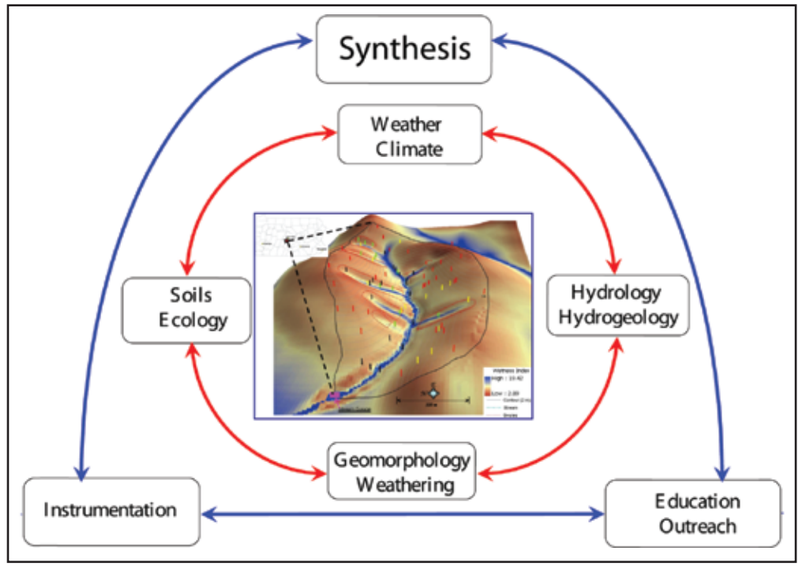
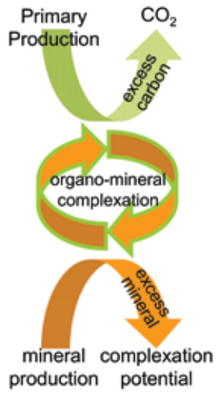
Boulder Creek,
http://czo.colorado.edu/inter/index.shtml

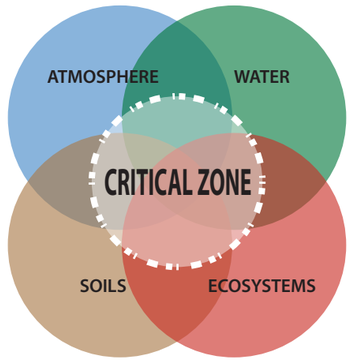
CZO LOCATIONS



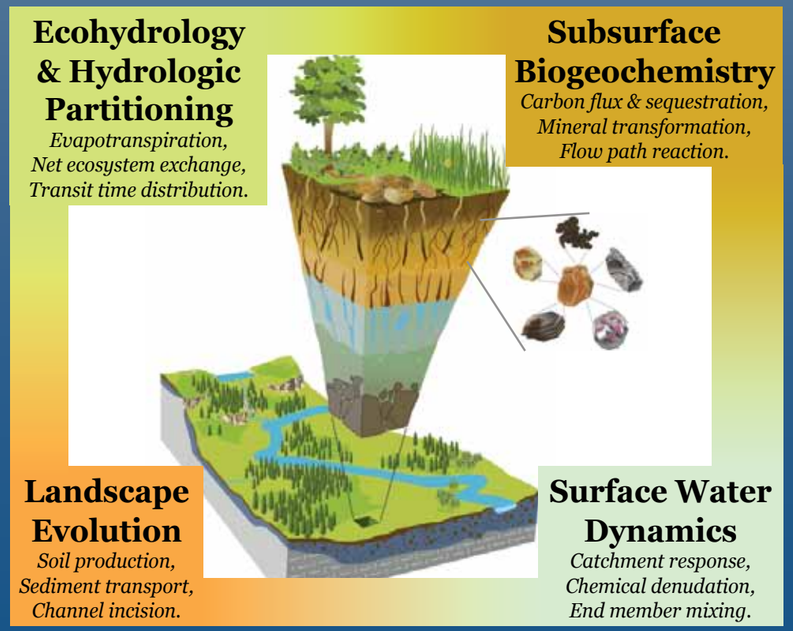
Shale Hills



Christina River Basin



Southern Sierra



Jemez River Basin

National CZO Program

CRITICAL ZONE OBSERVATORIES

The critical zone is where water, atmosphere, ecosystems and soils interact on a geomorphic and geologic template.

CZOs integrate process research from bedrock to the atmospheric boundary layer.

