



Hydro-micrometeorological relationships across mountain island forest, grassland and riparian ecosystems of a semi-arid basin

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Observations from a sky Island forested ecosystem in the semi-arid southwestern U.S. established that the type of ecosystems represented by the Mt Bigelow site in the Santa Catalina Mountain Ranges, NE of Tucson Arizona, respond to an annual wet-dry cycle instead of a hot-cold (summer-winter) cycle typical of other more temperate/western upland forest ecosystems. The ecosystem responds instantaneously and aggressively to the moisture conditions of the synoptic weather systems, and will turn off photosynthetic processes during the (Arizona) pre-monsoon (spring-early summer) period when soil moisture goes below ~10%. Conversely the trees remains turned on throughout the winter. This behavior is also evident in the vegetation indices from satellite observations. Similar adaptive behavior is evident in the vegetation dynamics of other semiarid ecosystems. These observations have significant consequences for representation of these systems in both carbon and water balance models, and for the representation of southwestern subalpine forest vegetation in snow related models. Continuous observations of wintertime fluxes are difficult at best and further complicated by the remote locations where these observations are needed. However, these observations provide necessary data to advance the accuracies of water/carbon related modeling and an elevated standard by which current observation networks and remotely sensed observations are extrapolated, interpreted, assimilated and applied to semiarid basin scale questions. A comparison of observations from the sky island forest, grassland and riparian ecosystems within a semi-arid basin will be presented.