

Interactive comment on “Future extreme precipitation assessment in Western Norway – using a linear model approach” by G. N. Caroletti and I. Barstad

Anonymous Referee #3

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General comments:

The manuscript represents an interesting application of linear model downscaling to future climate projections of the IPCC. In so far, the manuscript is a potentially valuable contribution and merits publication. However, the manuscript needs major revisions before being considered for publications.

First of all, the manuscript is difficult to read and not well structured (revise thoroughly). The language is not very precise. The manuscript would largely benefit from editing by a English native speaker. The description of the linear model is too short - the reader is

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obliged to read the previous papers in order to understand the essentials of the linear model. There are too many figures and tables in relation to the scientific content.

A major concern is that the authors do not present any significance analysis of their results (consider e.g., analysis of variance, bootstrap methods or anything for statistical inference). In general, the manuscript would largely benefit from using some statistics.

Another major point concerns the validation of the linear model. Is the linear model able to represent spatial variations that are due to orographic forcing for the reference period? Is this model able to correct for systematic errors in the GCMs? Are there changes in the reference period that can be attributed to changes in climate parameters during the reference period (detection and attribution)? How well do the GCMs represent the major parameters of the linear model?

The forcing term in the linear model is based on a Fourier transform of the topography of a limited area. What about the boundary conditions, since the assumption of periodic boundary conditions does not apply (was a pre-whitening applied/necessary)?

Minor comments:

p. 7540, lines 2-4: statement 'an increase in precipitation extremes' is too general - there is evidence for an increase of precipitation extremes in some regions - but uncertainty is large on the local scale

p. 7544, Eq. (4): note that l and k are integer values, shouldn't Eq. (4) consist of a sum over all l and k ?

Fig. 2 is not mentioned in the text.

p. 7545: Precise whether you work with daily accumulations.

p. 7546, line 24-25: How are the days with orographic precipitation defined exactly?

p. 7546ff: I wonder, whether it is wise to use the relative values, as important information is removed. How many days are there with orographic precipitation? The major

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signal (increase) would be visible with absolute values, but this information (model spread, uncertainty in the model, ect.) would not get lost.

p. 7547: What standard deviations are shown?

Fig 6: Figure not very clear (visibility of station points is weak)

The tables of the appendix are not discussed.

Table 5 and Fig 7 contain same information, remove at least one.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 7539, 2009.