

## ***Interactive comment on “Quantifying different sources of uncertainty in hydrological projections at the catchment scale” by C. Dobler et al.***

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Received and published: 24 August 2012

General comment The paper of Dobler et al. is an important contribution to the discussion of uncertainty related to climate-impact studies. It is well structured. The design of the study is described in an exemplary manner. The results of the study are mostly clearly elaborated and compared. A clear measure of uncertainty, however, is missing or not sufficiently elaborated (s. detailed comments below). The final discussion in the conclusion chapter provides a differentiated view of the findings and also their limitations. The most relevant references are considered. The title of the paper should include the location of the study because the alpine setting is an important and specific aspect of the study. All-in-all, I recommend to accept this paper for publication after

some minor revisions.

1. Abstract, p. 8174, line 2. “less attention ..”: I do not fully agree with this statement which is repeated in other paragraphs of the paper, too. In contrary, the components of uncertainty are intensively discussed today

2. Chapter 6.2, study area: The Lech catchment is described as “a typical Alpine valley”. Please elaborate more in detail what you mean with typical? Typical for which regions of the Alps? If you discuss this aspect then you could also draw some conclusions on the spatial representativeness of your findings (this point is not addressed in the conclusions).

3. p. 8180, line 2: Describe the grid box (spatial resolution) and the procedure described in this short sentence more in detail.

4. p. 8180, line 13 - 22: How can you describe the temporally variable lapse rate with only two stations? I assume there are much more station available within the Lech catchment as well as in the region.

5. Performance for present climate conditions, p. 8185, line 7ff: Why did you not include the delta change method in your evaluation of the performance?

6. Fig. 4 (a), p. 8207: the scale of y-axis is too large ([0, 125]) to provide a realistic impression of the model performance on a daily basis. Perhaps you could introduce relative deviations.

7. Fig. 5 to Fig. 8: Although these figures depict the uncertainties which originate from different sources for different parameters, they are not directly comparable at first glance due to an inconsistent caption of the single diagrams, e.g., the uncertainty resulting from GCMs is shown in Fig. 5 as “(a)”, in Fig. 6 as “(i)”, in Fig. 7 as “(a)” and in Fig. 8 as “(a)”. This is somehow confusing. A direct caption “GCM uncertainty” (instead of (a) or (i)) may be helpful.

8. Fig. 6 and Fig. 8: Each figure indicates the “size of impact range originating from

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uncertainty source”. This seems to be a measure of uncertainty. The calculation of the measure “percentage points” is not described in the paper. Furthermore, the paper refers not in detail to these specific diagrams which are very important for comparing the uncertainties which result from the different sources.

9. Mean high flow, p. 8185, line 7ff: The title of this chapter is misleading as floods of different return periods (exceedance probabilities) and not mean high flows are investigated.

10. Fig. 8: Please elaborate why the uncertainties are largest for floods of smaller size. i.e. with a large exceedance probability.

11. p. 8191, line 14: Why is the Lech basin complex? Was does this mean? Is it more complex than other alpine basins? cf. point 2 of the detailed comments.

12. p. 8191, line 25 and 26 ← → p. 8192, line 2: The sentence on p. 8191 suggests that the GCM structure is the most important source of uncertainty. If this statement is correct, the sentence on p. 8192 "Uncertainty related to the choice of RCMs is found to be on comparable magnitude“ is misleading.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 8173, 2012.

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