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Hydrology and Earth System Sciences Discussions

Interactive comment on "Flood trends and variability in the Mekong river" *by* J. M. Delgado et al.

Anonymous Referee #2

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Review of the paper entitled "Flood trends and variability in the Mekong river" by Delgado et al. submitted to HESS.

Delgado et al. present an interesting application of statistical methods of trend detection to runoff in the Mekong river. The primary result is standard trend detection methods such as regression and Mann-Kendall test do not work very well when the variance of the extreme value distribution changes over time. The alternative method, i.e. fitting a Non-stationary Generalized Extreme Value distribution NSGEV, then turns out to work very well. I generally think this paper is acceptable for publication to HESS, after some moderate revisions. There are three major issues that need to be addressed, which I will treat in order of importance.

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Interactive Discussion
Discussion Paper

1. The authors present a test that states whether a more elaborate GEV model with a linear or quadratic trend is better than a simpler model. However, this does not show whether all the individual parameters are significant. For instance, in a quadratic model it could well be that the trend is quadratic, but that the parameter of the linear term mu_1 is not significant. To test this, the authors should perform a bootstrap analysis to approximate the covariance matrix of the parameters and then test their significance by t-tests. Because we are dealing with a non-stationary extreme value series, it would probably be good to sample subset data from the series using a stratified design so as to make sure that the entire range of the non-stationary series is represented.

2. The results from Vientiane are much different from the other stations. The authors come up with an explanation stating that the sources of water are different for that stations. This explanation is not sufficient enough. It would be good to ponder more about variations in strength between EAM and IM in time (and find some supporting references thereof).

3.The change in variance with time is obtained by integration of a wavelet power spectrum. Although not wrong, it seems to be a bit of overkill, as the change of variance with time could have easily been be obtained by a moving period variance with the period equal to the time window used to calculate the wavelet coefficients.

Some minor points:

- Page 6694, line 20: change to “as a first approach to studying the variability of”

- Page 6696, line 1: add “the” before “river”

- Page 6696, line 12,13: not clear what is meant by this.

- Page 6702, lines 19-20. It is not clear what s meant by “covariates” here. Do you mean that both parameters are estimated simultaneously?

- Page 6708, line 17: what is meant by “changes on the landscape level”?

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