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Hydrology and Earth System Sciences Discussions

Interactive comment on "Topological and canonical kriging for design-flood prediction in ungauged catchments: an improvement over a traditional regional regression approach?" *by* S. A. Archfield et al.

Anonymous Referee #1

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GENERAL COMMENTS The comparison of predictions from different models, or model blends, is very useful for practical applications in ungauged basins; however, I would include in this paper also some considerations concerning the inherent uncertainties of the estimation methods.

Let's first consider the sample uncertainty, that is implicitly taken into account by both the GLS and the kriging procedures, although no information about it is provided in the paper. I first suggest to include in the paper a summary of records length as a

first approximation of such uncertainties, or directly a summary of sample variances (here, only the minimum record is reported at page 12198 line 8). This information is very important because, for short records it is likely to have a regional estimate more accurate than the empirical one, especially for large return period. For instance, this effect is considered by Gotvald et al (2009) who suggest, for practical applications at gauged sites, to compute the design peak flow weighting the empirical and the regional estimates, according to their variances. But, this effect can also affect the comparison of the residuals (e.g. fig. 3) where large error could be due to large uncertainty in the empirical value instead of bad predictions. It would be interesting to check the results of fig. 3 in light of the sample uncertainty.

The second point is the comparison of prediction variances of the different models at ungauged sites. The authors could check them and evaluate if better results are possible weighting different approaches (e.g. GLS and TK).

SPECIFIC COMMENT page12204 line15-16: it is not clear why flood quantiles have been scaled by the factor DrAˆ0.65. I would add a short explanation of this point.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 12193, 2012.