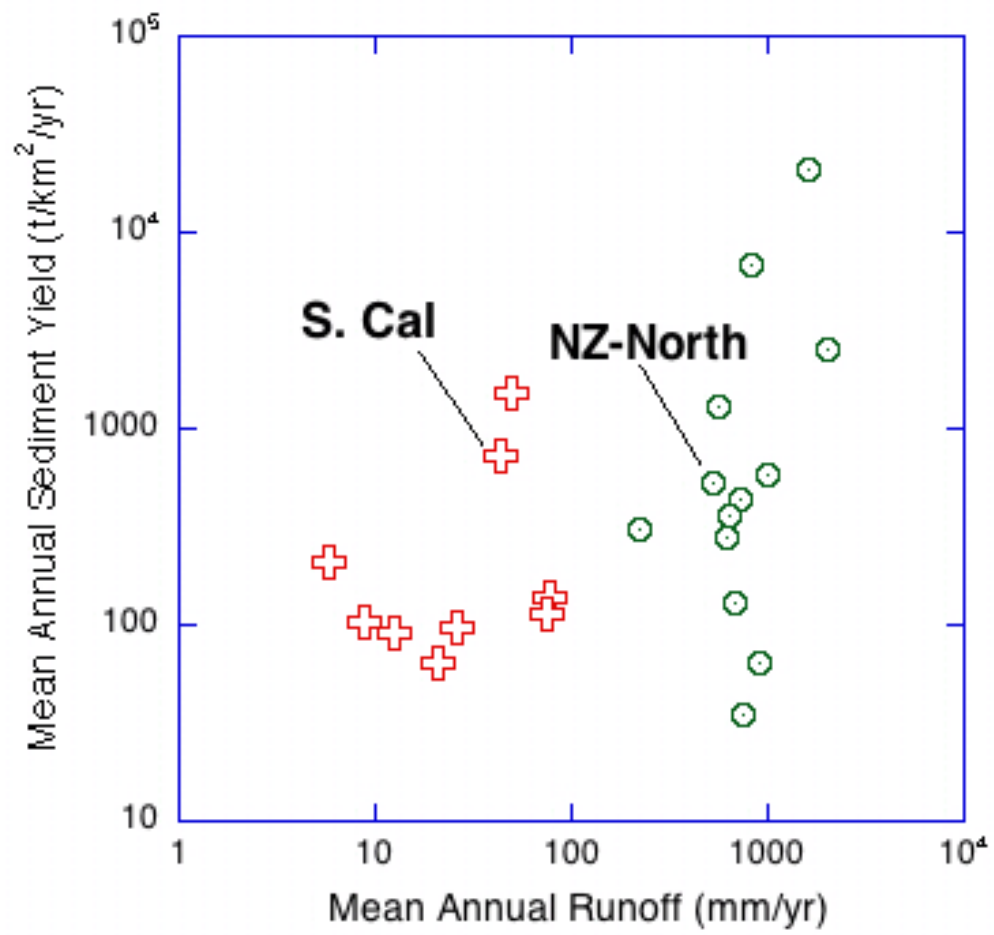


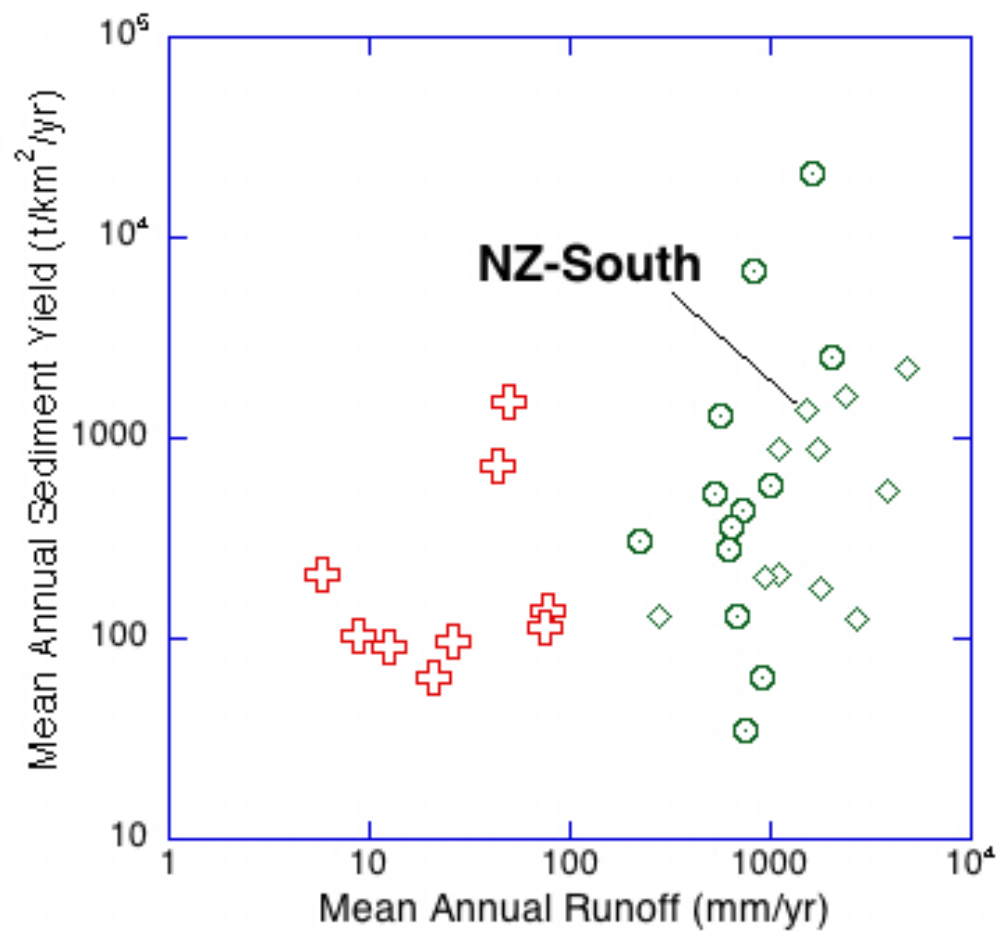


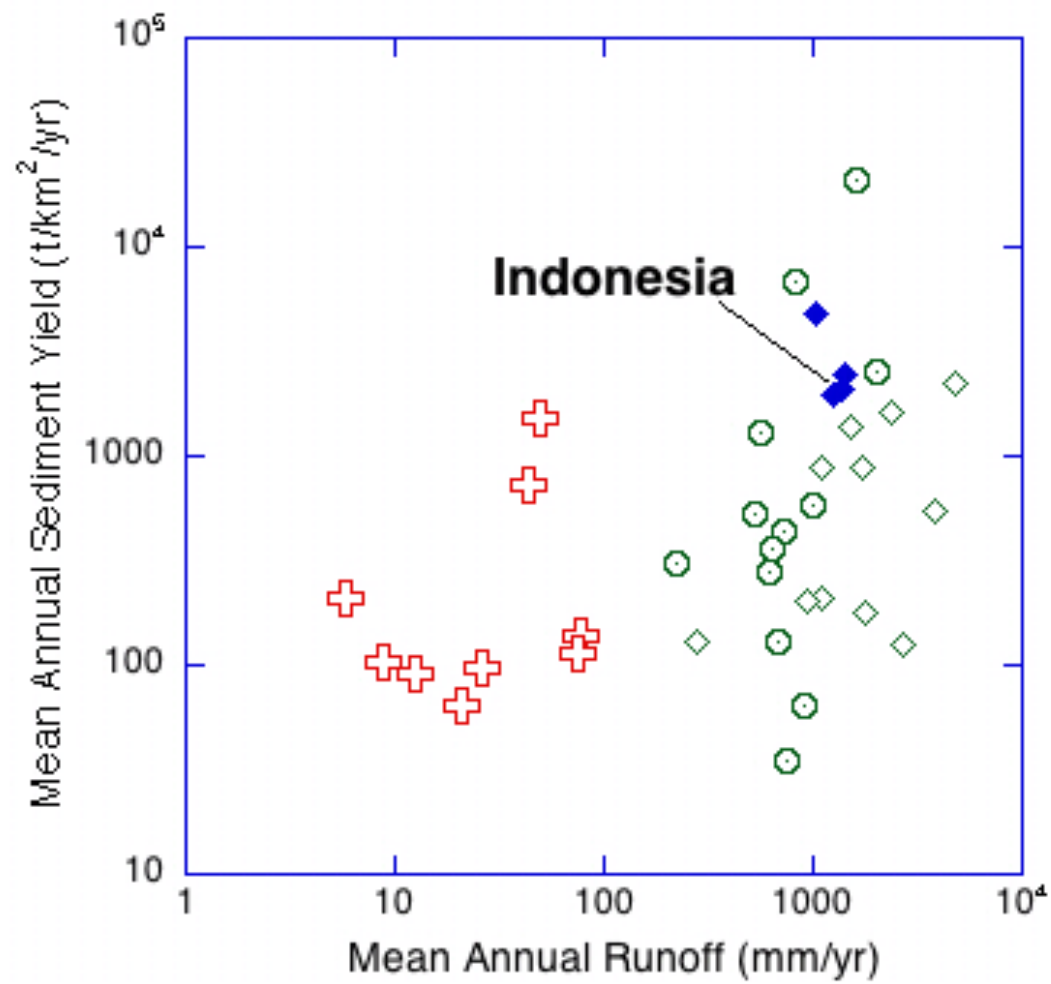


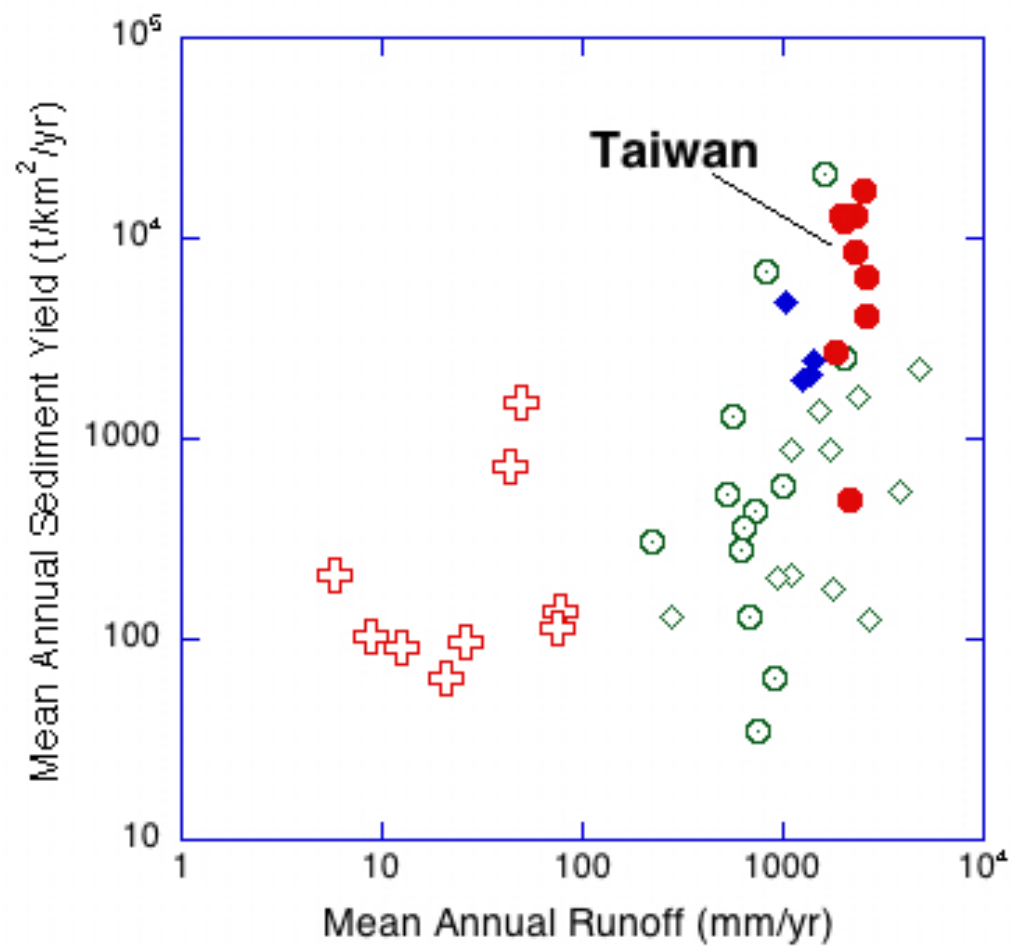
Milliman and Farnsworth, 2011

