

Summary Report

The Ecosystem Sensitivity to Rainfall Experiment (EcoSeRE): Design and Synthesis

Organizers: Melinda D. Smith (KNZ), Scott L. Collins (SEV), and Alan K. Knapp (SGS, KNZ)

The goal of this working group was to continue to design a network-level experiment, proposed previously as part of the LTER Decadal Planning process, to manipulate rainfall (i.e., impose drought) in terrestrial ecosystems. As part of these planning activities, we conducted a targeted synthesis of relevant climate data from a broad range of terrestrial ecosystems, including the LTER/ILTER sites that have expressed interest in participating in this network. Specifically, the purpose of this data synthesis activity was to 1) provide context for the experiment and inform its design (i.e., determine the type and magnitude of drought manipulations), and 2) refine the guiding questions and hypotheses for the network based on this data synthesis.

We held two two-day planning meetings in Fort Collins, CO. The first meeting was held Mar 1-2, 2013 and consisted of 20 participants (as well as 5 remote participants). This meeting had two objectives. The first was to come up with detailed plans for an international drought experiment. The second was to work on the data synthesis focused on characterizing extreme wet and dry years. The workshop was successful in developing a more detailed plan for the international drought experiment, including decisions about experimental treatments and infrastructure. In addition, significant progress was made on the climate data synthesis. Results from the data synthesis were presented at two international meetings (INTERFACE Meeting, Czech Republic; Batsheva de Rothschild Seminar, Israel). In addition, a poster presentation for the international drought experiment was given in an organized poster session at the Ecological Society of America Meeting in Minneapolis, MN.

Building on the efforts of the first working, another two-day working group meeting was held June 28-29. This meeting consisted of a subset of participants from the first working group (Smith, Collins, Knapp, Phillips, and Sala). The primary goals of this working group were to develop a NSF Research Coordination Network proposal for submission for the August deadline at NSF (see products below) and to continue to refine and finalize the climate data synthesis.

In addition, the working group supported one month of post-doctoral researcher and two months of a graduate student to work on the climate data synthesis. The postdoc and graduate student gained experience with working with large climate datasets. These analyses are currently being written up for submission to a peer-reviewed journal (see products below).

Products

Knapp, A.K., D. Hoover, K. Wilcox, M. Avolio, S. Koerner, K. La Pierre, M.E. Loik, Y. Luo, O.E. Sala, and M.D. Smith. Beyond amount: Assessing precipitation regimes in extreme wet and dry years to inform climate change experiments. In preparation.

Smith, M.D. (PI), Phillips, R. and O. Sala (Co-PIs). RCN: A global network to assess terrestrial ecosystem sensitivity to drought. NSF Biological Sciences, Ecosystem Studies Program, \$499,880.

Presentations

Knapp, A.K. What have we learned from global change experiments in grasslands? Batsheva de Rothschild Seminar: Coordinated approaches for studying long-term ecosystem responses to global change. Ramat Hanadiv Park, Israel. (Keynote)

Knapp, A.K. Characterizing precipitation regimes of very wet and dry years: implications for experiments conducted across multiple ecoregions. CLIMMANI & INTERFACE Workshop, Mikulov, Czech Republic.

Smith, M.D. The role of long-term comparative experiments in global change research. Batsheva de Rothschild Seminar: Coordinated approaches for studying long-term ecosystem responses to global change. Ramat Hanadiv Park, Israel. (Keynote)

Smith, M.D. The International Drought Experiment. Organized Poster Session: The National Ecological Observatory Network (NEON): Building a community-infused community-driven resource for ecological science. 98th Ecological Society of America, Minneapolis, MN.