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Adv. Geosci., 27, 37-43, 2010

www.adv-geosci.net/27/37/2010/

doi: 10.5194/adgeo-27-37-2010

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Impact of climate change on water balance of forest sites in Rhineland-Palatinate, Germany

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Abstract. It is expected that the biomass productivity of forest stands will be influenced by global climate change. In order to adapt forest management to this fact a model based approach was developed in cooperation with forestry experts. The concept aims at detecting the link between climate, terrain and soil parameters with the biomass productivity of some tree species. This article gives an insight into the first two steps of this approach. At first the WaSiM-ETH 8.2 model was parameterised to simulate various forest sites. Furthermore, different drought stress indices were applied to the simulated water balance time series. The impact of variations of climate, topography and soil characteristics on water balance was plausibly simulated. All drought stress indices detected years which were dominated by dry conditions. However, the indices related to soil water content were more selective than those related to evapotranspiration. Drought stress indices for one future climate projection have shown an increasing frequency of drought stress during vegetation period. Thus, the first two steps are capable components to detect the link between water balance with climate, terrain and soil parameters.

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Citation: Grigoryan, G. V., Casper, M. C., Gauer, J., Vasconcelos, A. C., and Reiter, P. P.: Impact of climate change on water balance of forest sites in Rhineland-Palatinate, Germany, Adv. Geosci., 27, 37-43, doi:10.5194/adgeo-27-37-2010, 2010. [Bibtex](#) [EndNote](#) [Reference Manager](#) [XML](#)

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