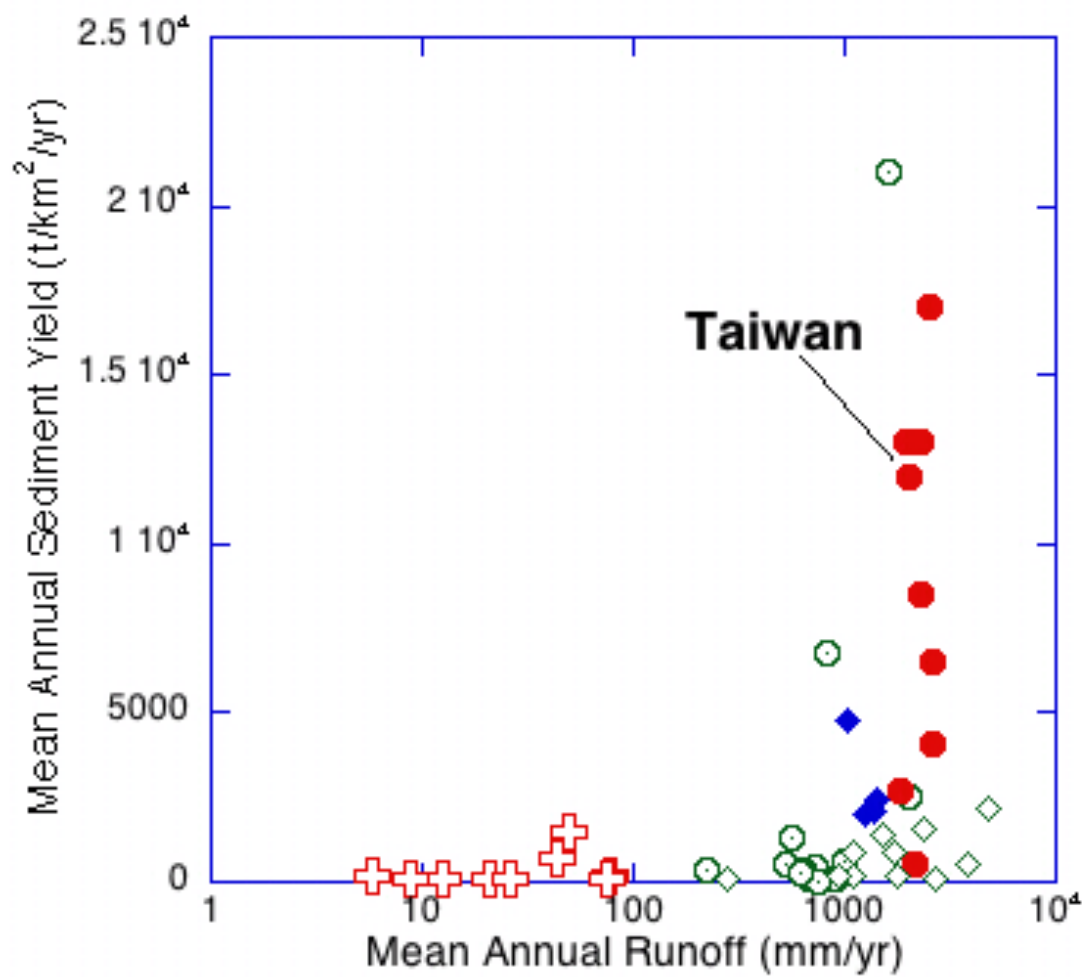




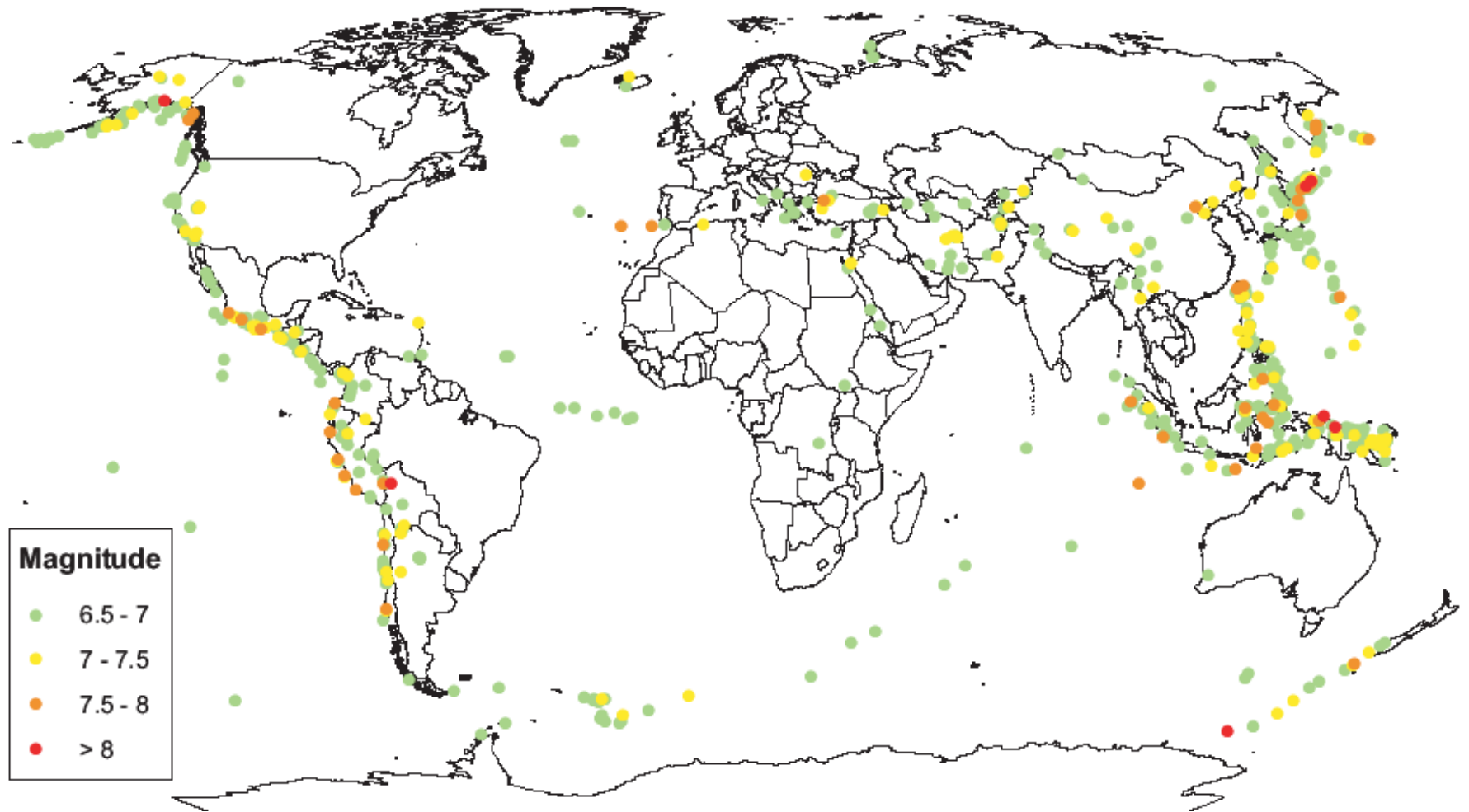






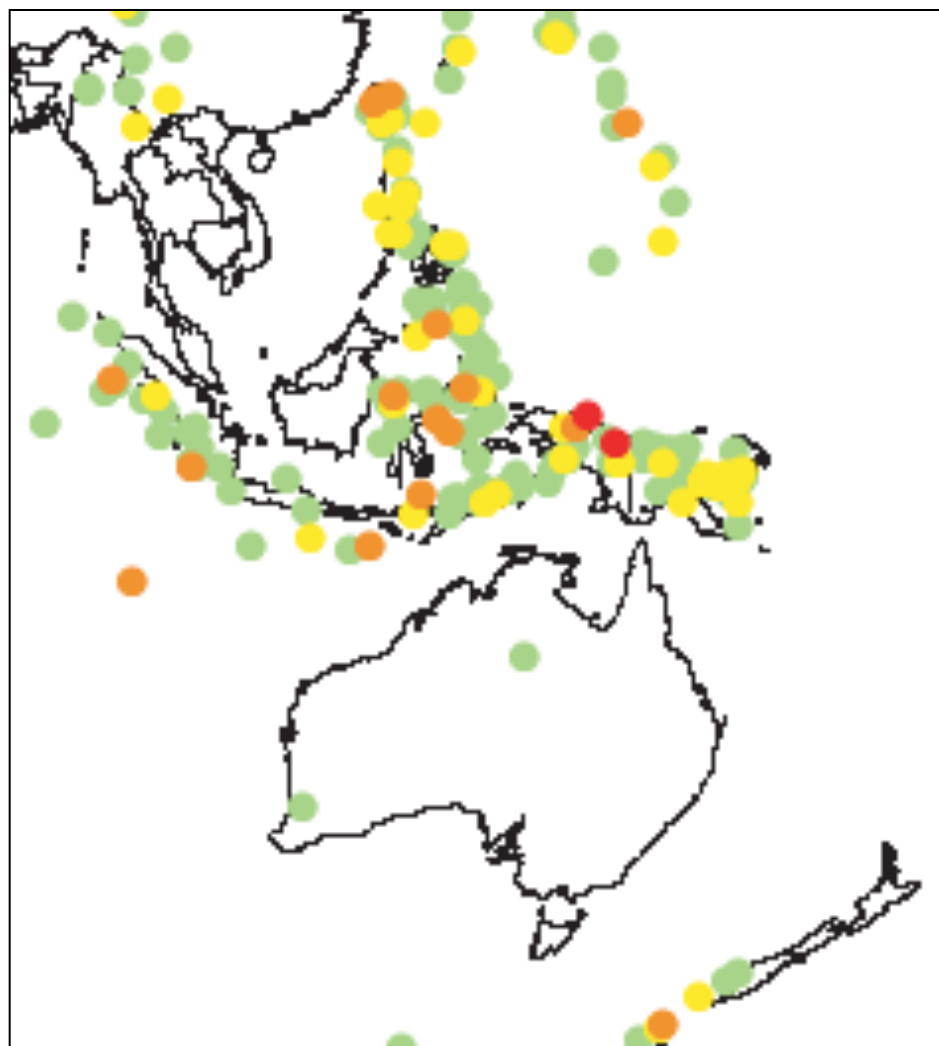
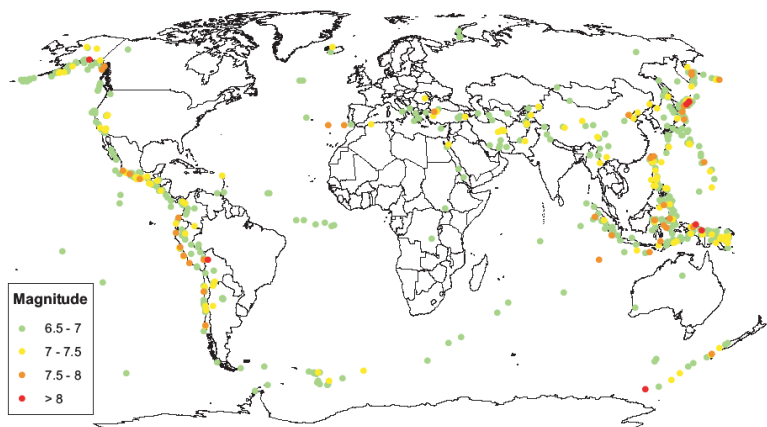


