

Critical Zone Science, Sustainability, and Services in a Changing World

Conference Overview

October 22-24, 2015, Purdue University, West Lafayette, IN. U.S.A.
[Beck Agricultural Center](#) and the Holiday Inn Lafayette-City Center.

This conference is run in conjunction with:

- 2015 workshop on Flux, Stabilization, and Reactivity of OM in the Critical Zone organized by the U.S. National Science Foundation Critical Zone (CZ) Observatory Network, Working Group on Organic Matter (OM) in the CZ.
- The Consortium for the Advancement of Hydrologic Science Instrumentation (CUAHSI) instrument training short course on “The Role of Runoff and Erosion on Soil Carbon Stocks: From Soilscales to Landscapes” Beginning October 20th.

Introduction and Context

The intensification of natural resource extraction from terrestrial systems is occurring at a breakneck pace and in many cases without adequate knowledge—or with complete disregard—of the limits and capacity of the supporting ecosystems, water resources, air and soil quality, and surface geology. The complex interactions across these environmental domains that function to support human activity occur in what has been recently conceptualized as the Earth's “Critical Zone” (CZ), the thin surface layer from the top of vegetation to the bottom of aquifers. Rapid growth in human population, changing consumption patterns, and climate change are intensifying pressures on the CZ, especially in emerging economies such as China.

The 2015 Joint Annual Conferences of the US-China EcoPartnership for Environmental Sustainability (USCEES) and the China-US Joint Research Center for Ecosystem and Environmental Change (JRCEEC) will focus on critical zone science, sustainability, and services. It will bring together and leverage the scientific communities from the USCEES, the JRCEEC, and members of the US Critical Zone Observatory Network (US-CZO) to address key aspects of CZ function and services and the threats to its sustainable use in a changing climate, increasing urbanization and population, and increasing resource extraction pressure.

The USCEES, one of 30 current US-China EcoPartnerships, was established within the U.S.-China Strategic Economic Dialogue (SED) framework in May 2011. The six organizations that form the core group of the USCEES combine the capabilities of three U.S. institutions (Purdue University's Global Sustainability Initiative, University of Tennessee's (UT) Institute for a Secure and Sustainable Environment and Institute of Agriculture, and the UT-Oak Ridge National Laboratory Joint Institute for Biological Sciences) with three complementary center and institute partners of the Chinese Academy of Sciences (the Institute of Geographic Sciences and Natural Resources Research, the

Research Center for Eco-Environmental Sciences, and the Institute of Applied Ecology). The USCEES was developed from the JRCEEC, which was established in July 2006 between the Chinese Academy of Sciences, the University of Tennessee, and Oak Ridge National Laboratory and later Purdue University.

CONFERENCE AND WORKSHOP GOALS AND OBJECTIVES

The conference will be organized with a common plenary session each morning followed by afternoon thematic symposia and workshops. On the last day of the conference a field trip will explore the field sites for the Intensively Managed Landscapes Critical Zone Observatory.

Scientific Sessions

Invited and voluntary contributions to oral and poster presentations on CZ -related topics will include but are not limited to:

- Near surface flux of solid, dissolved, and gaseous C and N from soil, weathered outcrop, and litter organic matter in catchments
- CZ services and functions regulating anthropogenic-sourced contaminant reactivity, mobility, and mean residence time
- Mechanisms of stabilization/destabilization of organic matter in soils
- The role of hydrology and mineralogy in the deep connectivity of dissolved organic matter and associated inorganic elements in the CZ profile
- Climate and land use regulation of C, N, and water cycles in terrestrial ecosystems

NSF Cross-CZO Working Group on Organic Matter Workshop

At this conference the cross-CZO Working Group on Organic Matter (XCZO-WG-OM) will organize afternoon and evening workshops focused on flux, stabilization, and reactivity of organic matter in the CZ with the goal of making recommendations to NSF for common measurements, common methods, common laboratories, and common experiments to support cross-U.S. CZO and international CZ science. Three workshops are planned and include 1) multivariate and chemometric methods for large and complex data set analysis in CZ science, 2) organic matter dynamics as controlled by erosion and deposition, 3) mineralogical controls on soil and sediment OM reactivity and persistence. The findings and recommendations from these workshops will be presented to the CZO National Office and will support the XCZO-WG-OM overarching mission to define what controls 1) the organic matter storage in biomass above the critical zone, 2) organic matter storage and flux in the mineral and soil matrix, 3) gaseous exports of organic matter from the critical zone, and 4) dissolved and colloidal organic matter flux from and within the critical zone. See ["CZO Workshop"](#) tab for details.

CUAHSI Instrument Training Short Course

We have the good fortune to also include an educational activity in the form of a CUAHSI instrument training short course on “The Role of Runoff and Erosion on Soil Carbon Stocks: From Soils to Landscapes”. The course, beginning on October 21, one day prior to the main conference activities, is aimed at graduate students and designed to inform participants about the state-of-the-art instrumentation and measurements that are available for quantifying carbon dynamics in Intensively Managed Landscapes (IMLs). This course will examine the key processes that define carbon budget in intensively managed landscapes, which include erosion, litter incorporation into the soil profile, microbial activity/ respiration, and stabilization in aggregates. Field demonstrations of mobile rainfall simulators will be used demonstrate soil movement, deposition, and reactivity with a variety of field and lab-based tools. A separate registration portal will be established for interested graduate and postdoctoral researchers. See ["CUAHSI Short Course"](#) tab for details.

Field Trip to Upper Sangamon Water IML-CZO

On the last day of the conference, October 24, a field trip to visit research infrastructure of the IML CZO in the Upper Sangamon Watershed near University of Illinois will be available to participants. We anticipate this will of particular interest to our Chinese colleagues as they consider options for how to develop a similar CZO platform.

