

In Search of Organization and Complexity in Semiarid Mountain Regions with Monsoonal Climates

Enrique R. Vivoni

Department of Earth and Environmental Science, New Mexico Institute of Mining and Technology, Socorro, NM.

Abstract. Semiarid watersheds in the southwestern United States and northwestern Mexico have unique characteristics due to the variability of climate forcing, ecosystem processes and hydrological responses within a complex topographic setting. The North American Monsoon (NAM), occurring during the summer season, is the primary driver of ecological, hydrological and geomorphologic processes in the region. NAM effects vary considerably as the distance increases from the core of the monsoon region toward the southwestern US. Over this region, watershed processes (vegetation state, soil moisture, runoff, evapotranspiration) during the monsoon are critical for water resources and ecosystem sustainability. Nevertheless, little research has been performed on quantifying hydrological processes and their linkages to the monsoon within basins exhibiting topographic complexity. The goal of this talk will be to highlight recent research that illustrates how catchments respond to the monsoon based on field and remote sensing observations as well as numerical modeling of watershed processes. We will also discuss linkages and feedbacks between surface properties and atmospheric conditions and the potential role played by landscape variations such as soil moisture and vegetation changes.