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Competition or Synergy between main factors for catchment response? - A case study from southwest of Germany

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For the meso scale catchment of the Lauter river, Saar-Nahe-Bergland of Rhineland-Palatinate two land use classifications were performed, for the 2007 based on multispectral ASTER data and for 1964 based on monospectral Corona data. The performed land cover change analyses indicated an increase of forested areas, especial on former execrable or step agricultural parcels. This was accompanied by a moderate increase of settlement areas. Coincidental an intensification of discharge and the duration of high water at the catchment outlet could be observed that could not been parallelized with decreasing trends within annual precipitation.
These observations were mainly attributed to the fact, that changes that affect an increase of runoff (increase of impermeable areas) and changes that are linked to the cushioning of runoff generation (afforestation) are situated in different catchment areas (near to the main river respectively in the head water catchments). Additionally up to now only the annual volume of precipitation was under investigation, not the allocation within the year, not the concentration in single events and even not the proportion between liquid and solid precipitation. Further complexness of the system follows from proven records on changes in water management like straightening of the man watercourse or the construction of wastewater treatment plants and changes in agricultural land use (crop type, enlargement of parcels). Most of these changes will continue for the future. Hence the enthralling question for further investigations will be if pursued changes will amplify each other or act in a more comparative way so that further development of catchment discharge will decrease.