

Interactive comment on “Characterising hydrological response in urban watersheds based on inter-amount time distributions” by Marie-Claire ten Veldhuis and Marc Schleiss

Anonymous Referee #2

Received and published: 29 November 2016

This paper applies an existing framework (Schleiss and Smith, 2016) for analysing inter-amount-times (IAT) to time series of daily streamflow from 17 urbanised watershed monitored by the USGS. The stated aim of the paper is to explore how IAT can be used to characterize the hydrological response and compare results to analysis based on traditional analysis techniques.

In general I found the manuscript difficult to read for a number of reasons – The introduction is very unstructured. It starts by discussing effects of urbanisation, then gives a general A-Z of general challenges in applied hydrology, incl. flood frequency analysis, flow duration curves, multivariate statistics, unit hydrographs, baseflow separation, before ending-up with a very detailed summary of scaling issues with a high

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level of assumed knowledge on behalf of the reader. I suggest a much more focussed introduction is necessary to better justify the scientific gaps being addressed by the study.

â€” The aim is presented very loosely as ‘to explore how inter-amounts can be used to characterise hydrologic response for a range of (semi)urban watersheds in North Carolina, US.’ I think it would be more convincing if the aim could be linked more strongly to a distinct problem/gap when using existing methods for analysing the hydrological response from urban watersheds. What is the actual scientific and/or applied problem being addressed here?

â€” I was struggling with some of the technical description in Section 2. This is partly down to a number of key places where the notation is hard to follow (see more detailed comments below), but also because I could not follow how this method was going to add new insight that was not available from a direct analysis of runoff time series. Again, I think a more focussed and readable introduction might have been helpful here.

â€” The results discussion (Section 3) is hard to follow. Maybe consider introducing more subsection and better explain how the different analysis comes together to answer the scientific aim, rather than at present where I get the impression it is a series of independent and individual analysis undertaken because it is possible.

â€” The main conclusion seems to be that flashiness is related to watershed area, but that no link to urbanisation could be identified. While this is, of course, not the fault of the researchers it does perhaps suggest that the title of the paper (urban watersheds) is not really appropriate as no new insight into the effects of urbanisation seems to have been discovered.

â€” I don’t think the strong conclusion on page 17, line 21-22 is justified as it is not clear what characteristics is being referred to that could not have been established using conventional time series?

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Detailed comments I think HESS uses British rather than US spelling, so catchment rather than watershed

Page 2, line 25: Define 'scale-break'

Page 3, line 5: Not sure what 'moments $q[0.1-4]$ ' signifies?

Eq. (4): this equation sums over q_i , but in the lines above the sample flow time series is defined in terms of r (line 14). Should it be ' r ' in Eq(4) or else ' q_i ' need to be defined somewhere

Eq (5): I don't understand the notation used in this equation. What does ' $Q_t, nq-nq$ ' mean?

Eq (6): I don't know how to link this equation to Eq. (5) – I think some more explanation is required here.

Eq(7): ' T ' is not defined anywhere?

Page 6, lines 23-24: Given that the flashiness is one of the main conclusions of the study, I think a more comprehensive description of the concept is required, for example include a conceptual figure.

Page 7, line 16: What is 'Scott's rule'?

Page 19=0, line 14: what does 'cq' refers to?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-509, 2016.

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