



On the couplings between semi-arid vegetation pattern and landscape water balance

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I will present a model of landscape water balance that is derived from the underlying distribution of the size and density of individual trees. The model is driven by spatially homogeneous but temporally stochastic rainfall forcing. The dynamics of water balance at a point are assumed to be dependent on the number of co-occurring plant canopies and rooting zones. The model is used to test the ecohydrological hypothesis that plant patterns in semi-arid landscapes are organized to maximize total plant water use while simultaneously minimizing plant water stress. I will apply the model to a series of savanna sites within southern Africa, and model predictions of optimal pattern with those observed from field surveys and high-resolution satellite imagery.