

Interactive comment on “Hydrological responses of a watershed to historical land use evolution and future land use scenarios under climate change conditions” by R. Quilbé et al.

Anonymous Referee #2

Received and published: 26 July 2007

The paper structure is clear, well written, the objective and the methods are clearly described and the tables/figures are fine.

Following other referee comment, more information about calibration and validation of hydrological model and climate scenarios is needed. Indeed, the authors indicate they present it in papers not available yet. This make very difficult for the reader to estimate the quality of the results. The way the results are assessed could maybe be improved as averaging or homogenising the results of all the combinations of GES scenarios may lead to unrealistic results (some detail is given in the specific comments).

Specific comments: - Page 1344, lines 18-19: a more detailed description of the sce-

nario construction and the downscaling methods and results in terms of P and T scenarios is needed (it is given in a submitted paper, the authors claim, not available for this referee). A figure showing for example the mean monthly evolution of P and T and perhaps other variables may help the reader to quickly understand the main differences between scenarios. - Page 1345, lines 14-15: maybe a figure would help to illustrate the uncertainty linked to relations between pig production and land use. - Page 1346, line 1: provide the meaning of the SSU acronym - Page 1346, lines 19-20: some details could be provided on the interest of assessing such particular critical streamflow sequences regarding the hydrological processes or water management (why these return periods and number of consecutive days) - Page 1347, lines 18-20: It seems that there could be a contradiction here, as it is stated in Page 1340, line 19 that the model is sensitive to Manning coefficient. Water balance do not depend on evapotranspiration only so, does the kind of soil/vegetation may not have at least an influence on the runoff/infiltration partitioning? Moreover, low flows are controlled by aquifer drainage and groundwater recharge should be at least slightly influenced by land use. So maybe Gibsi is more sensitive to ETR than to runoff simulation or maybe the more important effect stated is due to the land use effect on the groundwater recharge? Some additional discussion would certainly improve this section and provide some needed details about the hydrological modelling results. - Page 1348, lines 14-15: again, a more detailed description of the scenario construction and the downscaling methods and results in terms of P and T scenarios would help the reader to analyze such results. - Page 1348, lines 16-18: the interest of combining all the GES scenarios is questionable here as it makes harder the results assessment (as stated page 1350, line 16). Comparing different GES scenarios using one single GCM for different GES scenarios or one GES scenario with several GCMs should perhaps facilitate the assessment and the comprehension of the results. - Page 1348, lines 25: "(not shown)", It is found embarrassing to not provide any figure, especially when the results are further discussed in the following sentences. - Page 1349, lines 1: why is it homogeneous? Due to the delta method used? - Page 1349, lines 6-8: the fact

that the B2 scenario has a more severe impact than the A2 scenario is very surprising, as the latter is normally the pessimistic one that may provoke a stronger temperature increase. Further details are necessary to explain these results. - Page 1348, lines 11-12: part of this discussion is needed in the present paper. - Page 1349, line 18: Fig 4 doesn't seem to illustrate the GCM-GES-M effects. Maybe Fig. 6? - Page 1350, line 4: Briefly remind the characteristics of both land use scenarios - Page 1350, lines 4-7: it not seems as clear as stated, maybe an additional figure would be helpful. - Page 1350, lines 8-11: ECHAM4 B2 provokes a discharge decrease while HadCM3 provokes an increase, so is it meaningful to provide a mean value? Maybe sediment load simulated under HadCM3 increases under scenario B2 anyway? - Page 1350, lines 16-19: Right but, maybe providing averaged and homogenised results from such a different conditions is less realistic than comparing results depending on GES scenarios at least. - Page 1351, lines 7-8: Ě and a further thought about how to present the results of impact studies to water managers could be interesting too. - Page 1351, lines 21-23: it is not very clearly demonstrated in the main text as only averaged values are provided and comparisons between both driving forces fail. - Fig 8: it is not clear which graph is for which GCM-GES-M combination.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 1337, 2007.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper