

Interactive comment on “Seasonal and inter-annual variations in carbon fluxes in a tropical river system (Tana River, Kenya)” by Naomi Geeraert et al.

Anonymous Referee #2

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REVIEW Seasonal and inter-annual variations in carbon fluxes in a tropical river system (Tana River, Kenya)

SUMMARY This paper studies the dynamics of water, carbon and sediment transport within the Tana River using data at three sites from 2012 to 2014. The major findings from the study are that the characteristics of the wet season hydrograph dominate the quantification of these fluxes while the dry season discharge is fairly consistent. Another conclusion from the study is that higher sampling frequency is needed to accurately estimate the carbon and sediment fluxes.

GENERAL COMMENTS I have several major concerns with this study. First, it seems that a lot of this data has already been published elsewhere. The authors fail to de-

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scribe how the current manuscript is different from previous studies done on the Tana River by the same research group or a subset of this group.

Secondly, a majority of the conclusions were made using 2 years of high temporal resolution data that had different hydrological regimes. So, is it not surprising that the results indicate that the majority of the difference is associated with hydrological regimes? In my opinion, a lot more can be done with the data that is available. Why not look at concentration temperature relationships? It is not clear how large or small temperature fluctuations at the site were in terms of both seasonal and annual trends.

The authors also simplify all the assumptions regarding retention or mobilization of carbon. There could be a strong impact of microbial reactions on POC, DOC and DIC fluxes. Note that microbially mediated breakdown of DOC can result in a pH decrease accompanied by an increase in bicarbonate alkalinity. Thus, DIC and DOC fluxes can be interlinked. How do the authors address this linkage in understanding patterns of DIC and DOC fluxes along the Tana river?

The publication is also missing recent references that are very much relevant to the current study. For example, Arora et al. (2016, Biogeochemistry); Raymond et al. (2013, Nature); and Van Cappellen and Maavara (2016, Ecohydrology & Hydrobiology).

SPECIFIC COMMENTS

Page 5 Para 20 Slightly more detail can be added to the sentence stating the differences in sampling protocols, especially differences in DIC collection methods.

Page 5 Para 25 A reference should be provided for the maximum POC concentration chosen for this study.

Page 6 Para 25 “dry seasons still had a fair share” of what?

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