**CZO Network All Hands Meeting**
**Sept. 21-24, Fish Camp, CA**
**Planning Agenda**

Meeting Goals:

1) Share science results and working plans
2) Develop ideas and concrete plans for cross-site science and integration.

**Day 0 – Sunday evening Sept 21**

| Minutes | Time | Activity |
|---|---|---|
| 30 | 4:00-7:00 | Registration; *Informal discussions, sign up for field trips, post posters* |
| 120 | 6:00-8:00 | Dinner (rolling buffet, eat at your convenience) |
| 120 | 7:00-9:00 | Starter: Poster session<br>– *Each CZO brings 3 posters on below topics (more NatGeo map/infographic than research presentation) to facilitate discussion and cross-CZO ideas and give a sense of place, progress and plan.*<br>– *(1) Wayfinding (maps, conceptual model) (2) Gadgets & Installations (3) CZTope* |

**Day 1 – Monday Sept 22**

| Minutes | Time | Activity |
|---|---|---|
| 60 | 7:00-8:00 | Breakfast; Load ppts onto computer & put up posters |
| 40 | 8:00-8:40 | Introduction to meeting – Roger<br>– SSCZO welcome & outline meeting aims (10 min)<br>– *Quick round the room names:* 150 people @ 10 s/person = 25 min |
| 45 | 8:40-9:25 | Integrative keynote talk on CZ science – Mike Goulden, Southern Sierra CZO |
| 20 | 9:25-9:45 | Charge to participants: Introduction to themes – Session Conveners – Roger Bales?<br>find ways to move forward on cross-site science & products |
| 30 | 9:45-10:15 | International CZO Discussion & Report on meeting in China – Chen Zhu, Steve Banwart & Whendee Silver |

| | | |
|---|---|---|
| 30 | 10:15-<br>10:45 | Break & poster viewing |
| 90 | 10:45-<br>12:15 | **Theme 1 – What controls CZ properties and processes?**<br>– Introduction to target questions underlying Theme 1 (5 min) Riebe<br>a. *How does critical zone development depend on lithology and geologic legacy?*<br>b. *How does critical zone development vary with climate?*<br>c. *What is the role of microbes in the critical zone in mediating solute evolution of runoff water and carbon processing?*<br>d. *How does hillslope aspect, as it influences local climate, affect critical zone evolution and structure?*<br>*Toward an energy-driven model for CZ development (8 min) Pelletier*<br>*Toward a mechanical processes-driven model for CZ development (8 min) Dietrich*<br>*Toward a chemical processes-driven model for CZ development (8 min) Brantley*<br>*Natural experiments to test models: knickpoints, aspect, drill the ridge, more (8 min) S Anderson*<br>– Discussion (45 min) |
| 75 | 12:15-<br>1:30 | Lunch, with a talk on Ecosystem Services – Paul Sutton |
| 90 | 1:30-<br>3:00 | **Theme 2 – What is response of CZ structure, stores, and fluxes to climate?**<br>– Introduction to target questions underlying Theme 2 (5 min) (Chorover)<br>– Five 8 minute talks, one pertaining to each of the five questions.<br>a. *What is the relationship between concentration & discharge? (Derry)*<br>b. *What factors moderate soil-organic carbon relationships in shallow and deep soil? (Plante)*<br>c. *How do material & energy fluxes across boundaries relate to climate? (McIntosh)*<br>d. *Especially on shorter time scales, what controls biogeochemical stores and fluxes within the CZ? (Berhe)*<br>e. *How do microbial communities (activity, composition) influence biogeochemical stores and fluxes? (Gallery)*<br>– Discussion (35 min) |
| 30 | 3:00-<br>3:30 | Break & poster viewing |
| 90 | 3:30-<br>5:00 | **Theme 3 – What is response of CZ structure, stores and fluxes to land use change?**<br>– Lead talk (15 min)<br>– Short talks (6 x 1 min thumbnails = by invitation)<br>– Introduction to sub-themes (5 min)<br>*a. How does the CZ respond to climate change & land-use/management effects?*<br>*b. How does regolith affect vegetation?*<br>*c. How do (bi-direction) vegetation-regolith dynamics influence CZ structure, stores & fluxes, including water & C?*<br>*d. How do material and energy fluxes across boundaries relate to land use change?*<br>– Discussion (60 min) |

| | | |
|---|---|---|
| 10 | 5:00-5:10 | Instructions for breakout groups |
| 80 | 5:10-6:30 | Breakout groups on themes 1-4 (organization meetings before dinner)<br>– Multiple breakouts on each theme<br>– Use of main meeting room plus common areas at hotel<br>Agenda: i) what each CZO is doing (questions, methods & tools, findings), ii) impediments, iii) what we can do together, iv) synthesis for planning & next steps (summary document with next steps) |
| 60 | 6:30-7:30 | Dinner -- breakout groups can continue over dinner if desired |
| 90 | 7:30-9:30 | Poster viewing<br>Additional time for breakout groups |

