



Changes in runoff generation due to conversion of catchment vegetation

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In Central Europe, many pure Norway spruce stands, established on primary beech sites, were converted into mixed stands over the last 60 years. The conversion of forest management from Norway spruce monocultures into mixed deciduous-coniferous forests changed the forest structure dramatically. This changes could influence the hydrological processes on the catchment scale, associated with changes in runoff generation.

In this study, the effect of forest management on the runoff in mixed deciduous-coniferous stands on Pohorje mountains in NE Slovenia were investigated. Two small forested experimental catchments of Oplotnica River on Pohorje were compared with similar size and shape but different share of Norway spruce *Picea abies* (L. Karst) and European beech *Fagus sylvatica* (L.). Measured stream flows, throughfall, stemflow and the mixture of forests were compared in the period 2008 till 2013 for both catchments. Hydrological models in the HEC-HMS program were built for both catchments, calibrated and validated using measured data. Precipitation losses were estimated by the Soil Conservation Service (SCS) method, while precipitation was converted into surface runoff using the SCS synthetic unit hydrograph procedure.

The measured seasonal throughfall and stream flow was lower in the catchment with higher share of spruce in the mixed spruce-beech forest. Modeled precipitation losses in the river basins were 92% and 95% of total precipitation, respectively. The results indicate higher interception, infiltration and accumulation of precipitation in the catchment with higher share of spruce in the mixed spruce-beech forest.

Forest management practices should aim towards decreased surface runoff in alpine catchments. Therefore implementation of hydrology-oriented silvicultural measures via a more accurate prediction of the impacts of tree species conversion on runoff generation in this type of alpine catchments is discussed.