



## **Application of the dendroclimatic model MAIDEN over the last century in Europe**

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Trees are one of the main archives to reconstruct the climate of the last millennium at high resolution. The links between tree-ring proxies and climate have usually been estimated on the basis of statistical approaches, assuming linear and stationary relationships. Both assumptions can be inadequate and this issue can be overcome by ecophysiological modeling which helps to study the response of tree-growth to climate. It is particularly true for MAIDEN (Modeling and Analysis In DENdroecology), which simulates tree ring growth starting from temperature and precipitation daily inputs. Currently, MAIDEN has been applied in the Mediterranean and temperate region, in the eastern Canadian taiga and in Argentina. The objective of this study is to run the MAIDEN model for main European tree species and extend it to all regions in Europe where MAIDEN has not been calibrated yet. The first step consists of an automatic calibration of the MAIDEN model over the last century (1900-2010) for the selected sites, covering a wide range of environmental conditions. The calibration is based on a bayesian procedure with a Markov Chain Monte Carlo sampling developed by Gennaretti et al. (2017) and focuses on the most sensitive parameters of the MAIDEN model. The performance of MAIDEN at those sites is then evaluated through a cross-validation procedure, which tests the robustness of the estimation when selecting different calibration periods. Finally, the performance of the MAIDEN model is compared to the one of other tree-ring growth models such as VS-Lite and to linear statistical response functions.

Gennaretti, F., Gea-Izquierdo, G., Boucher, E., Berninger, F., Arseneault, D. & Guiot, J. (2017). Ecophysiological modeling of the climate imprint on photosynthesis and carbon allocation to the tree stem in the North American boreal forest. *Biogeosciences Discuss.*, 48, 1-26.