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Discussions

Interactive comment on "Stream flow recession patterns can help unravel the role of climate and humans in landscape co-evolution" *by* P. W. Bogaart et al.

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Dear Editor

The research questions raised by the authors are important, and they have made some interesting revelations. Particularly, their results on the relationship between landuse and recession flow properties seem to be informative. However, I have some doubts regarding the analytical methods followed by the authors. Below are my comments and suggestions that they may be find useful:

1. I agree with the previous commenters D.E. Rupp and Ross Woods that a plot be-

tween the recession coefficient 'a' and the exponent 'b' (Figure 4 in the article) can be misleading because the units of 'a' depends on 'b'. So we won't get any useful information by comparing 'a' values from two recession events having different 'b' values.

2. The coefficient 'a' of a basin varies significantly across recession events (see, for e.g., Biswal and Marani, 2010; Shaw and Riha, 2012). Note that the variation of 'a' can occur over three orders of magnitude. However, the exponent 'b' does not vary much for a basin; hence, we can use a representative 'b' for a basin assuming that its variation is mainly due to errors in the data. The comparison of 'a' values from different recession events can then be done considering a single value of 'b', in which case 'a' for different recession curves will have the same units. It can be found by integrating the power law recession equation (-dQ/dt =aQˆb) that there is a relationship between 'a' and the characteristic discharge Q_n (discharge after n-th day after the recession peak): a \propto Q_5ˆ(1-b) (Biswal and Marani, 2014). This implies that 'a' will decrease with increase in Q_n (which represents initial storage in the basin), and vice versa (note that generally b > 1). Therefore if we have to study the effect of catchment properties on 'a', we need to first eliminate the effect of Q_n on 'a'.

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Best regards, Basudev Biswal

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 9865, 2015.