Cross-CZO Opportunities

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What data products would you like to see from all CZOs?

Toby O'Geen (TOG): Like something from the Nat. Coop. Soil Survey.

Inventorying how soils are related to land use, particularly for dynamic soil properties like:

Carbon,

Water content,

Aggregate stability

Nutrients

Microbial respirations

More than texture, mineralogy

For a national-scale database; some are method intense

Ultimate goal would be to predict:

"Under management scenarios, climatologies, soils will change…."

Asmeret Asefaw Berhe (AAB): Granitic landscape project across CZOs (4 CZOs)

Craig Rasmussen is leading the cross- CZO project; Carbon focus with fire aspect

Most of these CZO already have info available on C, N, texture, mineralogy

Peter Hartsough (PCH): need depth and WHC (as it applies to questions 2 and 3);

To answer what controls water stress & fundamental weathering regimes

Cliff Riebe (CR): A lot to work with

Christina Naomi Tague (CNT): Flux towers across a gradient

Need sapflow at least if not flux towers, especially co-located with soil information (moisture, potential)

Valles/ Jemez has 2 towers, in mixed conifer forest; think 1 burned

Reynolds creek has 1, but not in trees

Susquehanna Shale Hills has 1 tower

Sap flow is related to water stress

Tree ring dendrochronology could be an easier solution than flux tower; dendrometers are also cheap

Mike Goulden (MG):

We're discussing gadgets where we need to step back and look at the experimental design

Our flux towers are arrayed along a gradient, but how do we compare across CZOs without a unified experimental design?

TOG: True network has unified experimental design, replication of bets measurements

MG: no replication now across the CZO network

Marilyn Fogel (MF): Get to unified design now, after years of developing separate ways is challenging

CNT: In western environments, how does water stress change with elevation?

How does that coevolve with water storage?

Could answer these questions using data from Jemez River Basin, Reynolds Cr (Boise) Boulder, Southern Sierra; potentially Angelo or Andrews EF for the Northwest

Martha Conklin (MHC): Water stress is valid but we also need to know water yield:

What is the residence time of the water? What is the turnover time?

CNT: And for any CZO with a forest: how does mgmt impact water yield?

MHC: Noble gases or stable isotopes could be used for residence time

MF: Also need vegetation samples to look at composition

For precipitation vs. available water vs. water use

Vegetation integrates over season

However, further questions on topic from group: Is this a 1 time measurement? Core measurement? Annual measurement? Does it matter when during the season the samples are taken, and can this be coordinated across the network?

MHC: Signature of storms is highly variable

MF: Look at organic, June through August - time series in the tree rings too

Matt Meadows (MM): Another question is whether growth is fueled by deep water or shallow water?

MF: Instrumented tree to start answering that

TOG: Sample leaves early and late in season for comparison?

MF: Built leaf is not as variable as that

Stephen Hart (SCH): Leaf water = TOG; time-integrated = MF

Other possible comparisons/issues: Mediterranean climate vs. temperate climates

Need precip = good records (long-term vs. current years)

Upper site does not currently have good precipitation records (as much as 30-50% error)

Steve Glaser (SG): Relative humidity is easier than ever; few hundred for sensor alone, and if we don't need real time transfer, then it remains cheap (download in person)

CNT: Definitely need relative humidity - it is the single largest source of error in the model

MG: Need to decide where to put sensors in an thoughtful manner:

* Where do we need the information?
* When do we need it?

CR: Another question would like answered: How and where do rock types vary?

Roger Bales (RB): Drilling and characterization will be discussed in depth at the Denver workshop

MCH: Wells can be installed where we drill to coordinate efforts: What kind of well?

CR: Geochemical response on list and geophysics; What is response in water?

Si / Germanium ratios in stream water to ID sources, especially for shallow to deeper sources;

Should it be part of core measurements?

MM: Some of the archive samples may have defrosted?

MCH: need wells to do age of ground water

CR: Friedhelm is working on cross-CZO H2O characterization

AAB: Another question: How much of C is pyrogenic in the fire-affected systems?

Using NMR and mid-infrared

TOG: Stream water biogeochemistry is major endeavor, especially if we tried to get event-based sampling across the network.

SCH: H2O stress needs to be complemented by work on the Rhizosphere:

Root turnover, production, distribution, mass

Would like to install minirhizotrons for Cross CZO measurements

Also matters for weathering because of acid production and H2O stress; physical movement