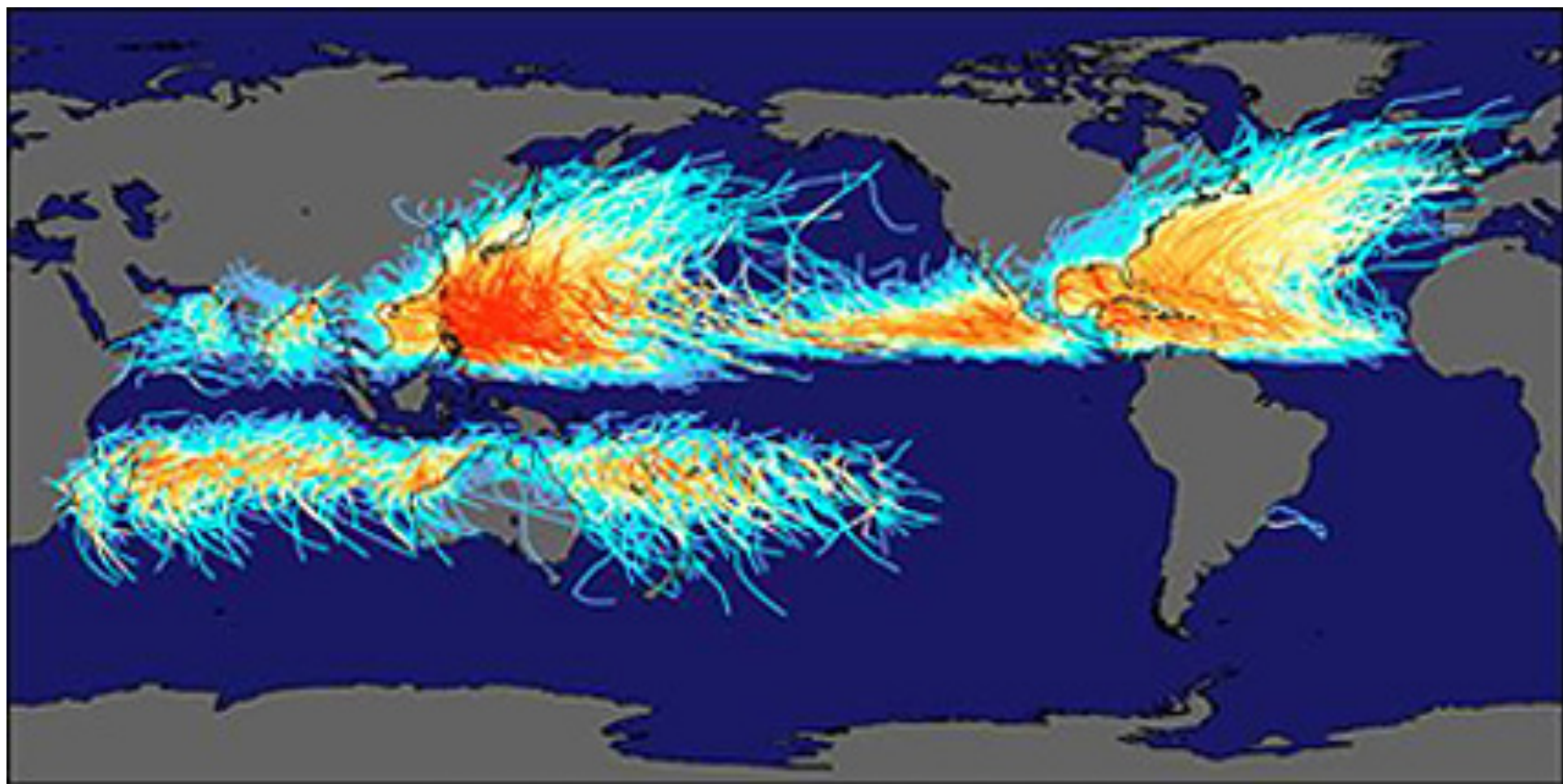
Earthquake Epicenters 1950 - 2000



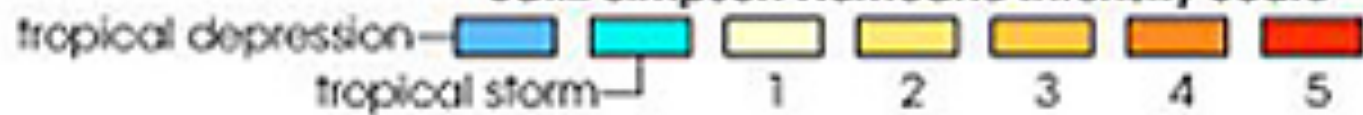
Milliman and Farnsworth, 2011

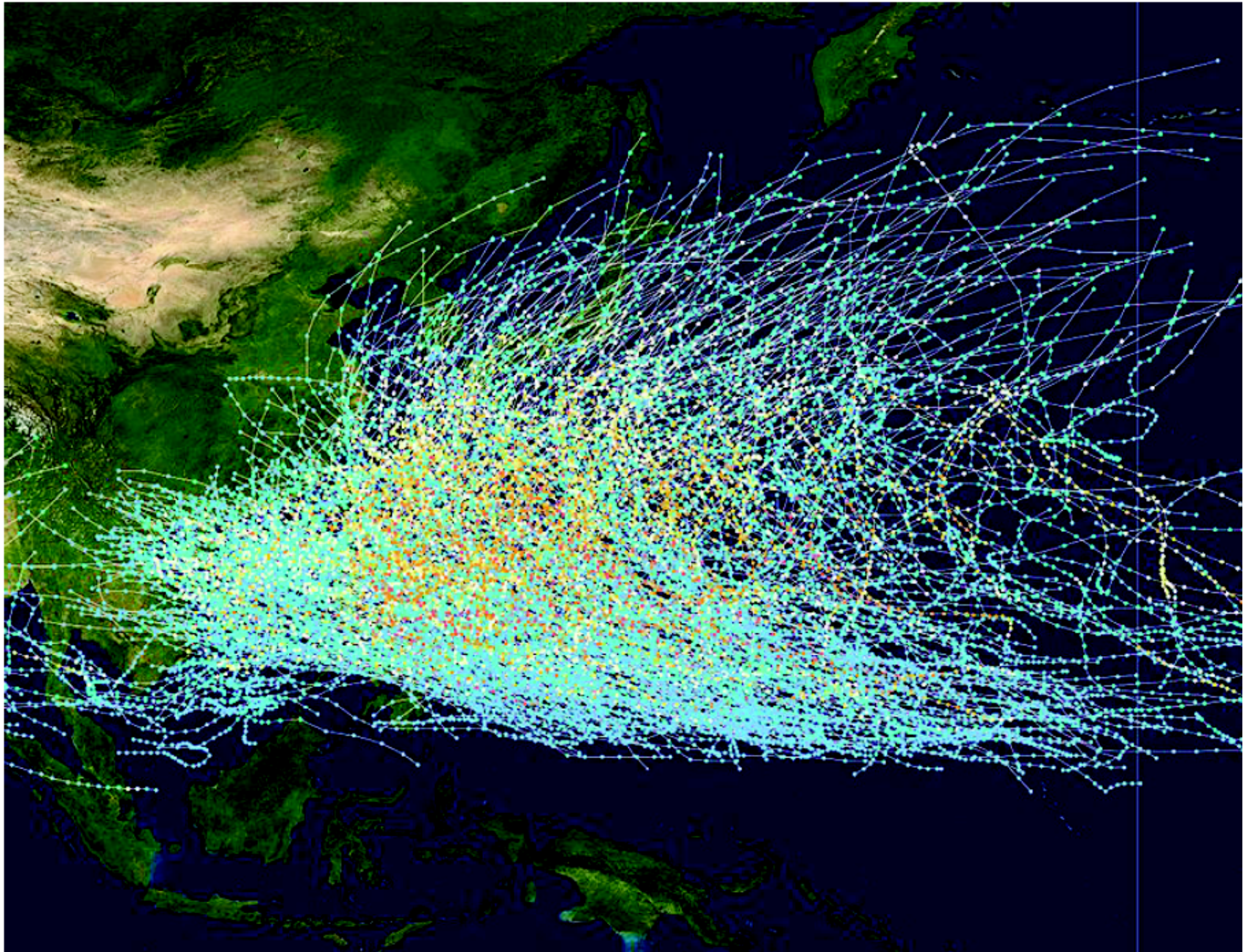
Earthquake Epicenters 1950 - 2000





Saffir-Simpson Hurricane Intensity Scale





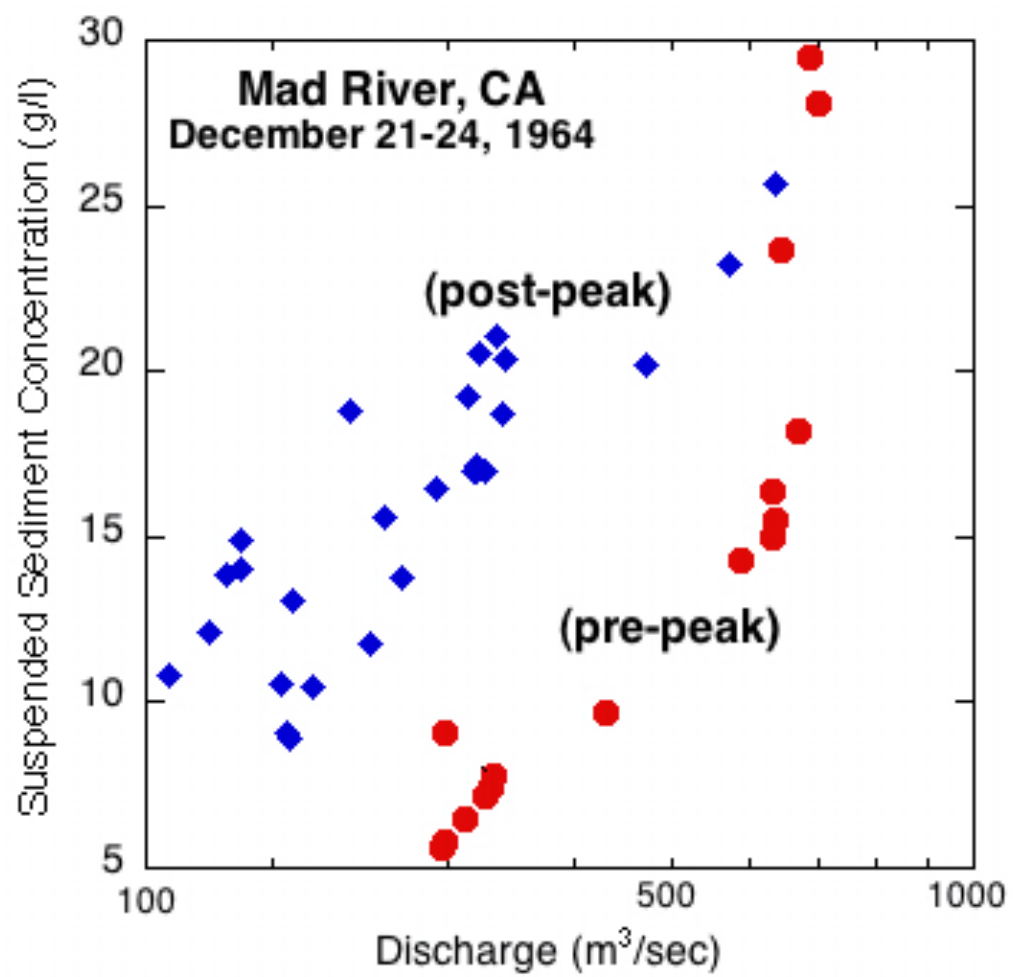
Perturbations -> Down-Gradient Transport

