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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Using variograms to detect and attribute hydrological change" *by* A. Chiverton et al.

Anonymous Referee #2

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This paper introduces a new method, applying variogram parameter estimation within moving time windows in order to detect changes in runoff behaviour for 94 UK catchments. The temporal changes are then related to meteorological variables. Also, estimated variogram parameters are related/interpreted to characteristics of the runoff time series. While the first reviewer is strongly criticising the theoretical assumptions of using/estimation variogram in this context, I do not see this point as too much of a limitation. Estimating extreme value distributions within moving temporal windows is pretty standard in order to illustrate how additional uncertainty exists concerning necessary time series length and how derived recurrence intervals might vary dependent on available data. I can easily see the estimated variogram parameters as a temporally changing auto-correlation characteristic that is analysed against some average

behaviour – so I am fine with that, but would like to see some uncertainty information on the parameter estimates for each window.

But before going into detail here, I think there is a more general concern I would like to rise and that I think would need to be discussed (and solved) beforehand. Why are the authors going the tedious way of estimating variogram parameters first, when they later try to relate them to various characteristics of the runoff time serious? Especially when variogram parameter information contain mixed properties of these runoff time series (which are the topic of concern anyway). Why do they not analyse the runoff characteristics directly and try to relate them to meteorological conditions? While it seems interesting to analyze the Meteorology-Variogram-Runoff relationship, it is not obvious to me here why this additional step of variogram analyse has been introduced at all!

Perhaps a comment in the discussion would be able to clarify this point – and I am willing to take arguments into consideration . . . however I believe this should be made much clearer (in case there is a good reason) in the paper!!

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 11763, 2014.