

Public Abstract

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Title: The Identification of Prehistoric Amazonian Slash-and-Burn Cultivation Practices Using Agent-Based Modeling

Agent-based modeling offers unique insight into questions concerning the slash-and-burn cultivation practices of prehistoric Amazonian populations. Due to the poor preservation of some botanical remains and a paucity of ethnographic records on cultivation practices, little is known on the prehistoric cultivation practices of indigenous populations in this region. The Amazonian Slash-and-Burn Model and the Succession Model, both agent-based models, were developed to help address how much influence prehistoric Amazonian populations had on their surrounding environment and if different slash-and-burn cultivation strategies could be identified based on the signatures left behind in subsequent forest composition and patterning. Ethnographic references on contemporary indigenous populations of lowland Amazonia were selected based on if slash-and-burn cultivation was practiced for subsistence and if manioc was the main crop. This data was then used as the foundation for creating the model parameters. Data on household interactions, size and distance of cultivation fields from the household settlement, and the length of time fields were cultivated and allowed to stay fallow were focused on in both models. The Succession Model represents a slightly more complex agent-based model than the Amazonian Slash-and-Burn Model, in that, fallow successional stages were added to better mimic the real-world environment. The models were both sensitivity tested to determine how each parameter, or key data inputs, affected the model results. Once the models were sensitivity tested it was determined that varying cultivation and fallow cycles resulted in different proportions of forest land, fallow land, and cultivation land on the total landscape through time. These results suggest that different slash-and-burn cultivation strategies could potentially be identified in paleoecological records. Further model testing of varying cultivation/fallow cycles will need to be performed to determine to what extent varying cultivation strategies affect subsequent forest composition and how precise the identification of the type of slash-and-burn cultivation strategy can be in paleoecological records.