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Holocene Integrative Vegetation Evolution (HIVE) : dynamical modelling under transient climate conditions in Europe

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European landscapes have known a variety of transformations through the Holocene as a consequence of large-scale climate changes and anthropogenic impact. Recent evolution of the European area has seen a recession of agriculture in several regions (e.g. Navarro & Pereira, 2012, Ecosystems ; Perpiña Castillo et al, 2018, European Commission) putting into question what is to happen to the land so abandoned (Fayet et al, 2022 Environmental Science & Policy), for example if more « natural » conditions are to be implemented.

During the Holocene, European forests evolved in response to both climatic and human pressure. This joint evolution makes it hard to understand what the rôle of each factor is. Recent simulations at the global scale show that there could be significant delay between the natural vegetation evolution as computed in climate models and the observed evolution as recorded in palynological assemblages (Dallmeyer et al., 2023).

We aim at exploring the effect of human and climatic impacts on the vegetation evolution in Europe during the Holocene by means of high spatial resolution modelling.

To better understand how human pressure impacted vegetation cover in Europe, initial DGVM simulations were conducted using SEIB model, and were compared to pollen-based reconstruction from the REVEALS database. That way, the difference between simulations (representing european vegetation cover without homo sapiens presence) and data (representing real european vegetation cover) are a mean to evaluate the extent of the human impact. The simulations were running using climatic inputs from the intermediate complexity climatic model iLOVECLIM, using a downscaling approach to increase the spatial resolution and a bias correction method to improve the climate representation over the european area. Using steps of 300 years time windows periods from the begining of the Holocene to the preindustrial period, we present the results of those simulations and the comparaison with the pollen database as well as comparison with another vegetation model to assess the inter-model dispertion. The outcome could help us understand how our species has shaped the lands even before agricultural times as well as the extent of the climate induced vegetation evolution.

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