Dear Editor,

In their interesting paper, "Changes of Nonlinearity and Stability of Streamflow Recession Characteristics under Climate Warming in a Large Glaciated Basin of the Tibetan Plateau", the authors examine changes in the parameters a and b of the power law recession equation given by $-dQ/dt = aQ^b$. Between two periods of years (1980-1996 and 1997-2015), they calculate an increase in b in five basins and a decrease in a in four of five basins. To the overall decrease in a, or $\log(a)$, they ascribe a physical significance: a decrease in "streamflow stability".

However, no such physical significance to be ascribed to changes in a alone when b also changes. The problem arises from the units a, which change as b changes. The authors are making a nonsensical comparison of two values with different units and claiming one value is less than another.

A consequence of the scale dependence of a is that the reported change in a over time is dependent on the units the authors use for discharge Q. If they were to use different units (in other words, rescale Q), not only might the absolute and relative magnitudes of the change in a be different, so could the sign of the change (and zero change is also possible given the precise rescaling).

We can take basin YBJ as an example. Table 3 shows values of a decreasing from 0.043 to 0.034 when Q has units of mm/day. At the same time, b increases from 1.79 to 1.90. Converting units of Q to m/day, and keeping b at 1.79 and 1.90, results in values of a of 9.41 and 17.04, respectively (assuming the relationship $-dQ/dt = aQ^b$ holds exactly). Converting units from mm/day to m/day doesn't simply change the values of a, but results in an *increase* in a instead of a *decrease* over time. Certainly, if the reported changes in a had a physical significance, simply changing the units wouldn't change the physical interpretation.

The same general problem of misinterpretation exists in their examination of a as a function of temperature.

I recommend that the authors be very careful in their interpretation of changes in a under simultaneous changes in b. I also recommend the authors look to Dralle et al. (2015) and Biswal (2021) for further discussion on the relationship between the power law coefficients.

Lastly, on the more general topic of the role of climate on the variability of the b parameter, the authors could look to Jachens et al. (2020) for additional discussion.

Sincerely,
David E. Rupp

References

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