

Interactive comment on “Dynamics of water fluxes and storages in an Alpine karst catchment under current and potential future climate conditions” by Zhao Chen et al.

Anonymous Referee #1

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The subject paper presents a model based on a previous model (Chen et al., 2014) for the northern Alps on the Germany-Austria border, adding new developments as the presence of the non-karst area and the surface runoff, the slow flow and the snow accumulation and melting. The work seems fine for me but, however, the manuscript is hard to read itself and it looks very focused on the study area, that is why I must say that the manuscript is not suitable for publication unless it was revised in some aspects.

The model is based on the one developed by Chen et al., 2014 but, are there more differences between both models apart of the new developments? The basic setting of the model should be explained in the manuscript: what boundary conditions do

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the authors use and why? What are the equations that are solved... I miss also a brief discussion about the differences between both models in terms of hydrodynamics (how the new developments change the results and why they should be included). In fact, it looks like the new model fits the discharges considerably worse than in the previous one.

The authors also present some climate scenarios in order to evaluate the behavior of the system and the connections between climate change and subsurface dynamics in karst aquifers. This could be a research of broad interest however, again, the discussion is hard to follow without going through literature and the conclusions are very focused on the study area. May be it would be interesting to compare this work with some other studies of karst aquifers dynamics.

Talking about the “extremely dry conditions” in 2070, it is not clear to me how the authors introduce the baseflow, is it a constant value as in the work of Chen et al., 2014 or is it different now? Please, explain.

Regarding the conclusions, the authors claim that “the results demonstrate that the spatiotemporal distribution of water fluxes and storages is controlled by surface hydrological setting” but also that “the results should only be applied to understand the relationship between the hydrological processes within the studied catchment and potential climate change patterns”. The conclusions are valid but they do not seem to be relevant for the general hydrogeological knowledge. The authors should try to generalize them. It would be interesting to evaluate how a karst system could be affected by climate change, why it is different the affection of climate change over a karst aquifer, are karst aquifers more vulnerable than non karstified ones?

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