1. Sediment Supply

- Increased Sediment Concentrations

2. Floods:

- Increased Sediment Transport





Wildfire in the chaparral

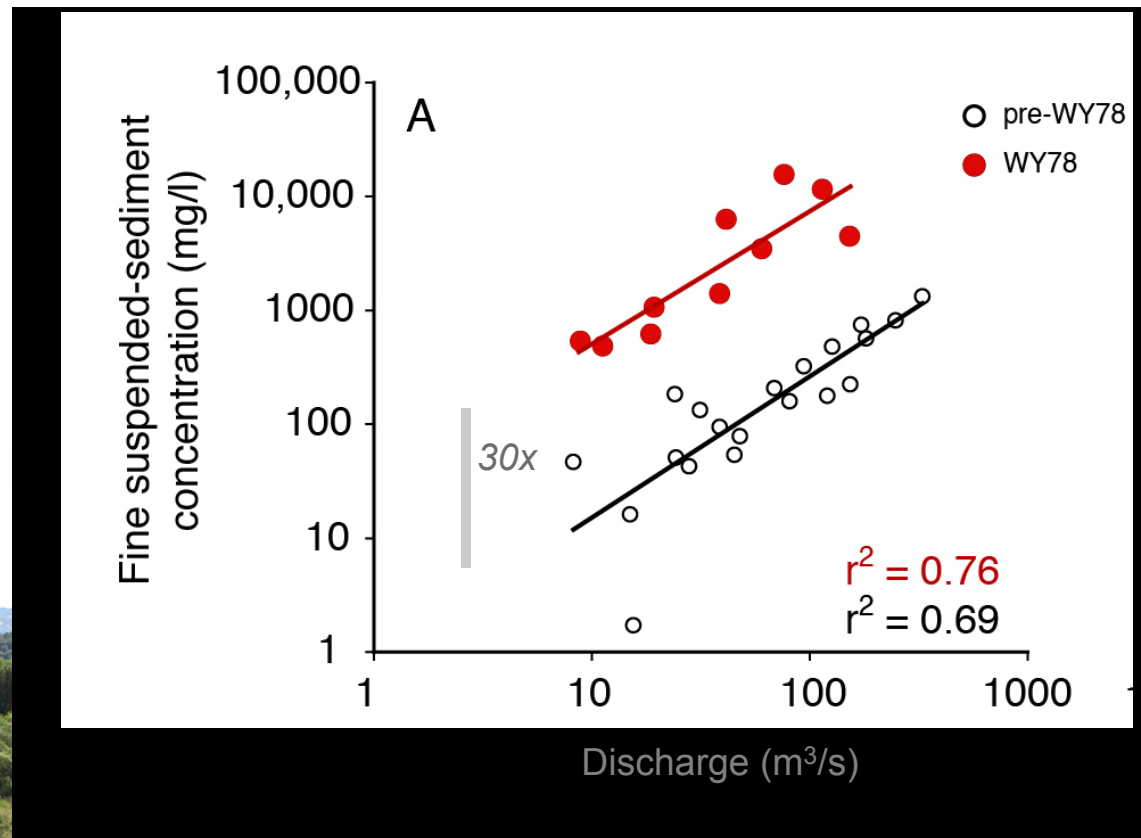
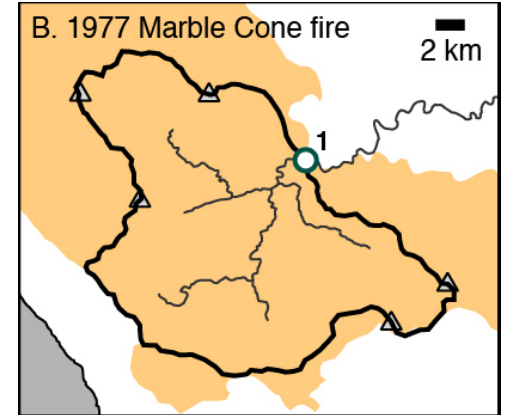


