

Symposium:

Looking for a pulse in dryland ecosystems: Evaluating the pulse dynamics paradigm forty years after its creation

April 10-14, 2018

Phoenix, AZ

Venue: We-Ko-Pa Resort and Conference Center, 10438 N Fort McDowell Rd, Fort McDowell, AZ 85264

Workshop Rationale: Dryland ecosystems are characterized by infrequent and variable precipitation and, in his seminal 1973 paper, Noy-Meir proposed hypotheses that placed dryland ecosystem controls into a 'pulse dynamics' framework. This framework has become a central tenet for dryland ecology and, while it has been frequently cited and built upon, the paradigm has not been directly tested. Now is an ideal time to undertake a rigorous quantitative assessment of the pulse-reserve paradigm. In the past forty years, the scientific community has accrued numerous experiments and datasets with which to test the paradigm. Further, several numerical tools have evolved that allow us to address these concepts across multiple spatial and temporal scales. Here we bring together world-renowned dryland experts, numerical modelers, and remote sensors to directly assess and refine a framework for understanding how precipitation and soil moisture drive plant community composition, productivity, soil respiration, and coupled biogeochemical cycles. Emerging evidence suggests that dryland plant activity determines biogeochemical cycles at the global-scale and, in this context, a framework for understanding how climate regulates dryland functioning would be of great benefit for considering both current and future global function. In sum, this symposium seeks to continue Noy-Meir's legacy of elucidating precipitation controls in drylands, to put this legacy into a climate change context, and to utilize the wealth of dryland data and numerical tools that have accumulated in the last forty years to create an improved framework on which dryland ecology can continue to build.

Schedule of Events:

Tuesday, April 10th

- Guests arrive at hotel
- 7:00 PM Dinner (Catered - Swimming Pool Patio)

Wednesday, April 11th

- 7:00-8:30 Breakfast at Hotel (Catered - Yow Hospitality Suite)
- 8:30-10:00 Introduction
 - The impact of Noy Meir's paradigm, Sasha Reed
 - Scale under Pulse-Reserve Paradigm, Scott Collins
 - Expanding the Pulse-Reserve Paradigm, Osvaldo Sala
- 10:00-10:30 coffee break (Catered - Yow Hospitality Suite)
- 10:30-12:00 Morning talks:
 - The Pulse-Reserve Paradigm in the microbial world, Ferran Garcia-Pichel
 - Evidence of the pulse-reserve paradigm in gas exchange patterns Marcy Litvak
 - Yesterday's pulses are today's deluges – when and where do they matter most? Alan Knapp
- Noon lunch at hotel (Catered - Yow Hospitality Suite)
- 1:00-3:00 Working Group 1 address the question:
 - a. Does the Pulse-Reserve Paradigm validity change in climatic space? Is it equally valid in summer than in winter precipitation systems?
 - b. What is the difference between the paradigms of pulse reserve and pulse dynamics?
- 3:00-5:00 Hike at Gateway to McDowell Sonoran Preserve
- 6:00 dinner at Sam Campana's home with the board of the Desert Edge

Thursday, April 12th

- Optional 6:00 AM Hike at Taliesin West – Lost Dog Wash Trailhead
- 7:00-8:00 Breakfast (Catered - Yow Hospitality Suite)

- 8:00-9:00 Morning talks:
 - Using new statistical approaches for evaluating the pulse-reserve paradigm. Scott Ferrenberg
 - Can we put pulse-reserve to use? Implications of the paradigm for restoration and ranch resilience. Brandon Bestelmeyer
 - Applications of the pulse reserve paradigm to productivity responses to precipitation change, Laureano Gherardi
- 9:00 -10:00 Working Group 2 address the questions:
 - a. Does the validity of the Pulse-Reserve Paradigm change with body size of organisms from microbes to plants?
 - b. Pulse-reserve dynamics from a biogeochemical point of view.
- 10:00-10:30 Coffee break (Catered - Yow Hospitality Suite)
- 10:30-12:00 Working Group 3 address the questions:
 - a. How does spatial scale of interest affect the validity of the Pulse-Reserve Paradigm from a patch to the landscape?
 - b. What is the parameter space of the pulse reserve paradigm?
- 12:00 Lunch (Catered - Yow Hospitality Suite)
- 1:00-3:00 Working Group 4 address the question:
 - How does the definition of pulse affect the validity of the Pulse-Reserve Paradigm?
- 3:00-3:30 Coffee break (Catered - Yow Hospitality Suite)
- 3:30-5:30 Group 5:
 - Developing a new Drylands Paradigm
- 7:00 Dinner (Catered - Swimming Pool Patio)

Friday, April 13th

- 7:00-8:30 Breakfast (Catered - Yow Hospitality Suite)
- 8:30-10:00 Refining the New Paradigm
- 10:00-10:30 Coffee Break (Catered - Yow Hospitality Suite)
- 10:30-12:00 Outline of publication(s)
- 12:00 Lunch (Catered - Yow Hospitality Suite)
- 1:30-4:00 Plans for future activities
- 6:00 PM Party time at Osvaldo's home

Saturday, April 14th

- Breakfast on own
- Guests check-out of lodging/depart AZ