

Interactive comment on “The impact of climate change on hydrological patterns in Czech headwater catchments” by A. Benčoková et al.

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We would like to thank to Anonymous Referee #1 for helpful comments and we apologize for the delay in our response.

RC: Scientific methods and assumptions valid and clearly outlined – as mentioned elsewhere, I am confused by the various input data: observed (measured?), simulated, projected. The authors should offer a clear, succinct, and simple (as possible) description of how they processed input climate (temperature, precipitation) data, especially for the calibration and validation periods.

AC: We have described the process of derivation of the input data in more detail.

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RC: "... the modeling process is quite complex and needs additional clarification..."; "The authors adequately explain (and reference) the basic structure of the models they used but integration of the various models becomes confusing. Somewhere in the process, there seems to be a loss of connection with any true, measured data." "perhaps a flow chart would help explain how the various 'models' are integrated..."

AC: We have added the flow chart. Hopefully it will contribute to the clarification of the modelling process.

RC: Title reflect content – suggest replacing 'hydrological' with 'flow' to more accurately reflect the content.

AC: We prefer to keep the title in its original form.

RC: Language fluent and precise – the authors' use of English is generally correct but frequently awkward. The manuscript would benefit with the services of a Copy Editor.

AC: We have asked a native English speaker to check the manuscript.

Technical corrections RC: Section 2.3. What is the location (Latitude, Longitude) of the climate station and the distance to the two stream catchments?

AC: The information was added to the section 2.1, where is the station firstly mentioned.

RC: Section 3.3. I am confused by the runoff data mentioned in this paragraph. I had presumed you were comparing modeled versus measured (Sections 2.3 and 2.4) runoff but the second sentence favorably compares "runoff ... calculated from ... RACO data" with the "simulation based on observed data". If the 'observed data' are weather data, I am further confused as the preceding paragraphs report major differences between measured and RACO-simulated data. If the input data are in disagreement, how can the output compared favorably? If the 'observed data' are runoff data from the weirs, why is it 'simulated' rather than simply measured at the weirs? Figure 3 doesn't mention 'simulated' observed runoff.

AC: We have tried to clarify the text in this section. The period of measured data for the catchments (1990–2006) and RCM control runs period (1967–1990) does not overlap. Therefore, we could not compare the simulated runoffs (RCM inputs) with measured runoffs. We had to compare the simulations with RCM corrected data to simulation with observed data.

RC: Section 4. I am assuming the first sentence is referring to ‘climatic’ data. This sentence captures my confusion among measured, simulated, modeled, etc. data that are used in this manuscript.

AC: We have rephrased the sentence to: “Comparing measured climatic data with RCMs simulated data in the control period; there was a clear shift in absolute magnitude and seasonality, making the direct use of RCMs data impossible (Fig. 2).” In addition, we referred to Figure 2 showing difference between uncorrected RCM data and measured data.

RC: I recommend not starting the Discussion with problems in the input data. A brief review of the study would be more appropriate; criticism of the process should come later.

AC: We have started the discussion with a brief summary of our aims.

RC: The first three paragraphs of this Section leave me totally confused. Quite possibly this is in large part my shortcoming.

AC: We have simplified the first paragraph and omitted the second and third paragraph. The second paragraph has referred to something obvious that might not to be absolutely clear from the description. We wanted to point out the fact that regional climate model data can be compared with measured data only by means of the long-term statistical behaviour. It is due to the fact that even though they represent the same period (meant the control period) the RCM data are not based on direct observation at certain location. Therefore, we cannot expect them to capture an individual event on a specific

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day (this refers to the temporal attachment).

RC: Are RCM and RACO data synonymous?

AC: RCM – is a general description for Regional Climate Model, while RAO is a one specific regional climate model developed by Rossby Center of the Swedish Meteorological and Hydrological Institute.

RC: Table 1. The authors need to clarify which of these data are measured, 'corrected', or projected

AC: We have extended the table and clarified the origin of the data.

RC: Tables 4-7. Captions should be revised to read “Percent change in monthly ...”

AC: It is true, however we have decided to change the figure design – to show the actual data and not the percent change, in order to simplify the text result section.

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