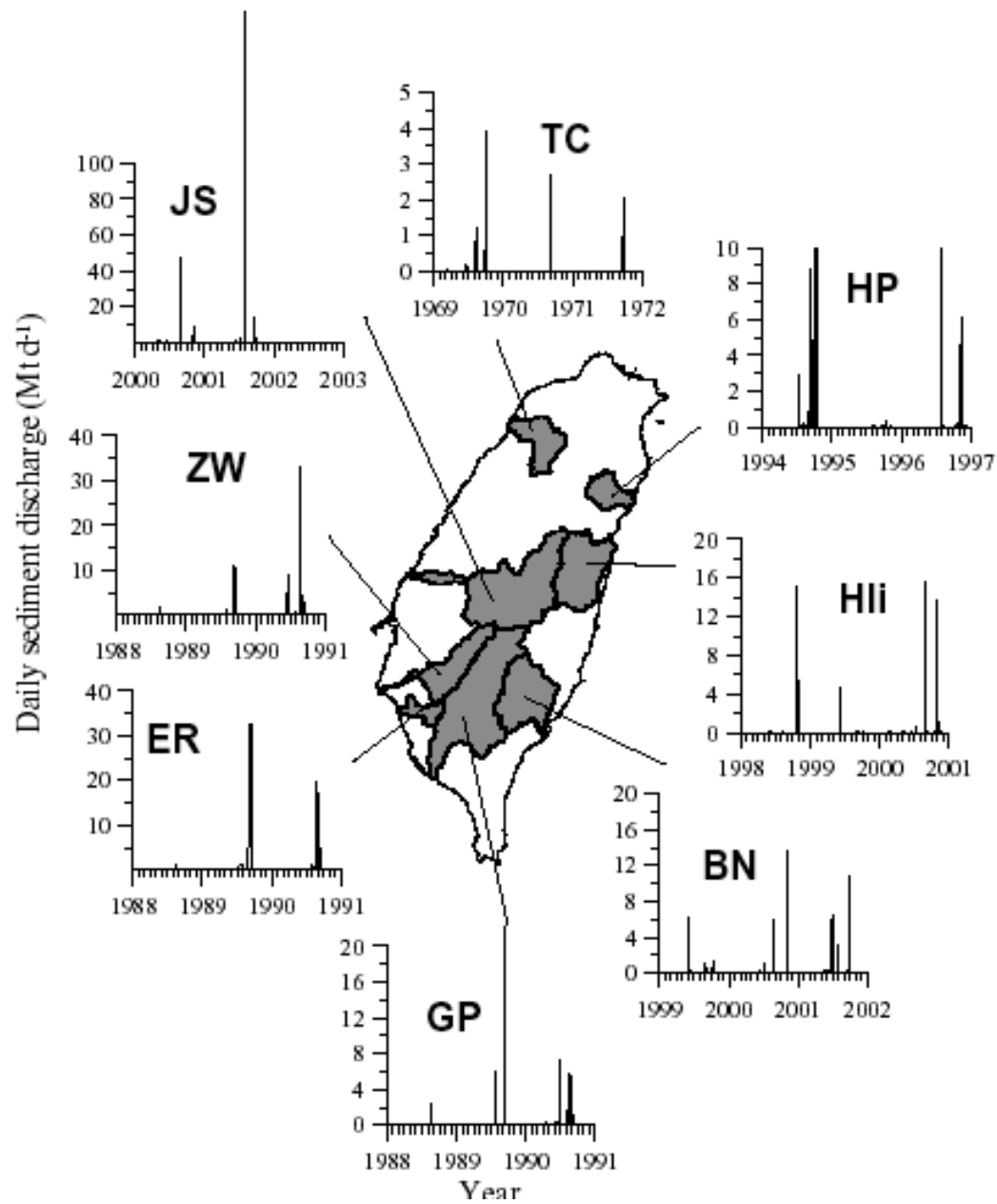
17 Nov., 2008

Arroyo Seco suspended-sediment samples

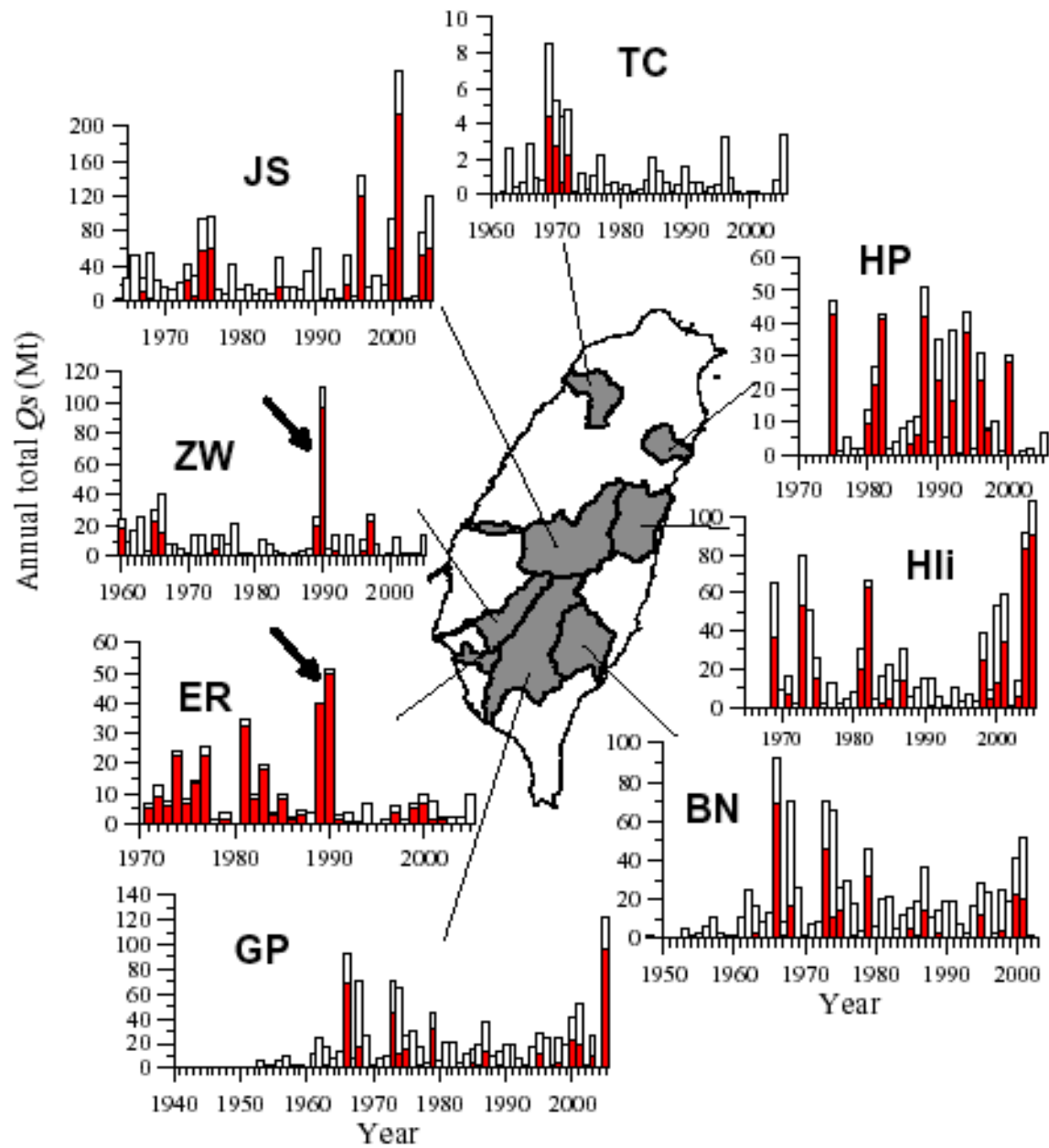
293 km²

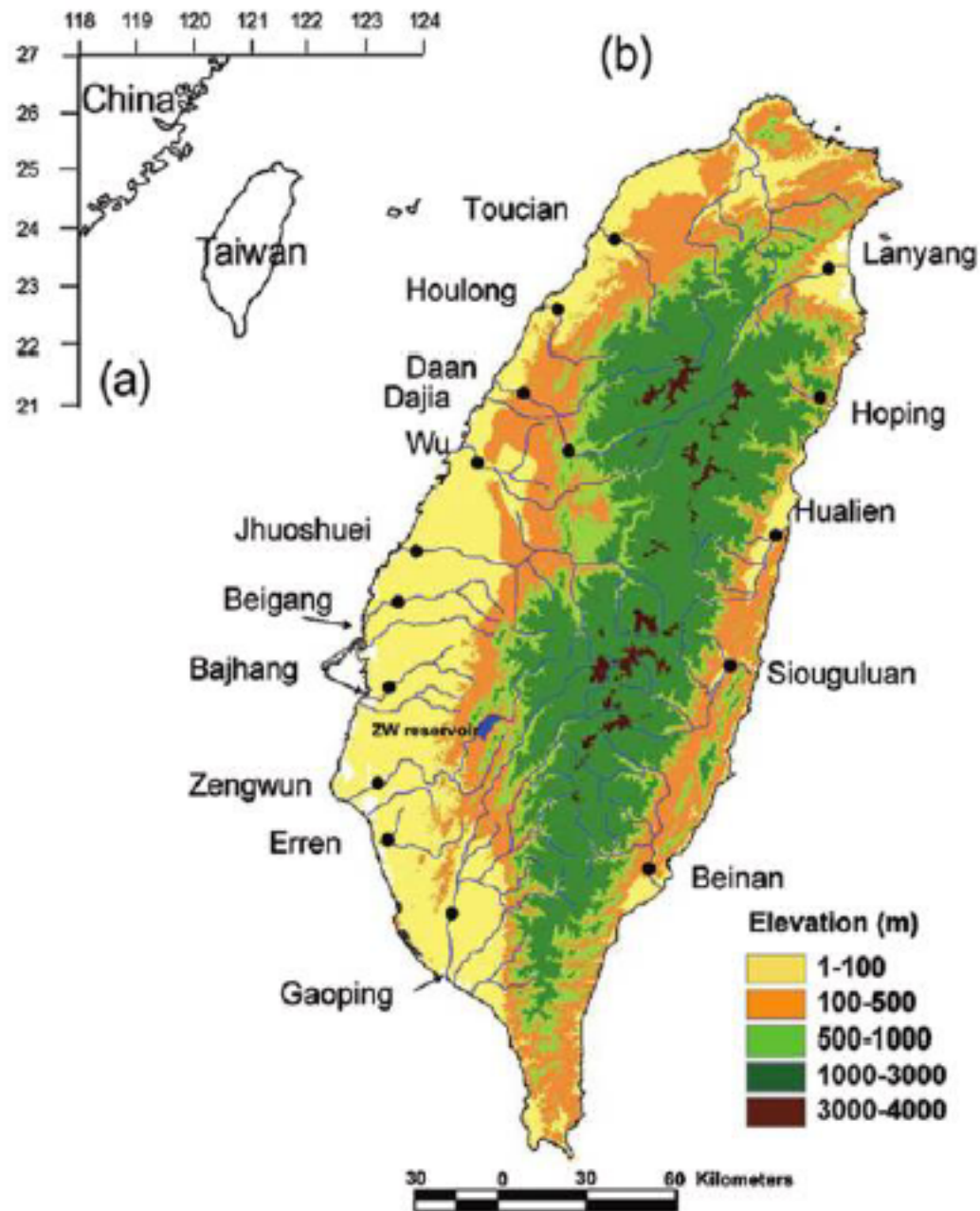
-silt and clay (<0.063 mm)



