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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Climate elasticity of streamflow revisited – an elasticity index based on long-term hydrometeorological records" *by* V. Andréassian et al.

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We thank Reviewer 2 (hereafter R2) for his detailed review and relevant comments, which we will take into account in the revised version of the paper. We give here a rapid answer to the points raised:

1. log-likelihood for the GLS model

We will take R2's recommendation and move the description to the Appendix.

2. preference of GLS over OLS :

As R2 noticed, we did assume that if residual auto-correlation violates the assumption of iid variables, it could affect the precision of the estimate. Obviously, in our results, the difference between GLS and OLS results is very small (see Figure 7, b and d). We will comment further this point in the revised version.

3. possible use of the Fu formula to complement the observations of the Turc-Mezentsev formula

We did not have an occasion to look in detail at the Fu formula, which does look extremely similar to the Turc-Mezentsev formula, and does respect the same boundary conditions, while not being analytically identical. We plotted both formulas and their own partial derivatives in the Q/P vs P/E0 nondimensional space (see attached file) and we could verify that both formulas are numerically equivalent provided we use the following relationship between Fu's parameter m_Fu and Turc-Mezentsev parameter n_TM:

m_Fu = ln(2)/ln(2-2^(-1/n_TM))

We have not been yet able to identify the reason for this surprising result from the description given by Zhang et al. (2004). The maths seem perfectly fine. We noticed that Fu (1981) cites Mezentsev, and we wonder whether he did notice or not that the expression he reached was numerically equivalent to that of Mezentsev (unfortunately, none of us can read Chinese)?

4. individual catchment info

We will add this information to the supplement

References

Fu, B. (1981), On the calculation of the evaporation from land surface, Atmospherica Sinica, 5, 23-31. Zhang, L.; Hickel, K.; Dawes, W. R.; Chiew, F. H. S.; Western, A. W. & Briggs, P. R. A rational function approach for estimating mean annual evapotranspiration. Water Resources Research, 2004, 40, W02502.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/12/C2534/2015/hessd-12-C2534-2015-supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 3645, 2015.