

## ***Interactive comment on “Vulnerability analysis in Complex Networks under a Flood Risk Reduction point of view” by Leonardo B. L. Santos et al.***

**Anonymous Referee #2**

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Paper Review Feedback General Comments: The manuscript considers complex networks approach for analysing topological vulnerability of a transportation network at a case study of the state of Santa Catarina (Brazil) within a context of reducing flood risk. While the conceptualisation of the research problem may be of interest to the journal's readers, there is a lack of sufficient detail and clarity on the method applied (e.g., how vulnerability is assessed) and indication of the validity of the results/conclusions. There are also major grammar related issues throughout the paper and requires a thorough proofreading. A summary of some specific comments and example technical corrections are outlined below for the authors to consider. Specific Comments: ¶ Abstract: o 1st sentence: it would be good to specify in terms of 'vulnerability' to what? o 2nd sentence: Do the authors mean '...some elements of a transportation network cannot

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be reached, ...'? o 4th sentence: what does 'in a graph' refer here? Is it necessary to have it? Otherwise, need clarification. o Last sentence: '...an important tool for stakeholders...?' It would be good to clarify 'tool for what purpose'? ¶ Introduction: o This section is too broad and needs to focus on providing useful context to the specific topics explored – transportation network and implication of (vulnerability to) flooding. For example, there is a passing comment on '...lack of insurance, savings and loans, ...', and it is not clear how this is relevant to the focus of the paper. ¶ Methods, and Results and Discussion: o This section lacks sufficient detail (except directing to another paper) to clearly understand the methodology employed in the vulnerability analysis. For example, it's not exactly clear how 'efficiency' (both at 'full capacity' and after 'removal of an element') is measured/estimated. Is it just an inverse of the length of an element? If so, why is this considered as a measure of 'vulnerability'? Also, not clear vulnerability to what? How the result shown in Figure 1 is produced also need to be explained in detail. o It is also not clear how the 'flood susceptible areas' (shown in Figure 2) are identified/modelled – the method used needs to be clearly stated? In addition, the paper's title suggests the vulnerability analysis is conducted within a viewpoint of flood risk reduction, but from the result in Figure 2 it is not clear what exactly the link is between 'vulnerability' (calculated based on just 'efficiency' as stated above) and 'flooding'. For example, should the vulnerability analysis consider identifying road network elements that are affected by (vulnerable to) flooding? That is, the index used to measure vulnerability needs to include a measure of the flood risk, than just efficiency. If this is the approach used, authors need to clarify this. As it stands, the link appears to be based on 'proximity analysis', if this is the case, the paper also need to clarify this. ¶ Conclusions: o This section should be less about just a repeat summary of the results from the previous sections, but more on a critique of the method and setting the results in the context of existing literature. This is important to highlight the validity of the method applied and also similarities and differences in conclusions of this study with other studies. Technical corrections: ¶ Introduction: o P2, Line 1–3: Check citation consistency/format: Taylor et al. (2006) vs. Taylor (2006)? o P2, Line 10–12:

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Statement needs clarification – element vulnerability to what and how is it different from ‘most susceptible areas for flooding’? o P2, Line 15–16: General statements like this should either be minimised/avoided or need to be supported with evidence (e.g., reference). iĈĝ Methods: o P3, Line 3–5: Check citation consistency/format: Herrmann et al. (2014) vs. Herrmann (2014)???

iĈĝ Results and Discussion: o P4, Figure 1: consider better/representative vulnerability classes (than which appears to be based on ‘natural breaks’?). o P5, Figure 2: Same as above comment. Also, there is no caption. iĈĝ References: o Check citation formats in main text – e.g., with double brackets in a number of places. o Consult appropriate referencing style: the order of the list needs to be either in order of appearance in the main text (in which case, it should be numbered) or alphabetically – at the moment, it’s neither.

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