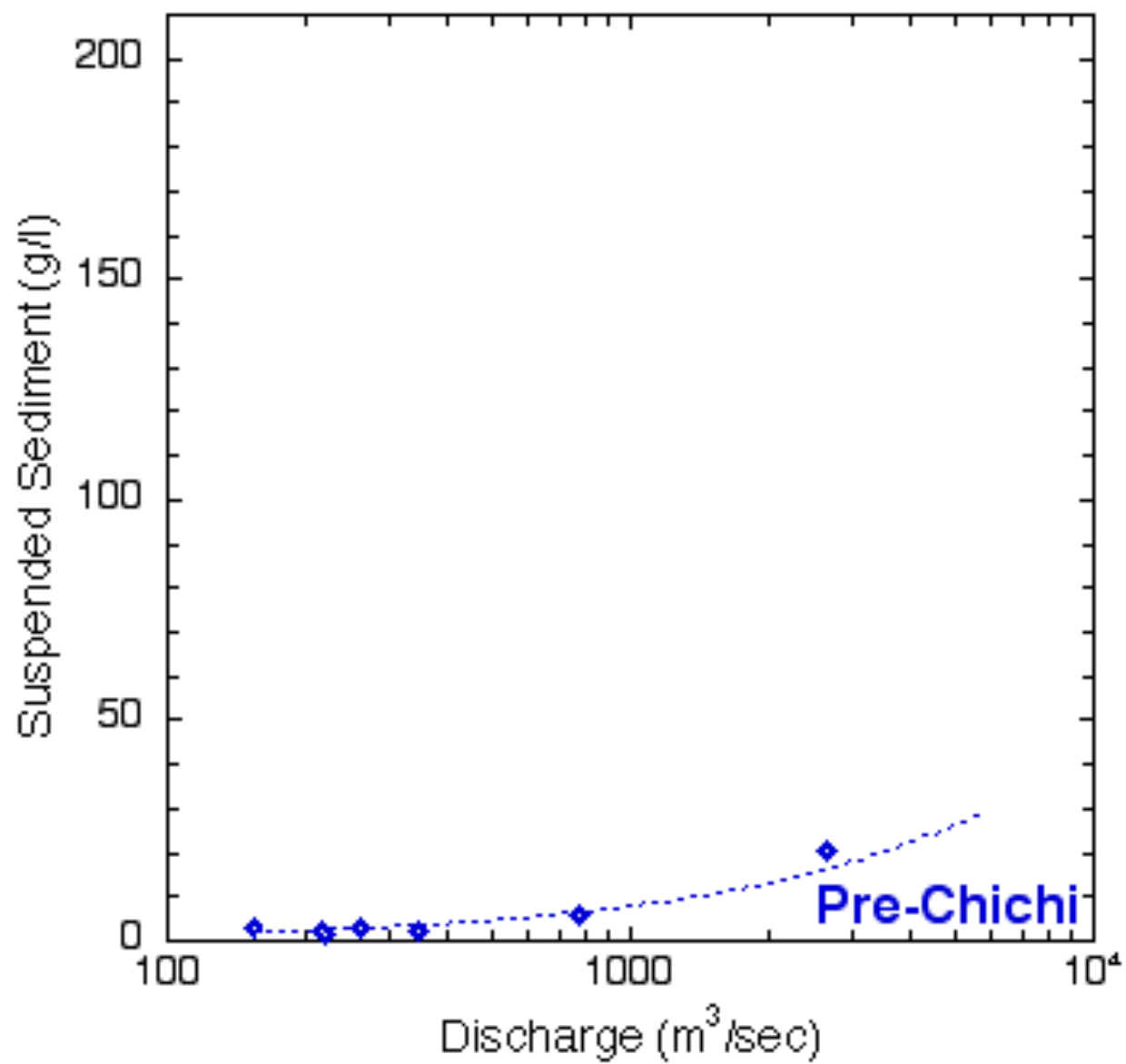


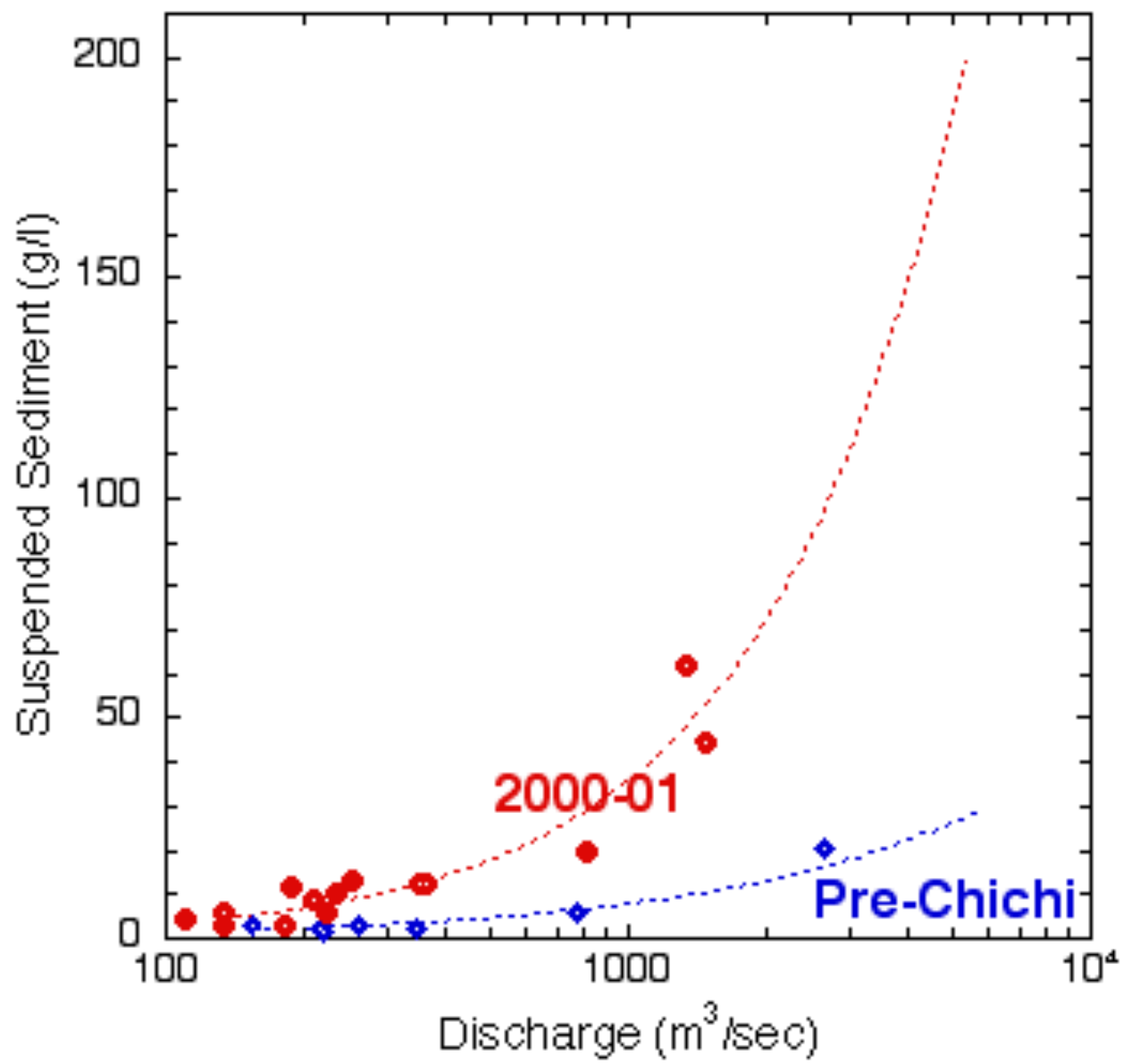
Kao and Milliman, 2008

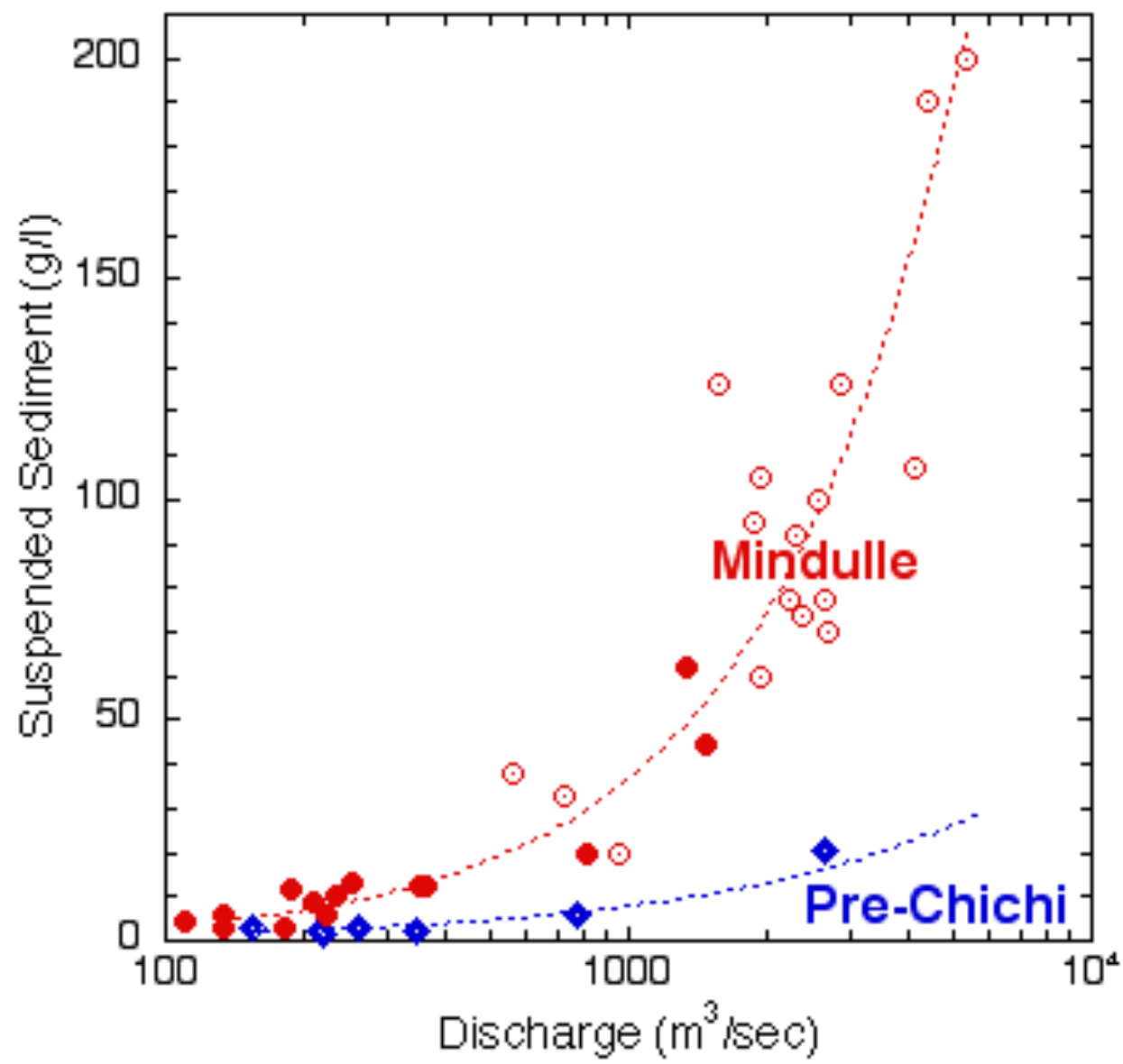




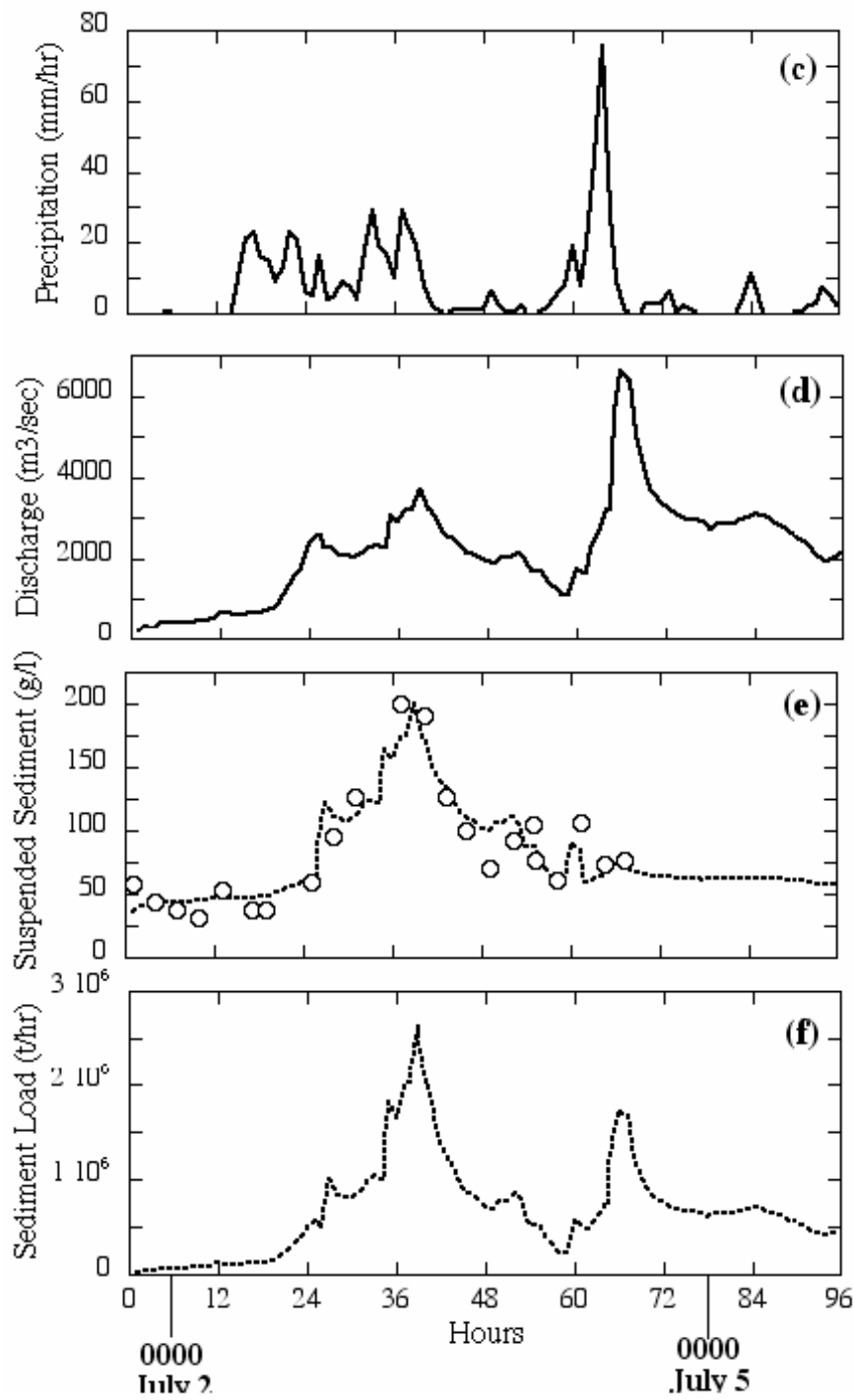
Kao and Milliman, 2008





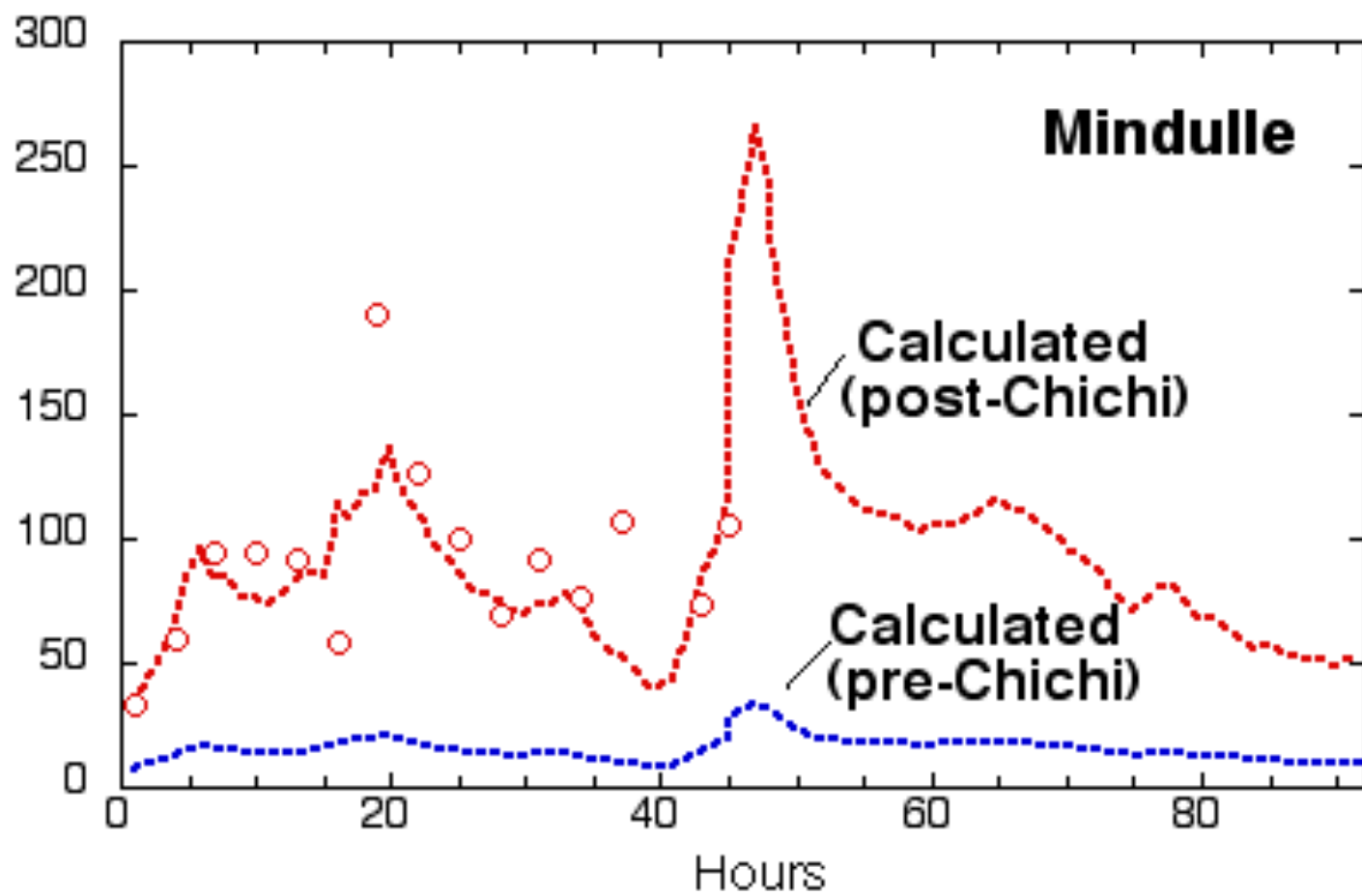


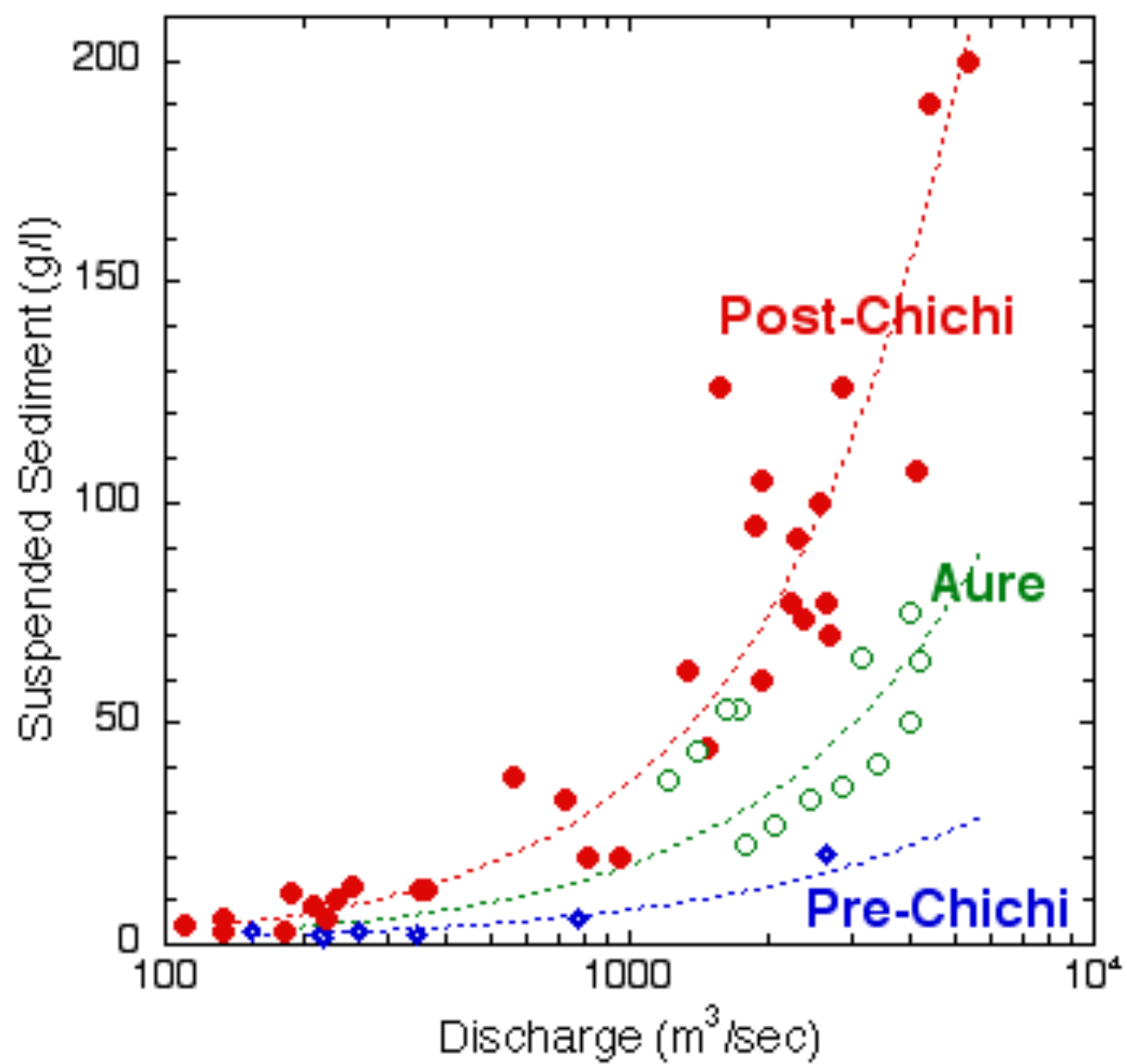




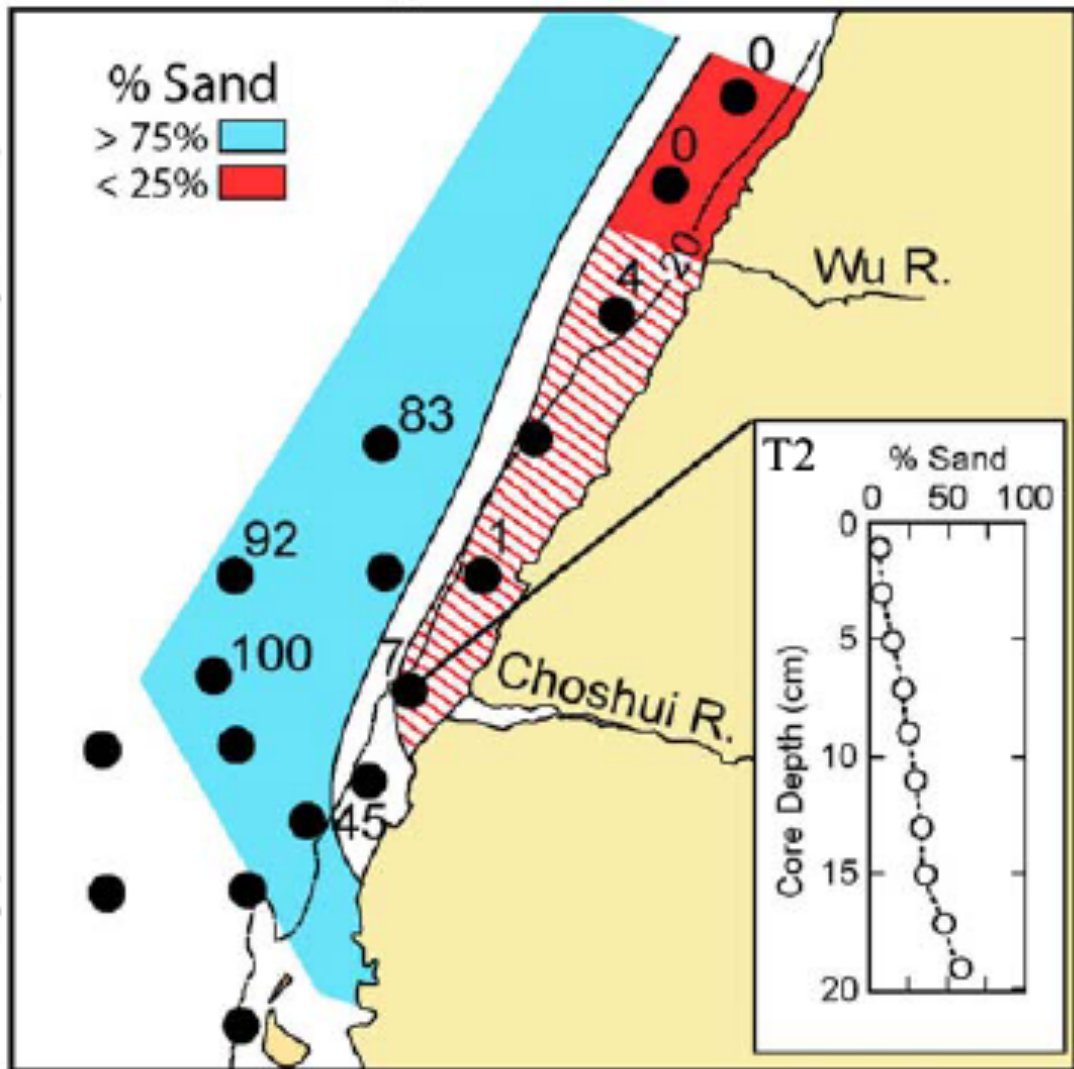
Milliman et al., 2007

Calculated, Observed Sediment Concentration (g/l)

