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**Punit Gandhi, Sarah Iams\*** ([siams@seas.harvard.edu](mailto:siams@seas.harvard.edu)) and **Mary Silber**. *A fast-slow switching model of banded vegetation pattern formation in drylands.*

From infiltration of water into soil during rainstorms to seasonal plant growth and death, ecohydrological processes thought to be relevant to the formation of banded vegetation patterns in drylands occur across multiple timescales. We propose a fast-slow switching model to capture these processes on appropriate timescales within a modeling framework based on reaction-advection-diffusion equations. The fast system captures hydrological processes that occur on the minute to hour timescales associated with major rainstorms, assuming a fixed vegetation distribution. The slow system acts between rain events, on a timescale of days to months, and evolves vegetation and soil moisture. Modeling processes at the appropriate timescales reduces the number of parameters that are chosen to fit pattern characteristics, and eliminates the artificial slowing of fast processes required to align their timescales with the biomass dynamics. We explore the fast-slow switching model through numerical simulation on a one-dimensional hillslope, finding agreement with observations of band spacing and upslope colonization rates. This fast-slow model framework introduces a tool for investigating the possible impact of changes to frequency and intensity of rain events in dryland ecosystems. (Received January 28, 2020)