

Reply on Anonymous Referee #1 and #2 on the paper NHESD – 7553, 2014

Referee comments	Reply
<p>#1 The methodology is applied to hypothetical scenarios without a real validation, this prevents from understanding how effective is the approach and its results.</p> <p>#2 As the other reviewer has already highlighted, the lack of any validation could seriously invalidated the results here presented. This issue need to be conveniently addressed or at least more in depth discussed. The authors have mentioned this issue just in the conclusion (but I think that it could deserved a broader discussion</p>	<p>In the Portuguese case there are no available validation datasets quantifying flood effects in a systematic and comprehensive manner for the entire territory. In fact, the lack of validation data is recurrent in this type of studies, as can be seen in the work done by Clark et al (1998), Cutter et al (2000), Weichselgartner (2002), Wu et al (2002), Krop et al (2006), (full references given below). Those studies usually refer these approaches as an initial reasonable yet subjective, qualitative assessments of the flood social susceptibility made by experts taking into consideration the best available socioeconomic relevant indicators.</p> <p>As was the case in those studies, it is the opinion of the authors that the lack of validation data should not hinder the publication of this paper, since it provides a methodologically valid approach (confirmed by previous studies) for the development of a Flood Social Susceptibility Index for the Portuguese Territory. Its publication will at least trigger a discussion with stakeholders involved in the flood risk management in Portugal and therefore will possibly be the baseline for the development of not only the necessary validation datasets but also other improved Social Susceptibility Indexes.</p> <p>Clark, GeorgeE; Moser, SusanneC; Ratick, SamuelJ; Dow, Kirstin; Meyer, WilliamB; Emani, Srinivas; Jin, Weigen; Kasperson, JeanneX; Kasperson, RogerE; Schwarz, HarryE - Assessing the Vulnerability of Coastal Communities to Extreme Storms: The Case of Revere, MA., USA. Mitigation and Adaptation Strategies for Global Change. Vol. 3. n.º 1 (1998). pp. 59-82. Available in: <http://dx.doi.org/10.1023/A%3A1009609710795>. 1381-2386</p> <p>Cutter, Susan L.; Mitchell, Jerry T.; Scott, Michael S. - Revealing the Vulnerability of People and Places: A Case Study of Georgetown County, South Carolina. Annals of the Association of American Geographers. Vol. 90. n.º 4 (2000). pp. 713-737. Available in: <http://dx.doi.org/10.1111/0004-5608.00219>. 1467-8306</p> <p>Ge, Yi; Dou, Wen; Gu, Zhihui; Qian, Xin; Wang, Jinfei; Xu, Wei; Shi, Peijun; Ming, Xiaodong; Zhou, Xin; Chen, Yuan - Assessment of social vulnerability to natural hazards in the Yangtze River Delta, China. Stochastic Environmental Research and Risk Assessment. Vol. 27. n.º 8 (2013). pp. 1899-1908. Available in: <http://dx.doi.org/10.1007/s00477-013-0725-y>. 1436-3240</p> <p>Kropp, J. p; Block, A.; Reusswig, F.; Zickfeld, K.; Schellnhuber, H. J. - Semiquantitative Assessment of Regional Climate Vulnerability: The North-Rhine Westphalia Study. Climatic Change. Vol. 76. n.º 3-4 (2006).</p>

	<p>pp. 265-290. Available in: <http://dx.doi.org/10.1007/s10584-005-9037-7>. 0165-0009 Wu, Shuang-Ye; Yarnal, Brent; Fisher, Ann - Vulnerability of coastal communities to sea-level rise: a case study of Cape May County, New Jersey, USA. Climate Research. Vol. 22. n.º 3 (2002). pp. 255-270. Available in: <http://www.int-res.com/abstracts/cr/v22/n3/p255-270/>.</p>
<p>#1 The Authors should better address if and how their methodology may be generalized to other social scenarios, or if it is suitable just for Portuguese society.</p>	<p>As mentioned in the State of the Art section of this paper, the methodology was based on the work developed by Cutter et al. (2003) and refined by Feteke (2010). Those methodologies were applied to both the US and Germany which proves that is suitable to apply to other social scenarios. The focus of the paper is not on the generalization of the methodology but on the application of an already tested methodology for the particular case study of Portugal.</p>
<p>#1 The paragraph on the study area should be summarized, while some more details about the dataset, together with some statistics, should be provided.</p> <p>#2 Sec. 3.1 This section should be strongly shortened and its main scope should be clarified</p>	<p>Changes were made to significantly shorten this section to comply with the suggestions given by both referees. Please see new submitted version of the paper.</p>
<p>#1 The English should be proofread by a native speaker</p> <p>#2 Also the English should be strongly ameliorated. I'm not a native speaker but in some parts is not easy for me to understand what the authors would explain and assess.</p>	<p>The paper was reviewed again at this stage and several changes were made to improve its comprehension in an attempt to comply with these comments. Please see new submitted version of the paper.</p>
<p>#2 I have seen that the most part of the authors</p>	<p>In this last version of the paper this link was highlighted in the end of Section 2. Please see new submitted version of the paper.</p>

