



# Boulder Creek Critical Zone Observatory

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and the

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USGS circular 1139

**Critical Zone** "the *h*eterogeNeo<sub>u</sub>s, near-surface environment in which complex interactions involving rock, soil, water, air, and living organisms regulate the natural habitat and determine the availability of lifesustaining resources." (National Research Council, 2001)

### **NSF's Critical Zone Observatories**



- Southern Sierra CZO (Roger Bales, UC Merced)
- Boulder Creek CZO (Suzanne Anderson, Univ Colorado)
- Susquehanna-Shale Hills CZO (Chris Duffy, Penn State)

## Geomorphology





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Erosion and weathering control the extent of critical zone development



Critical zone architecture influences sediment sources, hydrology, water chemistry and ecology

#### **Colorado Front Range- erosion styles**

Continental divide

Plains

Glacial (steady?) Fluvial baselevel lowering



#### **EROSIONAL CONTROL OF CRITICAL ZONE ARCHITECTURE**

#### Three experiments in one: the geomorphic context of Boulder Creek

**Upper:** glaciated

Middle: steady, old

Lower: rejuvenated





#### Great Plains, USA:

Incision is focused on the **upstream** end of the system (does not look like an upstreammigrating wave)











#### How does a block topple from an exposure?



# Community access and participation

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- All CZO sites are open
- Grad student summer stipends starting 2010
- Database available

# Network building

- Site access
- Sharing data
- Cross-CZO working groups
- Communication
- Student exchanges
- Cross-site synthesis

NOTE: NSF will look favorably on proposals that build on CZO sites and/or promote synthesis

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