

Interactive comment on “Analysis of feedback effects and atmosphere responses when 2-way coupling a hydrological land surface model with a regional climate model – a case study for the Upper-Danube catchment” by F. Zabel and W. Mauser

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Dear anonymous Referee # 2, the submitted paper is based on the work, described in the paper of Zabel et al. (2012), published in HESS. However, the paper discussed here includes substantially important and new information – as the validation! In order to validate the bidirectional coupling approach, we focused on the Upper Danube

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catchment. Here, we showed that near surface air temperature could be improved by the use of the bidirectional coupling approach when compared with interpolated data from 277 meteorological weather stations. Further, this study includes catchment analyzes, including the impact on runoff and the water balance. We wanted everyone to be able to read the paper as a standalone paper, without reading Zabel et al. (2012) first. Therefore, e.g. Figure 1 is essential for understanding the methodology. Figure 3 shows the monthly course of the planetary boundary layer height over the Upper Danube area. This is not shown in Zabel et al. (2012). Figure 2, 4, 10 refer to the Upper Danube catchment, while similar results presented in Zabel et al. (2012) refer to specific areas such as Milan. The PROMET offline results are included (e.g. in the evapotranspiration results). Of course, they are not included in the feedback and atmospheric response section, since the offline approach does not allow feedbacks between the atmosphere of the climate model and the land surface hydrological model. The less clear improvements for precipitation are mainly due to the coarse topography within the RCM. Zängl et al. (2007) showed that improved spatial resolution also improves precipitation results. Lingual deficits as mentioned in the comments were corrected.

Zängl, G.: To what extent does increased model resolution improve simulated precipitation fields? A case study of two north-Alpine heavy-rainfall events, *Meteorologische Zeitschrift*, 16, 571-580, 2007. Zabel, F., Mauser, W., Marke, T., Pfeiffer, A., Zängl, G., and Wastl, C.: Inter-comparison of two land-surface models applied at different scales and their feedbacks while coupled with a regional climate model, *Hydrol. Earth Syst. Sci.*, 16, 1017-1031, Doi: 10.5194/hess-16-1017-2012, 2012.

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