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Hydrology and Earth System Sciences
Discussions

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.

Anonymous Referee #2

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The paper examines the impacts of climate change as projected by a number of GCM/RCM combinations on future flood seasonalities estimated based on a multi-model/multi-parameter approach in different regions of Norway. The analysis shows that based on the projected changes there will be a shift of flood events towards autumn/winter in all regions with an increasing relevance of rainfall compared to snowmelt. I think this is a very interesting case study of potential impacts of climate change on flood seasonalities, especially important for a countries such as Norway that strongly depend on hydropower and related reservoir management. The paper is

clearly structured, easy to read and, in my opinion, well suited for publication in HESS.

One important point that is not stressed in the paper, but somewhat relevant for the whole study, is the fact that you assume stationary conditions for the whole reference period for which you calibrate your hydrological model. It is not so surprising that changes in the seasonality occur for future periods due to the large projected changes in temperature and precipitation. It would however, be very interesting to see whether changes in seasonality can already be observed in the measured data. If so, this may influence your modelling results for future time periods as model parameters may not be stationary for the reference period (you mention this problem somehow discussing model outputs for future periods under non-stationary conditions in lines 23-27, page 6292).

Further comments:

Page 6280, lines 16-17: Why did you choose the 2071-2099 as future period? Did you also have a look at changes in nearer future?

Page 6284, line11-12: How did you determine the "normal flood duration" for the catchments?

Page 6286, lines 15-24 and Figure 2: In the Figure you specify that for certain simulations you only apply one best-fit HBV parameter set? Why? And why is this not discussed in the related text?

Page 6287, line 5: Can you specify any reason for the lower performance? Are certain processes not represented well with the model?

Page 6287, lines 7-14 and Page 6288, lines 8-9: The performance of the HBV model regarding PTO events for the validation period (Figure 2) shows a low performance for the catchments Fustvatn and Junkerdalselv which is mainly relevant for the assessment of changes in flood magnitudes for the future period, while regarding the representation for flood seasonalities the performance of the model for the Krakfoss

catchment is rather low (Figure 3) which is important for the assessment of changes in flood seasonalities (You could stress this aspect more clearly in the paper). Can you comment on why e.g. model performance in the Krakfoss catchment is low reagrding seasonality and high regarding flood magnitudes?

Figure 2: Add the info on what the NSEw is in the Figure caption.

Figure 4: Are the changes shown here all significant or not?

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