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## ***Interactive comment on “Niger’s Delta vulnerability to river floods due to sea level rise” by Z. N. Musa et al.***

**Anonymous Referee #3**

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The authors assess the vulnerability of the Niger Delta to flooding with a GIS-based approach. Several variables influencing the delta are accounted for and ranked and an index of vulnerability calculated to identify the most vulnerable areas within the delta. The topic is of great interest due to the relevance of flooding issues to coastal areas which are often very densely populated and host important resources. The authors do a nice job in the introduction and acknowledge that healthy deltaic systems would be able to respond to sea level rise. The vulnerability of deltas is not only a function of sea level but of this factor combined with the capability of the system to respond to change, e.g. availability of sediment. The Niger is one of the largest deltas in the world and has been subject to anthropogenic disturbance due to oil extraction. The analysis of this system is thus important and of interest.

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The authors explain in the introduction why a simplified approach such as the one taken here, is necessary at times. Clearly we cannot obtain field data everywhere in a system as large as the Niger and a preliminary analysis such as the one proposed in this paper represents a good first step. It cannot be the end of the analysis though; I think it can only highlight possible areas where to concentrate more detailed analyses through field work and numerical modeling. The assessment of a system's vulnerability cannot be based solely on an overall analysis based on spatial 2D maps.

I also have some concern about the lack of acknowledgment, discussion and consideration of the uncertainty of the variables blended in the analysis. They all come from different sources; can we trust these values? What is the uncertainty? How is that reflected in the results presented?

I also think the paper lacks a discussion on how the variables used are chosen and ranked. There are a few references listed and a good number of variables listed in Tables 2 through 4. Where are these coming from? The references cited refer to different systems than the one analyzed here. Are ranges and rankings the same across different systems? And why would that be the case?

Also, how are the coastal segments identified? It seems to me that the spatial scale at which these parameters are computed is very important. So how to select those segments? What is the effect of this choice on the analysis results?

Given that the paper does not propose a novel method but rather the application of two previously proposed approaches, some discussion of advantages, disadvantages and why a combined approach may be beneficial should be present in the paper.

In summary, a discussion of uncertainty, rationale on the approach taken and related limitations should be presented and discussed in this paper. I think this approach may help guide more detailed studies as I mentioned above, but the message of this paper is not along these lines, but rather that an approach like this one would be enough to identify mitigation practices. I do not believe this is the case.

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**NHESSD**

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