

Interactive comment on “Anomaly in the rainfall-runoff behaviour of the Meuse catchment. Climate, land use, or land use management?” by F. Fenicia et al.

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The manuscript entitled ‘Anomaly in the rainfall-runoff behaviour of the Meuse catchment. Climate, land use, or land management’, submitted by Fenicia et al., has been evaluated by four referees during the discussion phase. While all referees have confirmed that the paper lies clearly within the scope of HESS, they also have outlined a couple of issues that need to be addressed before the final publication. Basically, the paper investigates the potential causes of an anomaly between observed and predicted runoff of the Meuse river that had been already identified by Ashagrie et

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al. (2006). The conclusion of the authors is that forest management has been a major driving force in this issue, since the age of forest stands has been subject to substantial changes at large spatial scales (the main hypothesis being that forest rotation has had a significant impact on evapotranspiration in the catchment). The authors have identified land cover management as the main cause having generated the lower than expected runoff. According to most referees, one important comment is that the authors should insist in the manuscript on the fact that their conclusions are by no means definitive and that the whole study is rather to be seen as an additional hypothesis (i.e. the impacts of changes in land use management on the discharge of the river Meuse) to previous studies in the area that had been focusing on the potential effects of climate and land use change on the discharge of the Meuse river. The reviewers also insist on the fact that some other causes might have generated the runoff anomaly. Mine works activities are cited as an example, potentially causing substantial modifications of underground water circulation (see also for example paper by Kang et al., 1992 – Hydrological Sciences Journal, 37 :581-597). The reviewers 1 and 3 have also insisted on the need to provide more detailed information on the model itself (temporal scale, time periods, spatial scale, model setup, etc.). Even though some of these informations can be found in the manuscript, it will certainly be helpful to go through the text again and reorganise this part and add some information where needed. Referee #3 calls for a sensitivity analysis of the model parameters that should be made available to the reader. This indeed will be helpful in the sense that it will allow to weigh the pertinence of the findings provided by the model calculations and the conclusions that are drawn from them. A final very important comment concerns the data sets that are used within the framework of the study. Referee #3 even considers this issue as the main weakness of the paper. The authors should revise this aspect of their study in the sense that indeed it is quite dangerous to consider one station (i.e. De Bilt) as being representative of the evapotranspiration over the entire Meuse basin. If there really is a strong representativeness, then this should be demonstrated in the manuscript. Also with respect to this last point mentioned above, the paper would greatly benefit from a

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discussion that would more strongly insist on the uncertain and weak points and assumptions that the study is based upon. This does then by no means reduce the interest of the paper and the merit of the hypothesis that is brought forward by the authors in terms of the influence of land use management changes on the discharge of the Meuse river. The paper could also benefit from a short section where all relevant information sources and data available on land use, land management, climate and hydrological data availabilities are listed. Given the above considerations and suggestions made by the reviewers, the authors should take into consideration the referee's comments in what can be considered a moderate revision of their paper.

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