

## ***Interactive comment on “A review of multivariate social vulnerability methodologies; a case study of the River Parrett catchment, Somerset” by I. Willis and J. Fitton***

**I. Willis and J. Fitton**

iaain.willis@live.co.uk

Received and published: 5 April 2016

Thank you for the review of the paper. Please see author replies (AR) following each comment raised below;

Line 91: it's = it is – (AR) Agree, but suggest that neither are appropriate. Propose changing to 'its' to recognise the possessive form within this sentence.

Line 132 et seq: data were used... (AR) Agree. This could be changed to the plural form of 'data'

Lines 135-7: How were these variables selected and why were the other 52 excluded? (AR) I think this question is already directly addressed in the paragraph immediately

C1

following and draws the reader to reference Tables 2 and 3 and how the variables selected are linked to previous studies from the literature showing how specific variables are correlated to social vulnerability (Lines 140-147). . . . “There were two main reasons for the seven initial indicators shown in Table 2. Firstly, as the focus of the study was to determine the difference that alternative weighting mechanisms may have on vulnerability scores, using fewer indicators made it easier to infer the influence of each methodology being reviewed. Secondly, not all census variables were eligible for inclusion in this study given that the focus was on determining factors that impact a neighbourhood's social vulnerability during extreme flooding. Whilst not exhaustive, Table 2 also provides example studies of where age, ethnicity, and disability have been shown to impact social vulnerability to support the selection of indicators within this study. Table 3 shows the correlation between the selected vulnerability indicators, with 'Persons aged 65 to 89' and 'Individuals day-to-day activities limited a lot or a little' (k005 and k035) showing the strongest relationship (0.687).” However, we will review the wording if variable selection is still not expressed clearly in this section.

Lines 155-166: Repetition vis-a-vis the previous page. (AR) Cannot see the relevance of this comment - there is no repetition here. Lines 152-163 discuss the data standardisation methodology and concept (i.e. why it's necessary to transform unformatted data and the Range standardisation method used). The previous page discusses initial 'variable selection', the rationale for this and the correlation of the variables. If the reviewer can kindly elaborate on what they mean?

Line 276: Figure ? (AR) An earlier figure was removed without editing the caption. This point was addressed in an earlier revision of the paper – please see the attachment to the previous reviewer's comments.

Lines 276-8: Observations of this kind cry out for explanation. It seems that higher population density equals greater social vulnerability. Figure 6: It is interesting how little the social vulnerability map corresponds with the flood map. I would have expected to see them overlaid. (AR) Agree, there is perhaps scope to elaborate on this further – for

C2

the reviewer's reference, the population groups impacted by the Somerset levels largely consisted of small rural villages (many of whom were affluent farmers). This is not in itself a surprising correlation given that the region is by and large an extensive area of historic agricultural land (<http://www.bbc.co.uk/news/uk-england-somerset-26080597>). Whilst social vulnerability is shown to be more exacerbated in urban areas, there was no prior expectation that this would spatially correlate with flood risk.

This article is summed up by its own conclusions (lines 326-7), "the fundamental qualitative assumptions underlining [sic] social vulnerability are perhaps the first source of uncertainty in this process." The paper uses ill-justified variables and a highly inductive methodology (essentially a blind correlation exercise) to define a vague sort of 'social vulnerability' that seems to be independent of vulnerability to flooding, which is, in the first place, driven by flood hazard. (AR) Very strongly disagree with the reviewers' summary here. Oddly, it seeks to discredit/dismiss an entire body of literature (both qualitative and quantitative) on DRR that has evidenced how people's preparedness, response, mitigation, and recovery from a disaster are correlated with vulnerability traits linked to social indicators. I would recommend the reviewer read any of the following papers referenced for more on this topic; Wisner et al. 2004; McMaster and Johnson 1987; Lew Wetli 1996; Johnson and Ziegler 1986; Chakraborty et al. 2005; Pulido 2000; Elliot and Pais 2006; Morrow 1999; Dwyer et al. 2004. The purpose of this study is to highlight/raise awareness about the uncertainties in quantitative methods - using just one case study area, a limited dataset, and a similar methodology, it seeks to raise the debate on uncertainty in quantifying social vulnerability more generally. The spatial correlation of flood risk is provided for context only and so that readers can see the implications such uncertainty has in a real setting.

---

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-58, 2016.