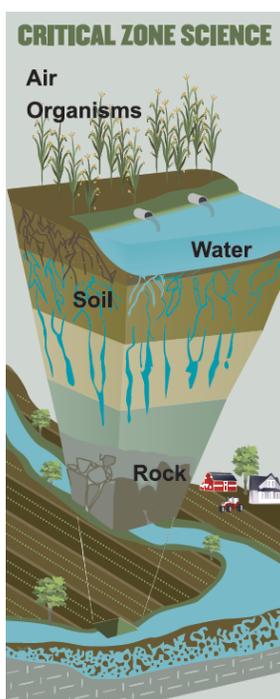


# Conference and Workshop on Critical Zone Science, Sustainability, and Services in a Changing World

## *A Brief Meeting Summary*

*October 22 - 24, 2015,  
Purdue University, West Lafayette, IN, USA*

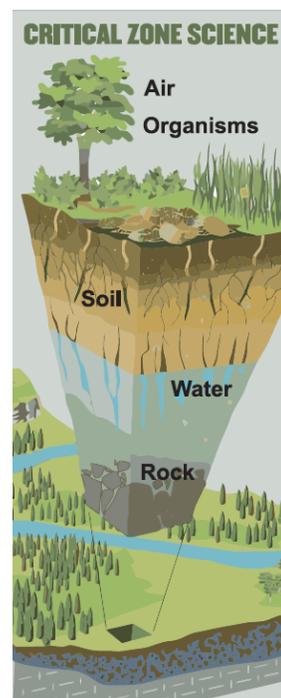
Organized by the U.S.-China EcoPartnership for Environmental Sustainability, the China-U.S. Joint Research Center for Ecosystem and Environmental Change, and the Working Group on Organic Matter Dynamics in the Critical Zone Observatory Network



Reported by Conference Chairs:  
Timothy Filley (Purdue University)

and

Dali Guo (Institute of Geographic Science and Natural Resources Research, Chinese Academy of Sciences) - November 24, 2015.



On Oct 20-24, 2015 Purdue University hosted a conference and workshop dedicated to Critical Zone Science, Sustainability, and Services in a Changing World. Organized by the U.S.-China EcoPartnership for Environmental Sustainability, the Intensively Managed Landscapes Critical Zone Observatory (CZO), and the Working Group on Organic Matter Dynamics in the Critical Zone Observatory Network, the gathering brought together over 150 leading researchers and their students to share the latest science related to terrestrial ecosystem function and vulnerability, and to discuss and debate options for sustainable use of natural resources. The conference attracted broad institutional participation with 22 U.S. and 16 Chinese academic and research institutions represented. Members of the newly funded China Critical Zone Observatory Network were also in attendance and engaged in discussions to promote bi-national cross-CZO research.

The Critical Zone is defined as the portion of the Earth's land surface that extends from the top of the vegetation canopy to the lowest limit of circulating groundwater.

Critical zone science views the ecological, geological, and hydrological processes taking place in this zone as an integrated and interconnected system that acts over broad spatial (primarily at the catchment level) and temporal scales. To advance this kind of integrated research, the U.S. National Science Foundation (NSF) has created and supports a network of Critical Zone Observatories (CZO) in the United States. Each CZO has unique attributes in climate, lithology, land use, biology, and topography that can be leveraged to study fundamental questions about how the structure and function of the Critical Zone evolves, including how it will respond to climate and land-use change. The CZO network, which began in 2007, currently consists of 10 sites. Collaborative research within each CZO, as well as across the CZO network, engages a diverse and growing



scientific community to advance knowledge of Earth surface science including the study of important Critical Zone processes, like soil formation, stream flow generation, landscape evolution, and the biogeochemical cycling of elements essential for life

The conference included invited lectures, panel discussions, workshops, and opportunities for informal networking. Among the many notable lectures, the organizers were particularly pleased to have Dr. Sonny Ramaswamy, Director of the National Institute of Food and Agriculture, United States Department of Agriculture address the importance of critical zone concepts in food security.



*Dr. Sonny Ramaswamy, Director of the National Institute of Food and Agriculture, United States Department of Agriculture, addressing the conference.*

Twenty-five of the graduate student attendees participated in a workshop on soil organic matter reactivity and persistence in eroding and depositional environments. Additionally, Purdue's Water Quality Field Station hosted a field-based demonstration on the importance of subsurface hydrological modification in U.S. Midwest agricultural. The final day of the conference offered a field trip to the Intensively Managed Landscapes Critical Zone Observatory in Illinois.

During the conference, three NSF-funded workshops were convened to identify important knowledge gaps and opportunities for partnering strategies with an eye towards making

recommendations for common questions, common measurements, common methods, common laboratories, and common experiments to support cross-U.S. CZO and international CZ science in the area of organic matter dynamics. The workshops were organized by the Working Group on Organic Matter Dynamics, and included the



*Some of the graduate student and postdoctoral researchers in attendance*

participation of a large cohort of scientists from China who are either already engaged in China CZO development or directly working in CZ-related science. A report to NSF on the workshop outcomes is forthcoming, and will include recommendations to help advance efforts toward closer China-U.S. CZO collaboration.

The conference and workshop program was funded by the U.S. National Science Foundation, Purdue University's College of Agriculture, Global Engineering Program, and College of Science, as well as the Confucius Institute, and corporate sponsors FuturaGene, Faegre-Baker-Daniels LLP, and the Tianjin Economic Development Area. The final dinner included an inspiring riverboat cultural event that showcased the rich history and architecture of the City of Chicago.

The success of the conference is a testament to the health and strength of the science and social networks of the EcoPartnership Program and the NSF Critical Zone Observatory Network. It also confirms the benefits of linking, leveraging, and aligning networked networks to promote on-going efforts to educate future leaders in global CZ science and policy, and address major societal challenges related to CZ functions.



*Professors from Nanjing Agricultural University and the Institute of Geochemistry, Chinese Academy of Sciences toasting the success of the conference*

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Low-resolution photos from the conference can be downloaded from the following directory (High resolution photos available upon request):

<http://www.purdue.edu/discoverypark/ecopartnership/critical-zone-conference/gallery.php>

If you have photos from the conference or any of the events that you would like posted to the gallery please contact Tim Filley ([Filley@purdue.edu](mailto:Filley@purdue.edu)).

The full conference program (abstract and attendee list) can be uploaded at:

[http://www.purdue.edu/discoverypark/ecopartnership/critical-zone-conference/CriticalZone\\_Program\\_web.pdf](http://www.purdue.edu/discoverypark/ecopartnership/critical-zone-conference/CriticalZone_Program_web.pdf)