- Boulder Creek, Colorado
  Suzanne Anderson
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- Christina River Basin, Delaware
  Donald Sparks
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  Fred Scatena
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- Jemez Santa Catalina, New Mexico and Arizona
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- Shale Hills, Pennsylvania
  Christopher J. Duffy – cxd11@psu.edu
- Southern Sierra, California
  Roger Bales – rbales@ucmerced.edu

An initiative of NSFs Earth Sciences Division, Geosciences Directorate, CZOs serve the scientific community with research, infrastructure, and data. Cooperative and synthesis research is strongly encouraged.
For Information and opportunities
contact Timothy White tsw113@psu.edu.

Join Us!

http://www.criticalzone.org/

BOULDER CREEK CRITICAL ZONE OBSERVATORY

Critical zone architecture, denudation processes, and weathering front advance.

Science questions:

- What is the legacy of long-term geologic history in the critical zone?
- What governs the dynamics of key interfaces within critical zone architecture?
- How do landscape position, slope aspect, microclimate and rock properties control the evolution of the critical zone?
- What feedbacks govern the co-evolution of the CZ and its hydrologic and ecological function?

CHRISTINA RIVER BASIN CRITICAL ZONE OBSERVATORY

Spatial and temporal integration of carbon and mineral fluxes: a whole watershed approach to quantifying anthropogenic modification of critical zone carbon sequestration.

Overarching Goal:

To integrate the mineral and carbon cycles to advance our understanding of anthropogenic impacts on carbon sequestration.

Scientific Questions:

- Is carbon sequestration limited at watershed scales by the formation rate of organo-mineral complexes, which is in turn limited by the rate of mixing of fresh organic matter with fresh mineral surfaces?
- Do accelerated soil erosion and mixing associated with agriculture and construction increase complexation and thus sequester organic carbon within a catchment?

The CRB-CZO focuses on the 1440 km2 Christina River Basin as a laboratory for exploring our questions.

JEMEZ RIVER BASIN / SANTA CATALINA MOUNTAINS CRITICAL ZONE OBSERVATORY

Carbon & water cycling, arid & semi-arid ecohydrology, landscape evolution, and iterative modeling & measurement.

The JRB-SCM CZO comprises elevation gradients on rhyolite, granite and schist in northern New Mexico and Southern Arizona. It is organized around broad climate-water questions that require a multi-disciplinary approach,
and that are especially pertinent to arid and semi-arid systems in the context of climate variation.

- How does variability in energy input and related mass flux influence critical zone structure and function?
- How do feedbacks between landscape evolution and the cycling of water and carbon alter short- and long-term critical zone development?

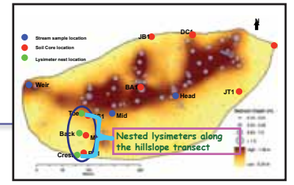
LUQUILLO CRITICAL ZONE OBSERVATORY

Critical zone processes, in landscapes with contrasting lithology but similar climatic and environmental histories

The Luquillo (LCZO) is in the USDA Luquillo Experimental Forest in Northeastern Puerto and is focused on comparing adjacent watersheds underlain by 2 different rock types, a grandiorite that produces sand when it weathers, and a volcanoclastic rock that weathers into clays and boulders. Projects include studies of deep weathering and saprolite formation; soil formation and soil carbon accumulation; riparian zone dynamics, fluvial geomorphology, and meteorology. Infrastructure includes weather stations, instrumented soil pits and riparian zones, and stream flow gages.

SHALE HILLS CRITICAL ZONE OBSERVATORY

The Susquehanna/Shale Hills CZO is a research effort to create an environmental observatory for the study of the pathways and rates of water, solutes, and sediments in the Shale Hills Watershed within the Penn State Experimental Forest. The Shale Hills CZO brings together 6 transect sites and multiple disciplines engaged in research on bedrock to atmospheric boundary layer processes in the critical zone. The focus of this multidisciplinary NSF-funded research effort is to quantitatively predict the creation, evolution, and structure of regolith as a function of geochemical, hydrologic, pedologic, biologic, and geomorphologic processes.



SOUTHERN SIERRA CRITICAL ZONE OBSERVATORY

Integrated research on hydrology, biogeochemistry and weathering across the rain-snow transition

Spatially distributed, high-frequency measurements of water and geochemical processes are the foundation for research in the Southern Sierra CZO.

Science questions and opportunities

Water balance patterns across rain-dominated vs. snow-dominated forest landscapesSnow and soil moisture controls over geochemical weathering and transport Feedbacks between hydrologic and biogeochemical cycles and landscape evolution Vegetation, water and nutrient-cycle feedbacks