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Land-use effects on flood generation – considering soil hydraulic measurements in modelling

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Abstract. The investigation in the catchment of the Mulde (51°0'55" N, 13° 15'54" E Saxony, Germany) researches the effect of afforestation measures on the soil hydraulic properties. The concept of a "false chronosequence" was used to quantify the time-dependent dynamical character of the forest impact. Four adjacent plots were identified at a test location with comparable pedological start conditions and a set of tree stands of different age: (1) arable field (initial state); (2) 6-year-old afforestation; (3) 50-year-old afforestation; (4) ancient natural forest ("target" stocking). Water retention curves and unsaturated conductivities were analysed in the lab. In the field, the undisturbed infiltration capacities were measured quantitatively (hood infiltrometer) and qualitatively (brilliant blue tracer). Pronounced differences between all 4 plots were detected. The afforestation causes an increased infiltration and soil water retention potential. Especially the topsoil layers showed a distinct increase in conductivity and portion of coarse/middle pores. The influence of these changes on rainfall-runoff calculations at the test location was analysed in this study.

Full Article in PDF (PDF, 936 KB)

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