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Can we reach a sensible balance between generality of model parameters and accuracy of simulations?

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Process-based ecosystem models are versatile tools providing profound insights into ecosystem processes and interactions between vegetation and environment. The ongoing development of the Biome-BGCMuSo model has delivered multiple improvements in model structure and parameters, and subsequently in simulated ecosystem dynamics. Since the number of parameters has increased during the model development, model parametrisation for biomes or tree species of interest is required to enable reliable model usage in the future.

Here we explore the issue of site-specific versus multi-site calibration of model parameters for the European beech (*Fagus sylvatica* L.) along an extended environmental gradient across Central Europe, covering Croatia, Hungary, Slovakia, Poland and the Czech Republic. First, thorough literature search for the plausible ranges of individual model parameters was conducted. This was followed by the sensitivity analysis to identify the most influential model parameters. Finally, model calibration was performed based on the generalised likelihood uncertainty estimation method and the data from long-term research plots located in the five countries. The calibration was conducted at levels of individual sites and the region as a whole to evaluate different aspects of site-specific and multi-site calibration approaches and to develop a generalised parameter set for the European beech in Central Europe.