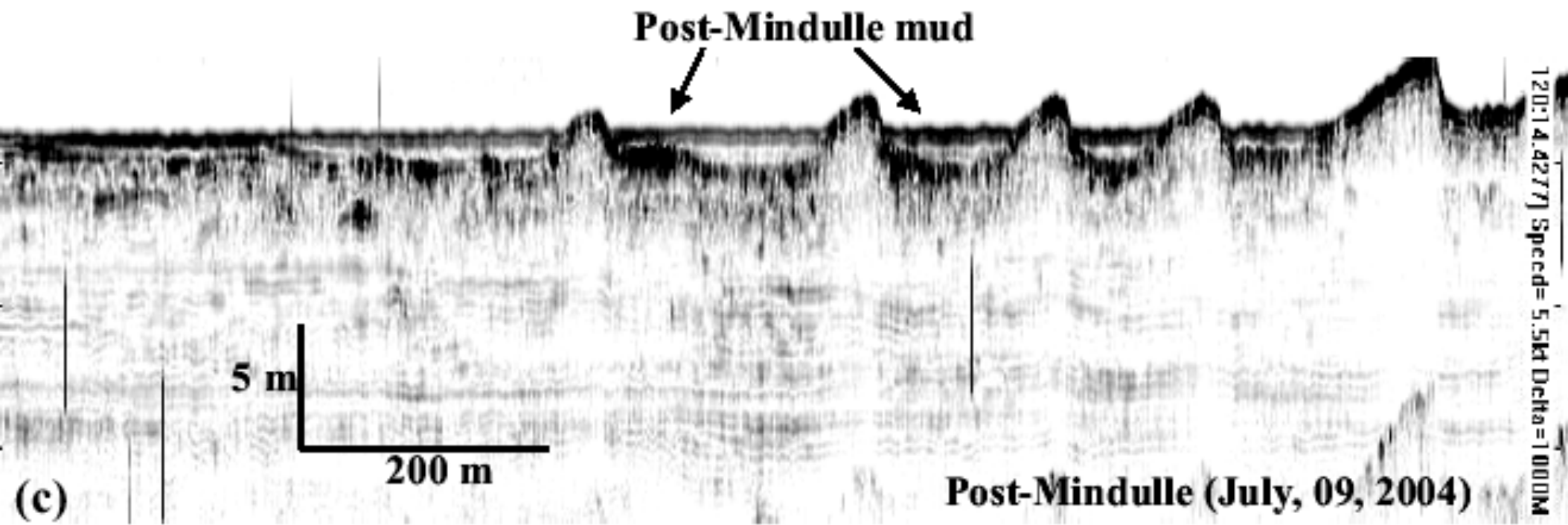




July 9-13, 2004



Milliman et al., 2007



Milliman et al., 2007

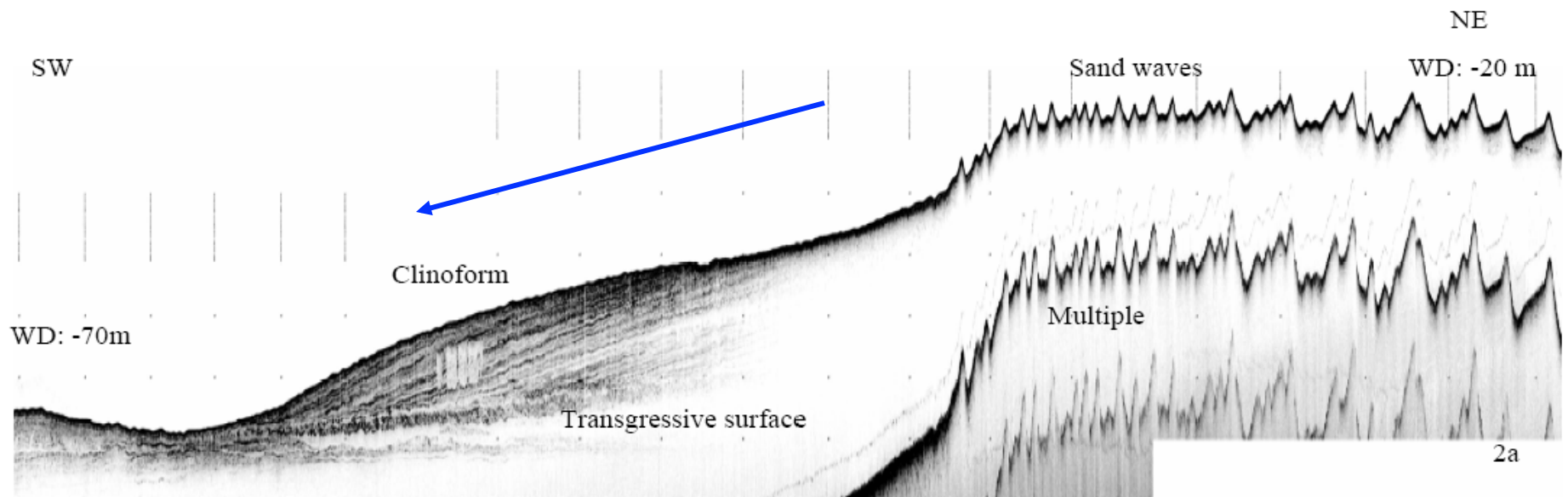


Fig. 2a

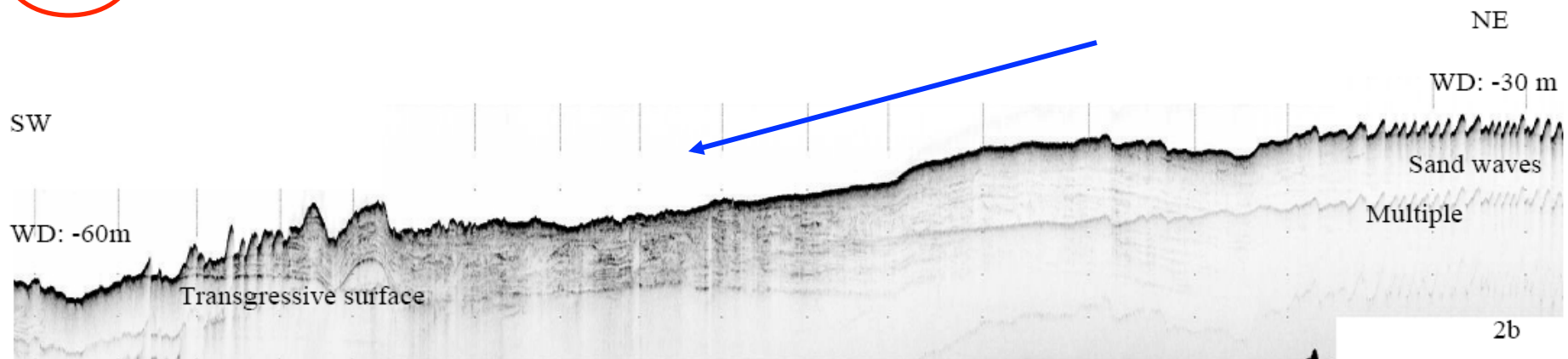
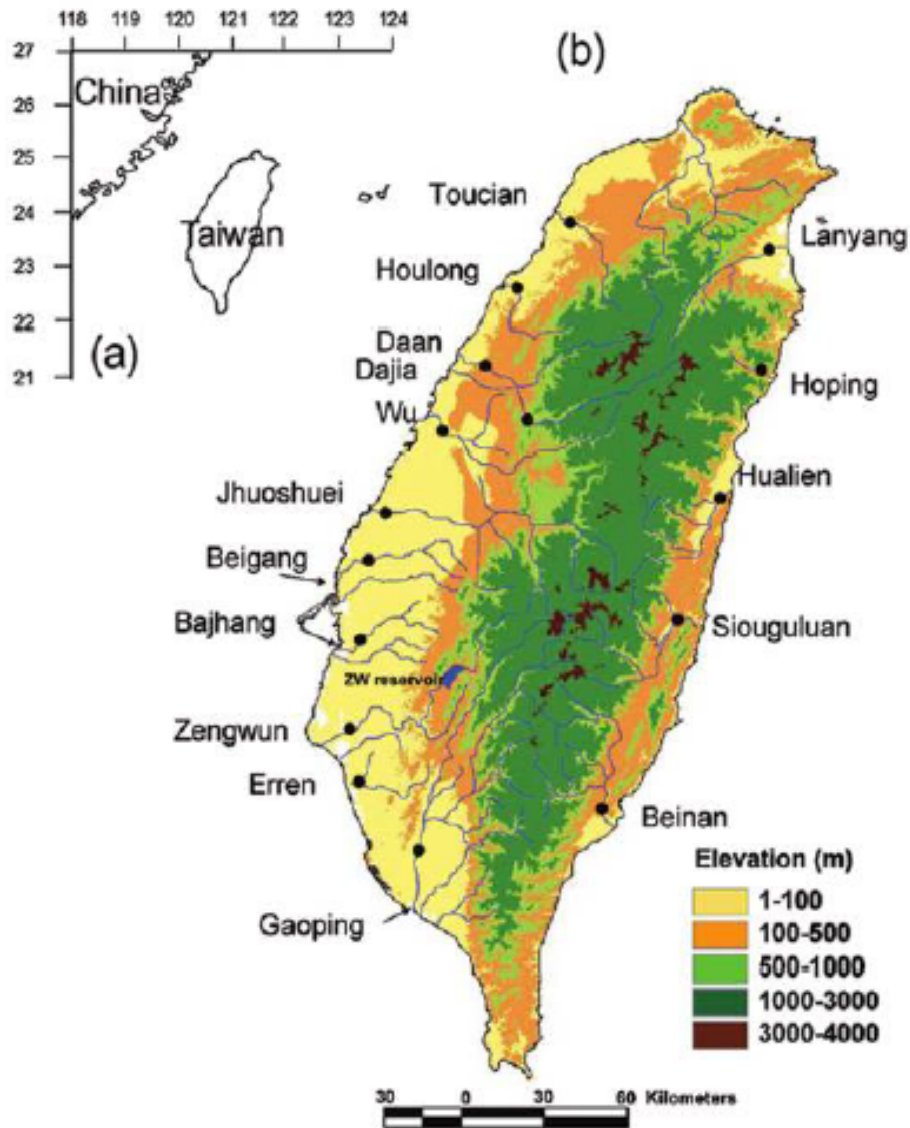


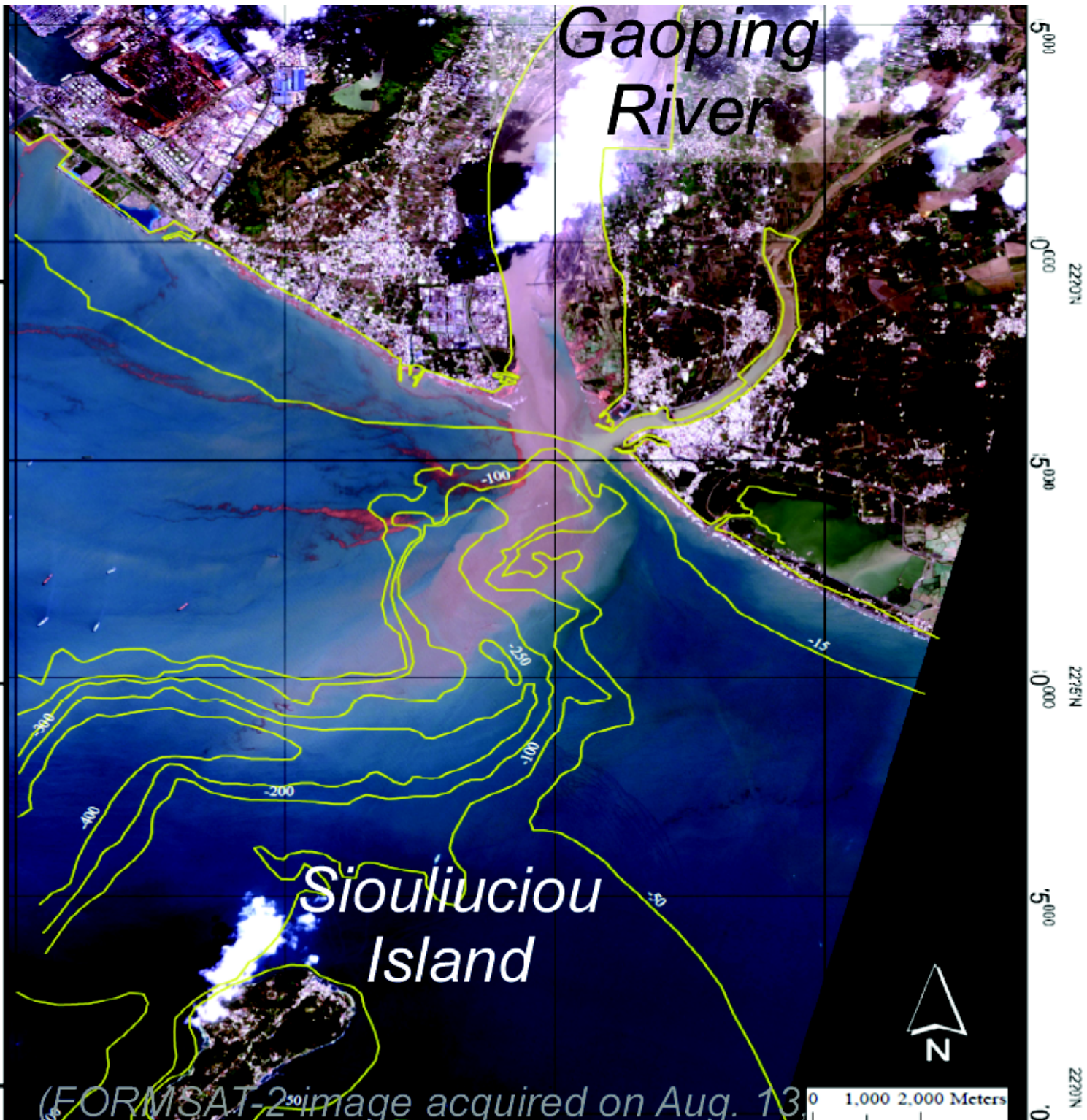
Fig. 2b

Morakot - Aug. 2009

2.8 m Rain

400-700 Mt in 3 days





Courtesy of
James Liu



