

## ***Interactive comment on “Stream recession curves and storage variability in small watersheds” by N. Y. Krakauer and M. Temimi***

**Anonymous Referee #2**

Received and published: 7 April 2011

The paper is surely written in elegant English, however, in many parts difficult to read at least for non native speakers. The text is much too long, not concise and to the point but cumbersome and the benefits or message of the work is not clear until the end. Unnecessary and unclear words like “coterminous USA” (bordering to the USA?) are superfluous and not found in dictionaries. Data are “binned” or sorted in “bins”, which makes the reader think of dust bins, instead of “sorted in classes”. Also equations are written in another manner than commonly used, particularly in most of the cited references (example  $\dot{O}$  (O with a point on it instead of  $dQ/dt$ ). Mathematical or computational skills are shown but physical, hydrological aspects and processes neglected. The authors used hourly streamflow values instead of daily values for more accuracy but they don’t seem to realize that these data are not “discharge measurements” or “measured discharges” or “streamflow measurements” and are not “observ-

C773

able as river discharge” but are all determined from measured water levels at gauging stations using more or less unsecure rating curves. So the wanted accuracy may be only a computational one.

Is “the conceptual pool that supplies streamflow during dry periods” (Abstract) baseflow as meant in most of the cited references, thus groundwater outflow, which is indeed the main contributor to streamflow? Baseflow supplies flow not only during dry periods but practically always! What makes the authors assume in lines 22-25 of page 1831, that “time scale for streamflow generated within the watershed to reach the gauge is not much more than one hour...”? At least subsurface flow will take much longer and baseflow response to rainfall will not consist of rainwater of this event but of groundwater pressed out because the hydraulic head of the aquifer is increased by infiltration and percolation. It is not clear what hydrological processes are considered in the paper and modelling of recessions remains pure fitting without physical meaning. Also the used predictors (point 2.5) are lacking physical significance. As recession flow is mainly outflow from the saturated subsurface zone (groundwater) it is essentially influenced by geology and aquifer properties (evidently not considered) and much less a function of the chosen surface parameters. Surface water storage has not much to do with flow recession as soil moisture is adhesive and hardly released as runoff.

Likewise it is erroneous that high forest cover leads to longer recession time (page 1844, line 15ff). The presence of vegetation may foster the retention of water (line 19) but the retention in the canopy (interception!) is lost by evaporation and water retained in the root zone (line 20) will not be released to the river but consumed by the plants. Particularly, deep rooted trees will consume groundwater and lower its levels. The reduction of surface evaporation by vegetation shading is normally highly surpassed by evapotranspiration from the plant surfaces. Thus, contrary to the assumption in the paper, vegetation and forests speed flow recession (s. articles: Federer, C.A., Forest Transpiration Greatly Speeds Streamflow Recession. *Water R.R.*, Vol 9 No 6, 1599-1604, 1973; R. Johnson, The forest cycle and low river flows: a review of

C774

UK and international studies. Forest Ecology and Management, 109,1-7,1998 or R.N. Weisman, op.cit. and many others).

Ignoring basic processes of flow generation, this article is not really a hydrological work but rather a computational one.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1827, 2011.