



From Paleoclimate Variables to Prehistoric Agriculture: Using a Process-Based Agroecosystem Model to Simulate Prehistoric Agricultural Productivity

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This paper explores the relationship between past climate and prehistoric Mediterranean agriculture by adapting a process-based dynamic vegetation model to estimate past agricultural productivity under climate scenarios that characterize the extremes of Mediterranean climate (warm/wet and cold/dry) in the Holocene. We adapt LPJmL (the Lund-Potsdam-Jena-managed-landscape model, (cf. Bondeau et al. 2007)) to the modeling of past agricultural productivity. Calibrating this model for past crops and agricultural practices and using a combined downsampling and simulation approach to produce high spatiotemporal resolution paleoclimate data, we simulate realistic potential agricultural yields under past climatic conditions derived from the Holocene climatic extremes. We here discuss this process with reference to a case study in Provence, examining the methodology and data requirements for modeling past agriculture using LPJmL as well as the potential range of variability in agricultural productivity under distinct climate conditions. We focus on comparing the range of variability induced by climatic shifts with that achievable through changes in agricultural practices.