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Uncertainties in regional climate scenarios data and their effect on results of impact models in forestry

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The ongoing climate change might result in an increased frequency of weather extremes, which in turn may result in wide area abiotic damage within forest and agricultural ecosystems. To implement any adequate adaptation and mitigation measures the knowledge on possible developments of future climate (climate scenarios) is required. As the spatial resolution of GCMs is quite insufficient for the description of regionally varying forest growth conditions, the results of GCM downscaling by means of dynamical and statistical regional climate models are implemented. The impact models driven with RCM data show the effect of climate on ecosystems functioning and allow to evaluate the results of adaptation and mitigation measures. However, both CGMs and RCMs when compared to observed data might show bias, which can considerably affect the results of impact modelling and consequently the choice of adaptation/mitigation strategies. In present study the climate scenarios C20, A1B (runs 1 und 2) downscaled by CLM and REMO are implemented. The bias of modelled precipitation is evaluated by means of measurements dataset REGNIE (DWD) and corrected using the Piani (2010) method. The coupled model estimating the interacting risks of windthrow and drought, developed in Goettingen University is used in the study. The temporal resolution of the impact model is daily. The results of the study shows that the direct implementation of the regional climate model data for the process-based impact model is not always possible due to the own or GCM-inherited model biases producing rather unrealistic risks. The spatial resolution and/or recommended spatial averaging of the regional model results could be also problematic in the regions with highly heterogeneous hilly or mountainous landscapes. A further downscaling is required.