

Interactive comment on “Seasonality in the alpine water logistic system on a regional basis” by D. Vanham et al.

D. Vanham et al.

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Authors' response to the comments of Referee 1

We would like to thank Referee 1 for his/her evaluation and helpful comments on the manuscript. In this response we answer to the fundamental questions of the Referee. In the final revised manuscript we will take the Referees other comments (like technical corrections) into account.

GENERAL COMMENTS

As a main comment the Referee indicates that the focus of the paper is not pointed out sufficiently. In the "SPECIFIC COMMENTS" the Referee asks if the main conclusion of the paper is the definition of a winter and summer period - as stated in the last sentence

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of the abstract (p2714 I15).

Yes, this is the main conclusion of the paper: the definition of a winter and summer period in order to analyse a water balance (water resources - water demand) for these two defined periods. We agree with the Referee to include a more detailed outlook within the paper. A general outlook in the text can be found on p2726 I13-20. Climate change is definitely an important issue in relevance to this analysis. Breiling and Charamza (1999), for example, analysed a climate change scenario of a 2°C rise in average temperatures without precipitation change in Austria. These values were also predicted in the greater Kitzbueheler region for the winter period for the years 2031-2039 by Kunstmann et al. (2004). Breiling and Charamza (1999) indicate in the North Alpine West (NAW) zone of Austria - in which the case study Kitzbueheler region is located - an increase of the snowline of 100m. In other zones an increase of 200m was observed. An analysis of the seasonality - as described in this paper - will result in a shortening of the winter period, due to the upward shift of the snowline in this climate change scenario. This means that a water balance (water resources - water demand) for the winter period will be analysed over a shorter period of time as in comparison with the existing situation. This shows the relevance of this paper. As requested by the Referee we will put extra focus on the aim, conclusions and practical use of this paper in the final revised version.

SPECIFIC COMMENTS

Title should be re-thought: It is not clear straightaway what "the alpine water logistic system" is referring to, although the general direction can be guessed.

The term is defined in the first sentence of the abstract (p2714 I2-3), and a reference is given in the introduction (p2715 I5-7). However, we understand that this term in the title of the paper can lead to some ambiguity. An alternative title could be: "Seasonality in alpine water resources management - a regional assessment". We would then adapt the text in the final revised manuscript accordingly.

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Abstract: could be improved, again with better focus on aims and especially on conclusions. Is the main conclusion the definition of winter and summer period as referred to in the final sentence?

See answer on general comments.

Snow data and interpolation: The altitude bias in snow measurement should be discussed, for the higher altitudes are underrepresented (as in almost any gauging network in mountains).

This is definitely an interesting topic. We will include this in the final revised manuscript.

Methodology: Commercial water use is also derived from number of inhabitants. Is commuting relevant?

Not in the investigated case study.

Methodology: The formulas for T_{snow} and T_{tour} are introduced also on a half month-time interval, grids "SCOV6190_S" / "SCOV6190_E" on a daily basis (p2724 I14). Be clear on the time-steps used.

In the actual analysis a daily time step is used. The grids "SCOV6190_S" / "SCOV6190_E" comprise daily information. The half month time intervals are stated as a generalisation.

References: the extensive data in the Hydrological Atlas of Switzerland could be referred to as a comparison, eg. the respective plates for low flow, snow cover and discharge regime, but also the significance of the Alps for water resources questions.

We referred to a map (plate) in the Hydrological Atlas of Austria (<http://www.boku.ac.at/iwhw/hao/>) on p2720 I11. This Atlas also includes analyses on these topics (low flow, discharge regime,...). A comparison with the Swiss Hydrological Atlas is definitely interesting.

REFERENCES

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Kunstmann, H., Schneider, K., Forkel, R. and Knoche, R.: Impact analysis of climate change for an Alpine catchment using high resolution dynamic downscaling of ECHAM4 time slices. *Hydrol. Earth Syst. Sci.*, 8, 1030-1044, 2004.

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