<p>have contributed to a similar discussion in NHEESD about vulnerability index (Jacinto et al 2014 Nat. Hazards Earth Syst. Sci. Discuss., 2, 7521-7552, 2014 www.nat-hazards-earth-syst-scidiscuss.net/2/7521/2014/ doi:10.5194/nhessd-2-7521-2014). I suggest to highlight and strengthen the link with the other paper.</p>	
<p>#2 Sec. 3.2 Census of 2001 cannot likely reflect some major changes happened in the society (I suppose even in Portugal) in the last 15 years</p>	<p>As stated in the paper the 2011 census data was not included in this study because only provisional data was available at the time. This is of course a limitation of the study. Nevertheless it is the authors belief that, although the magnitude of certain indicators might have changed in the last decade, its overall spatial distribution is similar. Since all indicators values are normalized before performing the PCA, the normalized values that relate one parish to another can still be considered valid.</p> <p>A phrase was added to Section 3.2 to emphasize addressing this comment: “In the authors opinion, although this is a limitation of the study, it doesn't compromise the results presented here. In the last ten years, only the magnitude, not the spatial distribution, of each parameter within the Portuguese territory has changed significantly, rendering the comparison between the different parishes still valid.”</p>
<p>#2 Sec. 3.2 How do the authors choose the characterization of each variable (minus/plus...) ?</p>	<p>As stated in the new revised version of this paper: “The evaluation of each indicator was made by the authors, following a similar analysis made in the work of Feteke (2010). Nevertheless, as in any variable selection process, there is some degree of subjectivity that should be taken in consideration when evaluating the results of this Flood Social Susceptibility Index.”</p>
<p>#2 Sec. 3.3 Could the authors better explain what d they mean with ‘expert analysis’ at line 24 The authors should better highlight what’s the most innovative aspects of their method and what’s different and new with respect to the method previously proposed by Feteke 2010 over Germany. I don’t</p>	<p>The expression “expert analysis” was removed from the paper since it does not apply here. The variable pre-selection was based solely on a comparison made by the authors of variables used in other referenced studies and the available indicators from Portuguese socioeconomic statistical datasets, as stated in the new revised paper.</p> <p>The authors do not claim they introduced any novelty in the approach originally developed by Cutter et al (2003) and refined by Feteke (2010). As stated in both the state of the art and methodology sections of the paper, the authors apply the same methodology to the Portuguese territory, where no Flood Social Susceptibility Index was previously developed in a consistent manner. Furthermore (and this is also stated</p>

<p>sincerely understand the novelty of this approach (out of the application onto the Portuguese territory).</p>	<p>in the paper) they do so in the context of the development of a Portuguese Flood Vulnerability Index, joining it with an exposure and a physical susceptibility components (the subject of the submitted companion paper). These two aspects, the chosen study area and inclusion of this SSI in a broader Portuguese Flood Vulnerability index are the main novelties in this work and not the presented methodology.</p>
<p>#2 Please clarify Sec.5 The authors state that “The PCA based technique avoided successfully most of the subjective selection processes based on expert analysis methodologies that can add bias to the final index, based on personal assumptions.”. However, if I correctly understood the expert analysis play a key role in attributing the susceptibility characterization (minus/plus... see sec.3.2). The authors should better clarify this point</p>	<p>The authors were referring to the variable selection process that reduced the number of variables included in the index from its original size, selecting only the most representative variables to determine Portuguese flood social susceptibility. Nevertheless there is still subjectivity in some steps of this methodology, namely, as referred by the referee, in the definition of the role given to each variable to characterize flood social susceptibility. This subjectivity could only be reduced if validation data existed, relating flood effects with specific socioeconomic variables, which is not the case for Portugal, as stated in the reply to previous comments from the referees. To clarify this situation a comment was added to the conclusions in the new revised version of the paper to emphasize this fact.</p>