



Influence of land-use change on water regime in the mountainous catchments

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This paper studies the influence of a-forestation on the water regime in catchments in the Ižera mountains. The measurement devices in the catchments were established in the 1980's after extensive forest devastation caused by air pollution and enhanced by heavy frosts and a subsequent increase in the population of beetle pests. About 60 – 70 % of the forest had to be cleared. Since then the hydro meteorological characteristics and water chemistry have been studied in the catchments. The first aim of this rather extended experimental site was to study the change of water regime in the altered conditions. The catchments are similar in size and altitude but have different a-forestation histories. In this paper a range of different modelling tools is used to establish whether the differences in catchment water regime can be quantified and attributed to differences in catchment characteristics. The paper also aims to test classification tools of hydro-meteorological conditions to establish those conditions in the catchments that are most sensitive to change in land-use. The rainfall flow process is modelled using a Data Based approach, with effective rainfall, described by the SMA or dependent on flow nonlinear gain followed by a linear black-box type, stochastic transfer function. Low flow conditions are modelled using a log-transformed low flow model. As the major floods in the catchments are dominated by snow-melt processes, only summer periods are used in the analysis. The results indicate that the differences in the catchment response to external climatic factors outweigh the land use influence apart from the low flows, where the changes in the response might be attributed to a-forestation. Further work on changes in flow chemistry should follow to confirm these findings.