

Interactive comment on “Towards Measuring Resilience of Flood Prone Communities: A Conceptual Framework” by Victor O. Oladokun and Burrell E. Montz

Anonymous Referee #1

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This paper adds to expanding literature on disaster resilience measurement. The primary purpose of the study is to develop a mathematical model based on the U.S. National Academies definition of resilience (“the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events”) and then implement the model for three flood-prone communities using a fuzzy logic equivalent. The background on the development of operational resilience measurement models is good, although it does rely primarily on relatively few papers (e.g. Cai et al. 2018; Cutter 2018; Keating et al. 2017; Zou et al. 2018), and perhaps misses other community resilience measurement efforts such as Zurich’s Flood Resilience program. I am also concerned that the definitional discourse does not adequately describe the complexities and vari-

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ability in the meaning of resilience—is it applied to a particular system, event, or more broadly to capture community abilities as the NRC definition is designed to do? I would encourage the authors to reduce the definitional discussion and simply select and then justify the definition they prefer to use (e.g. NRC 2012) as the basis for their conceptual model. In the formulation of the conceptual model (Figure 1,) the authors assume that resilience leads to recovery (the outcome of interest). How does the conceptual model line up with their preferred definition? While an attempt was made on p. 5-6 to do this, most of the discussion is focused on recovery or the recovery spectrum. So, how can the operationalization of a definition that includes recovery also be used to measure an outcome, also labeled recovery? The authors need to clearly distinguish resilience (an outcome in and of itself) from recovery or at a minimum more clearly articulate they are describing resilience-type capacities within communities that influence flood recovery. It seems to me that the conceptual model is oriented to flood recovery (p. 7) rather than resilience per se. Later on in the paper, they use the resilience index as the output (Table 6), but this is not found in the conceptual model as described in Figure 1). What is unique about the context of flood hazards in the model, or could it equally apply to any natural hazard impact in a community? The bulk of the paper describes the mathematics of the model and its implementation, but again I wonder as to whether the model is describing and/or modeling resilience. What is the source of the resilience input factors? Were the inputs verified to see if the model worked? In the “hypothetical” analysis who determined the inputs (e.g. who did the assessment as to the values of the inputs)? There is no explanation of this in Section 4 Model Application, just a very generic text about the study location. When the “results” appear, they are more like a description of the tool and how it can be used rather than results based on empirical and/or qualitative assessments. Thus, the information presented in the manuscript does not support the results as presented. In addition, the discussion and conclusion section is not especially robust either and in many ways rehashes the literature review rather than presenting new and innovative findings related to resilience in flood prone communities. This paper could be significantly improved by re-framing it as a method-

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ological contribution where the conceptual model and its mathematical expression is more fully articulated including all the requisite input variables including the sources. Then the fuzzy logic scoring template/tool can be described in more detail. In order to test the model, however, the authors would need to generate at least a small sample of stakeholders to complete the input variable assessments as a measure of the validity of the effort. This is a difficult paper to assess given how much of it seems focused on the modeling (Figures 2-6) and recovery quality, yet in these same figures there's no mention of the other two components (resource availability and resource utilization processes) unless these are both subsumed under resources per Figure 3. As a reader I do not understand the model and its conversion to a type of resilience index (the stated output). Whether this is a function of my lack of familiarity with mathematical modeling as used here or the authors' explanation of it is uncertain. Either way, the manuscript needs a rewrite to make it appeal more directly to the journal's readership.

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