Interactive comment on “Climate change impacts on the seasonality and generation processes of floods in catchments with mixed snowmelt/rainfall regimes: projections and uncertainties” by K. Vormoor et al.

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General Comments

This paper covers a highly important topic: The potential impacts of climate change on floods in regions with significant contributions of snowmelt. Given the economic relevance that floods and inundations have for society, reliable projections are required at the regional scale, e.g. for risk assessments or dimensioning hydraulic structures. While addressing this topic for selected regions of Norway, the diversity of the six catchments studied is high enough to be comparable to other mountain regions of the world.

With the inclusion of uncertainties, the authors also provide valuable insights into the model chain used. The paper is well-structured, written clearly, and relevant for a broad audience within the scope of HESS.

Specific Comments

* The one major point where more insight would have been desirable is the model’s predictive skill under changed conditions – e.g. by applying a differential split-sample test (see Andréassian et al., 2011; Klemes, 1986; Refsgaard and Henriksen, 2004) –, although the problem of time (in)stability of model parameters (Merz et al., 2011) is mentioned, and the uncertainties of the hydrological parameter sets are analysed. If not by extending the study with specific modelling experiments for the reference period 1961–1990, the topic should at least be addressed with a brief discussion.

* With reference to Gudmundsson et al. (2012), the authors consider non-parametric methods as most suitable for bias correction of precipitation (P6281, L26 ff.). In the following, they use these methods also for temperature correction – can they state something about the respective suitability?

* The approach to flood generating processes (FGP) is rather straightforward, but appropriate. Still, I suggest putting the approach into the context of more detailed methods, in particular the one described by Merz and Blöschl (2003).

* Since the extraction of extreme events is based on a Peak-Over-Threshold (POT) approach, did the authors consider POT-specific skill scores (e.g., Lamb, 1999; Viviroli et al., 2009) to evaluate their model?

* How was the catchment-specific normal flood duration (P6284, L 12) determined, i.e. how did the authors define beginning and end of a flood event? Does “normal” flood duration refer to “average” flood duration over all POT events sampled?

* I recommend adding a note on the recent study by Köplin et al. (2014) which treats a
very similar topic.

Minor Remarks

P6274, Abstract: I suggest adding the number of catchments studied and the daily time-step used.

P6274, L12: . . . in flood regimes *result* . . .

P6276, L25: Readability: . . . related to changes in the magnitude vs. *changes* in the frequency of events?

P6278, L16: Mention the time period also in the main text, not only in the Figure.

References


Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 6273, 2014.