

Interactive comment on “On the benefit of high-resolution climate simulations in impact studies of hydrological extremes” by R. Dankers et al.

Anonymous Referee #1

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This well-written manuscript compares RCM simulations of models run with different spatial resolution based on the effect when used as input to a hydrological model. Such an approach is useful since it allows directly assessing the combined effect of different climate variables on the simulated impact (here runoff).

Unfortunately I have to say that I have a major concern with the paper. In the first part, simulated annual maximum flows are compared to observations. The hydrological model (LISFLOOD), however, does not take into account river regulation and lake storage (p 2580, line 17, p2585, line 6f and p 2581 line 1). These have of course important effects especially on maximum flows and I would assume that it is there-

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fore that the errors are rather large. From Fig 1 one can see many catchments with a normalized RMSE of around 1, which means an error of about 100% on average. Such a large error makes the results of the study rather questionable. River regulation is important in many European catchments and using a hydrological model which neglects this seems not appropriate. I am afraid that the results using such an unrealistic model are not useful. There are two ways out of this: 1) using only catchments where regulation/lakes are of minor importance; 2) adding a regulation/lake routine to the model.

In the second part the authors compare simulations with simulations using different RCM resolutions. Here my concern would be whether the day-by-day comparison is appropriate. As the authors correctly point out, such a comparison would be senseless for a RCM model – observation comparison, because the RCM does not aim to simulate the weather of a certain historic day. For the different resolution RCMs one might argue that they are all forced by the same boundary conditions and, thus, should be expected to simulate the same ‘hypothetical’ days. However, the fact that some events were “completely absent in either of the experiments” (page 2582, line 20f) might indicate that the day-by-day comparison is not the best way to analyse the differences between the simulations. The efficiency values (fig 4) seem also very low for a model-to-model comparison. Why not using the same approach as in the first part?

Please also explain how LISFLOOD was parameterized.

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