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An idealized model for tree–grass coexistence in savannas

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We study the competition of trees and grasses in an idealized savanna environment. A simple implicit-space model is introduced, representing patch occupancy dynamics within the habitat and introducing life stage structure in the tree population, namely adults and seedlings. The model is able to predict grassland, forest, savanna and bistability between forest and grassland, depending on the different characteristics of the ecosystem. Stochastic fire disturbances significantly widen the parameter range where coexistence of trees and grasses is found. The model suggests that tree–grass coexistence in savannas can be either deterministically stable or stabilized by random disturbances, depending on environmental conditions and on the types of plant species present in the ecosystem.