Conference and workshop registration will begin on July 20. Please request letters for VISA applications as soon as possible.

Sponsors

- U.S. National Science Foundation
- Purdue University Global Sustainability Institute
- Purdue University Global Engineering Program
- The Confucius Institute - Purdue

Organizing Committee

Chairpersons:

- Dr. Timothy Filley (Purdue University, USCEES and IML-CZO)
- Dr. Guo DaLi (Institute of Geographic Sciences and Natural Resources Research-Chinese Academy of Sciences)

Scientific Committee

Asmeret Berhe (University of California-Merced- Sierra CZO)
Sharon Billings (University of Kansas-Calhoun CZO)
Indrajeet Chaubey (Purdue University- IML CZO)
Jon Chorover (University of Arizona-Catalina-Jemez CZO)
Yunting Fang (Institute of Applied Ecology-CAS)
TiDa Ge (Institute of Subtropical Agriculture-CAS)
Marie-Anne deGraaff (Idaho State University-Reynolds Creek CZO)
DaLi Guo (Institute of Geographic Sciences and Natural Resources Research-CAS)
Chi-Hua Huang (USDA - National Soil Erosion Lab)
Cliff Johnston (Purdue University)
Praveen Kumar (University of Illinois-IML CZO)
Meiling Li (Institute of Geographic Sciences and Natural Resources Research-CAS)
Henry Lin (The Pennsylvania State University -IML CZO and Shale Hills CZO)
Kitty Lohse (Idaho State University -Reynolds Creek CZO)
Thanos Papanicolaou (University of Tennessee -IML CZO).
Alain Plante (University of Pennsylvania -Luquillo CZO)
Craig Rasmussen (University of Arizona-Catalina-Jemez CZO)
Dan Richter (Duke University Calhoun CZO)
Gary Sayler (University of Tennessee)
Aaron Thompson (University of Georgia Calhoun and Luquillo CZO)
Ron Turco (Purdue University)
Adam Ward (Indiana University IML CZO)
Xudong Zhang (Institute of Applied Ecology-CAS)
Jie Zhuang (University of Tennessee)

Registration

A 100 USD registration fee will be charged for participants. The conference organizers will provide local transportation between the airport and hotel at no cost of the guests, and most of meals will be covered by the organizers during the meeting. Requests for financial assistance will be considered by the organizing committee. Open registration will begin on or about July 20. In the registration form please indicate if you have a need for an official letter of invitation to attend and if you are seeking financial support.

HOTEL, TRANSPORTATION, AND FOOD

A block of rooms for conference participants will be reserved at Holiday Inn City Center Hotel, Lafayette Indiana. The room rate will be posted on the registration web site and the cost will be born by the participant. Breakfast, lunch, and dinner for the duration of the conference will be provided for all registered participants and covered through registration fees and sponsor support. Travel to and from O'Hare international airport will be provided by the conference organizers according to scheduling. See "[Lodging & Dining](#)" tab for details.

TENTATIVE Conference Schedule

Tuesday, October 20, 2015

TBA - TBA

Day one of the two-day CUAHSI short course on “The Role of Runoff and Erosion on Soil Carbon Stocks: From Soilscales to Landscapes (see course description and itinerary)”. To be held at the Purdue’s Agricultural Center for Research and Education ([Link](#)) and led by Dr. Thanos Papanicolaou, Univ. of Tennessee ([More Info](#)).

Wednesday, October 21, 2015

TBA - TBA

Day two of the two-day CUAHSI short course on “The Role of Runoff and Erosion on Soil Carbon Stocks: From Soilscales to Landscapes (see course description and itinerary)”.

Conference attendees arrive and check in at Hotel: Holiday Inn, Lafayette City Centre. International visitors may wish to arrive on October 20 to acclimate.

Optional conference dinner for international guests..

Thursday, October 22, 2015

Day One of Conference/Workshop

8:00 - 12:00

Opening session and keynote speakers.

12:00 - 13:15

Lunch

13:15 - 13:45

Bus to Beck Agricultural Center

13:45 - 16:30

Working groups or thematic oral presentation sessions (4 simultaneous) Demonstration of ISEE (<http://isee.purdue.edu>) weather permitting

17:30 - 18:30

Break out session reports

18:30 - 20:00

Dinner

Friday, October 23, 2015

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| 8:00 - 12:00 | Opening session and keynote speakers. |
| 12:00 - 13:15 | Lunch |
| 13:15 - 13:45 | Bus to Beck Agricultural Center |
| 13:45 - 16:30 | Working groups or thematic oral presentation sessions (4 simultaneous) Demonstration of ISEE software (http://isee.purdue.edu) weather permitting |
| 17:30 - 18:30 | Break out session reports |
| 18:30 - 20:00 | Dinner |

Saturday, October 24, 2015

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| 7:00 - 8:30 | Breakfast |
| 8:30 - 9:00 | Bus to Beck Agricultural Center |
| 9:00 - 10:00 | Graduate student led presentations on CUAHSI short course outcomes. |
| 10:00 - 11:30 | Closing remarks, final recommendations, proposal discussion, and report time line. |
| 11:30 - 12:30 | Lunch |
| 12:30 - 13:30 | Optional Tour of Purdue University Water Quality Field Station |
| 13:30 - 19:00 | Optional bus trip to sites at the Intensively Managed Landscapes CZO at University of Illinois, Champaign |
| 20:00 | Dinner for Scientists from China |

Sunday, October 25, 2015

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| TBA - TBA | Visitors from China to depart. Conference and workshop registration will begin on July 10. Please request letters for VISA applications as soon as possible. |
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