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Interactive Comment

Interactive comment on "Is streamflow increasing? Trends in the coterminous United States" *by* N. Y. Krakauer and I. Fung

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This paper provides an interesting analysis of the attribution of streamflow variations to environmental changes. The topic fits well within the scope of the journal. However, the presentation of the results needs to be improved.

The effect of CO_2 on streamflow is claimed in the paper, but it is unclear what this is based on. The significance levels (p-values) for the different regression coefficients are not presented in the text, nor in Table 1, except for the regression between precipitation and runoff. The text mentions that for CO_2 "the association is not significant for the coterminous US". What then, is the claim based on that CO_2 does have an effect on runoff? Are some of the regressions for different precipitation regimes displayed in Table 1 then significant? If yes, for which regions? This could be clarified the table and

Figure 9, by identifying the statistically significant results.

In order to support the conclusions of this paper, Table 1 should be set up in a clear way, so that the different regressions are easily recognisable. This is now unclear with various footnotes. Crucially, the p-values of the different regression coefficients need to be presented here. If no significant link is found between runoff and CO2 levels for the coterminous US, this should be one of the main conclusions. This would be an important conclusion for other studies looking into global impacts of elevated CO2 levels. Perhaps at the regional level such links do exist, so please present more clearly.

Temperatures exhibit interannual variation that is linked to runoff, while CO2 levels change gradually. It is likely that therefore no significant link could be found. It may be possible to attribute runoff change to CO2 levels, but probably not in a regression analysis. This should be elaborated in the paper. For the reader to appreciate any of such possible links between runoff and the different variables, it would certainly help to present the timeseries of temperature and CO2 levels, in a similar fashion as was done for precipitation (Figure 5b).

Further, the physics behind the links between temperature increases and runoff reductions (section 3.2) could be further clarified. Evaporation is mainly determined by radiation, windspeed and humidity. Reduction in evaporation rates would increase the sensible heat flux (temperature) over the latent heat flux, Therefore, in areas where water is limiting (in summertime precipitation dominated areas), decreasing evaporation rates due to water shortages would lead to temperature increases, rather than the other way around. What is probably meant here is that an increase in the average temperatures creates conditions for the air to contain more water vapour. This should be explained, as any increase in temperatures may be modulated by local as well as global and regional (circulation, global warming) processes.

The title of the article is somewhat misleading; although a trend is the runoff dataset is determined (p. 791), the main thrust of the article seems to be the attribution of any

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variation in runoff. At least, the significant correlation between precipitation and runoff found (Figure 6) is largely based on their interannual co-variation, rather than the trend in precipitation and runoff alone.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 785, 2008.

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