

# A partial differential equations framework to model fire-prone savanna dynamics

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*Keywords: PDE – Impulsive PDE – Humid savanna – Travelling wave.*

Fires and mean annual rainfall are major factors that regulate woody and grassy biomasses in savannas. In this talk, we extend temporal models developed in recent papers by Yatat et al. (2016) [3] and Tchuinte et al. (2017) [1] into spatio-temporal models, in order to study the long term dynamics of a forest-grassland mosaic in a humid context of Central Africa. We take into account local biomass diffusion, as well as local competition for nutrients and light. For this model, we carry out a qualitative analysis that highlights some ecological thresholds shaping the dynamics of the system. We show that monostable and bistable travelling waves may exist. We explore through numerical simulations the use of fires on the dynamics of a forest-grassland mosaic in a humid savanna. Notably, we found that depending on fire-return time as well as characteristics of vegetation propagation phenomena, fire events are able to greatly slow down, stop or even reverse the progression of forest in humid regions [2].

## References

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