**Day 2 – Tuesday Sept 23**

| Minutes | Time | Activity |
|---|---|---|
| 45 | 7:00-7:45 | Breakfast; *prepare for departure for field trips* |
| | 8:00 | Depart Tenaya Lodge |
| | 8:00-5:00 | Field Trips / All day |
| | Trip 1 - ~45 spots | **Rim Fire & post-fire landscape mosaic in Yosemite**<br>Rim Fire, Cherry Lake, Hetch Hetchy Reservoir, and Crane Flat Lookout (J. Roche, M. Conklin)<br>*Start in high severity burn outside the park and then spend the rest of the day discussing the much more mosaicked burn pattern in the park (high severity largely confined to areas of previous high severity burns, the rest a nice mix of low and moderate severity). There are plenty of places to see all this. Hetch Hetchy is good because the mix of rock and oak forest really protects the reservoir from most fire effects. On the way from Hetch Hetchy back to the park, see several levels of fire intensity. Finish the day at Gin Flat in the park to see the snow monitoring equipment and a bit of the low intensity burn.* |
| | Trip 2 - ~120 spots | **New advances in the long-studied elevational transect of the western Sierra Nevada**<br>Stop 1: Drought-dust interactions; soil evolution at the catena level (E. Aronson, T. O'Geen)<br>Stop 2: Vegetation-atmosphere interactions, Providence Catchment (Lucas, Hartsough, Goulden, Stacy, Bales) |

| | | |
|---|---|---|
| | | Stop 3: Bedrock, vegetation and landscape evolution, Bald Mountain (C. Riebe, W.J. Hahm)<br><br>*The Southern Sierra Critical Zone Observatory (SSCZO) is a community platform for research on critical-zone processes across the rain-snow transition, including 4 intensively instrumented sites spanning a ~2500 m elevation transect on the western slope of Sierra Nevada Mountains. The region is home to many benchmark studies by Hans Jenny, the renowned father of modern soil science. Building on benchmark work of Hans Jenny and many recent studies of the critical zone in the region, a major goal of SSCZO research is to understand how mountain soils and regolith develop over thousands to millions of years and how they will evolve in response to changes in climate and disturbance, including fire and human activity. This trip will stop at multiple SSCZO research sites, focusing on the foothill oak-pine woodlands and the mid-elevation mixed conifer forests and exposed granite peaks. In the foothills, participants will examine minimally developed soil profiles, discuss how soils vary across the transect, and discuss the impact of drought on vegetation, subsurface structure, and dust inputs. At the more densely forested mid-elevation site, participants will explore interactions among regolith development, forest productivity, and evapotranspiration that persist through summer dry periods and wet winter months. Between the lower elevations, where productivity shuts down in summer dry periods, and the higher elevations, which suffer from winter cold limitation, there is a sweet spot for forest growth that persists through every season. Yet these highly productive forests are juxtaposed at geologic contacts by bare rock, including Bald Mountain, a prominent outcropping of granite where participants will gather for a third stop. Topics at this stop will include lithologic controls on vegetation, near-surface geophysics, and an overview of landscape evolution in the region.* |
| 90 | 5:00-6:30 | Break |
| 90 | 6:30-8:00 | Dinner with Local natural history / historical talk |
| 90 | 7:30-9:00 | Meeting time for Steering Committee with NSF Program officers<br>Optional: continuation of theme breakout discussions or alternate groups |

**Day 3 – Wednesday, Sept 24**

| Minutes | Time | Activity |
|---|---|---|
| 60 | 7:00-8:00 | Breakfast; *Load ppts onto computer*<br>Meeting time for Steering Committee with PI committee |
| 90 | 8:00-9:30 | **Theme 4 – How can CZ understanding be used to enhance resilience and sustainability, and restore ecosystem function?** |

| | | |
|---|---|---|
| | | – Lead talk (15 min) Mary Firestone or Steve Banwart<br>– Short talks (6 x 5 min = 30 min)<br>– Introduction to sub-themes (5 min)<br>*How can we apply understanding of the Critical Zone to enhance ecosystem services and patterns such as: water resources, disturbance, ecological indicators, sustainability?*<br>– Discussion (60 min) |
| 30 | 9:30 -10 | CZOData Presentation and Showcase (20 min present, 10 min Q&A) – Anthony Aufdenkampe |
| 60 | 10-11 | Breakout groups – Additional work time<br>Meeting time for Steering Committee with PIs |
| 60 | 11:00-12:00 | Breakout group - Wrap up discussions of next steps and develop summary document |
| 150 | 12:00-2:30 | Lunch<br>Reports from breakout groups (5 min plus each plus brief discussion) |
| 60 | 2:30-3:30 | – Steering committee report to the CZO group (plus discussion) |
| 15 | 3:30-3:45 | Meeting wrap-up comments |
| | 3:45 | First bus to Fresno airport |
| 45 | 3:45-4:30 | Follow-up breakout meetings<br>– CZO PI discussion<br>– Time to work on products or outline papers |
| | 4:45 | Last bus to Fresno airport |

**Theme and breakout products**. These will have tangible products, which may take different forms depending on maturity of current science and nature of the problem. Some suggestions:

a. outline a group paper
b. form an active Google group with an agenda
c. plan a follow-on workshop
d. plan a proposal
e. set up modeling target and means to achieve it
f. formulate research plan (e.g. tweaks to current monitoring that could yield integrative result, experiments that could be conducted)
g. plan a cyberseminar series

**Theme and breakout possible leads** (only some are confirmed **?=need to confirm attendance; *=can they commit to lead session?**)

Theme 1 – What controls CZ properties and processes?

Cliff Riebe
Suzanne Anderson*
Jon Pelletier
Sue Brantley*
Bill Dietrich*
Dan Richter*

Theme 2 – What is response of CZ structure, stores, and fluxes to climate?

Jon Chorover*
Steve Hart
Lou Derry*
Bill McDowell
Alain Plante*
Jen McIntosh
Asmeret Asefaw Berhe

Theme 3 – What is response of CZ structure, stores and fluxes to land use change?

Jon Pelletier*
Naomi Tague
Kitty Lohse
Greg Barron-Gafford

Theme 4 – How can CZ understanding be used to enhance resilience and sustainability, and restore ecosystem function?

Martha Conklin
Roger Bales
Bill McDowell*
Noah Molotch
Paul Brooks*
Mary Power*
Steve Banwart