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Afforestation in low mountain ridges, mapped by remote sensing techniques, and it's relation to the hydrological behaviour of Glan tributaries

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Analysis of remote sensing data (Landsat ETM+, TM and MSS) over the federal state of Rhineland-Palatinate provides the opportunity to map intensity and pattern of land cover change for more than three decades. It becomes apparent that the Saar-Nahe highlands, in distance to agglomerations and industrial growth centres, had been scene for significant afforestation as a reaction on the abandonment of farm land with low yield expectation. For some sub-catchments of the river Glan, a tributary of the Nahe, the investigation period was expanded to the year 1962 by employing declassified high resolution Corona data. Because of lower spatial (MSS) and radiometric resolution (MSS, Corona) satellite data from earlier periods do not allow a classification with more than three respective five land use types. Nevertheless, these data allow the identification of woodlands with an accuracy of more than 90% and provides thus a deeper look into the past with more spatial information than census data.

Given a considerable change from arable land to woodlands on mostly shallow loamy soils, a next step was to investigate a possible influence on hydrological characteristics of five Glan sub-catchments. The basins of the sub-catchments provided discharge data that covered the period of the satellite imagery. Statistical trend analyses were conducted on annual discharge and runoff coefficients. This was done parallel

to a trend analysis of meteorological parameters which are suspected to influence the hydrological behaviour of the test catchments.