

Responses to Reviewers Comments (NHES)

Douvinet et al, Are sirens effective tools to alert people in France?
Comments in normal font, Responses in italics

Reviewer 1

Overview comment

The authors improved the manuscript, which belongs to the social dimension of hazard, according to suggestions and notations, but some minor modifications and clarifications are still needed. Some of them regards figures and tables and are annotated in the attached version of the manuscript.

Minor modifications and clarifications have been included in the new version.

Detailed comments

1. Besides, the authors added the application of autocorrelation and Gini index calculations for a subset of the data (PACA region) but no mention has been done in the Methods section and the application to the whole dataset would be of interest.

Complete information was added:

A classical synthetic indicator, the Gini index (Atkinson, 1970; Dorfamn, 1979), was combined to the Spearman correlation coefficient, in order to detect levels of inequality between estimates. The Gini values may vary between 0 (a perfect equality with identical values for the overall population), and 1 (extreme inequality, with values equal to 0, except for one individual), and between 0 and 1, the higher the Gini index, the greater the inequality. In addition, the Moran index was calculated (Moran, 1950). Then, negative values indicate the negative spatial autocorrelation and values range from -1 (indicating perfect dispersion) to 1 (perfect correlation). A zero value is significant for a perfectly random spatial pattern.

2. Maybe a comparison between other subsets and with the whole dataset, or considering areas subject to various types of hazard, would increase the scientific significance of the manuscript.

Excellent point but unfortunately, we cannot do this because we do not have permission from the French Ministry of Interior to present the comparison between hazards and siren location at local scales.

3. Finally, the Discussion and Conclusion sections would deserve to be further improved and expanded.

Agreed - we have revised and expanded the discussion and conclusions.

Reviewer 2

Overview comment

Dear authors, the new version of the article is written in the required structure but is still lacking some parts and arguments:

Detailed comments

1. there some elements from methods that fit in the results section, and there are some results presented that do not have the methodology explained:
 - section 2.1.1 The first two sentences should be in the Results section

Good point, we have shifted these sentences to the Results. .

- section 2.2.1, some remarks on how the questionnaire was analyzed from a statistical point of view is needed; same for 2.2.2, 2.3.1, 2.3.3,

No statistical point of view, just questions and interpretations; We present questions of each sample in the Appendix B, C and D.

- section 3.3.2 mentions the Gini index without references in methodology on how it was computed and on what data; also, references to some p values do not mention what type of test was applied

Same remark that the previous reviewer.

- section 3.3.1 does not have in methodology a description of the survey

In revising, we added the questions we asked in the survey, and added details in Appendix D.

2. there are many research ideas in the beginning not responded in the conclusions, and the questions of section 1.3 do not fit (with their responses) the scope and the rating of NHESS (scientific significance and quality);

In response to the first point, we have endeavored to follow through in the conclusions on all questions raised in the paper. The questions regarding public perception are important and worthy of inclusion because this factor strongly influences the degree of trust in sirens, independently of the actual areal coverage.

3. the targeted problem, of siren alerts is composed of two parts, the siren as a mean of sending signals and the system that decide the alert; the spatial problem of siren coverage is thus one thing, and the system is another thing; so the paper argue the lack of spatial coverage, but the system decision part is not methodologically appropriately approached; then there is the idea of a lack of risk perception and siren awareness from the people that are not included in the scope of the article but is included in the material, methods, results, discussions, and conclusions.

Good point. We addressed this concern in revision, adding the quantitative analysis.

The lack of these parts makes the article not suited for NHESS, at least in the present shape. I do not recommend a major revision as in the first review, mainly because now since the article is more articulated is clear that it is not suited for this journal. I think that in a revised version that will deal with these observations, the article could be published in a journal that is suited more to qualitative analyses.

While we agree about the centrality of the quantitative analysis, qualitative analyses are also important to fully understand the issues surrounding the effectiveness of sirens, and to avoid an overly technological or “siloed” assessment.

Reviewer 2

Overview comment

The manuscript examines the use of warning sirens in France as part of a system for alerts in emergency situations. The manuscript is interesting, and provides a wealth of information from different sources, including literature, spatial analyses, surveys, and questionnaires. I appreciate this kind of research to bring together these different elements. I believe that this would be of interest to the community of NHESS. The writing is ok, though the text overall would benefit from a thorough proof-reading / copy-edit, but I believe this is part of the NHESS process if accepted.

Detailed comments

I do have several main concerns regarding the manuscript in its current form. These are summarized below, and further elaboration is provided in the specific comments section.

1. The overall aim of the paper is ambiguous, which distracts from the overall message. In the conclusions (lines 473-474) it is stated that "...This study aimed to understand the reasons why sirens are the only alerting tools available in France, and why successive governments have maintained their trust in these tools since the end of World War II, ...". However, in the introduction it is stated that "...the main goal of this paper is to answer the question: "Are siren alerts effective tools for risk management in France?"

Good point. In revision, we have clarified and made consistent the paper's aims, and aligned the paper structure with this goal.

2. Some of the methods should be more thoroughly explained (see detailed comments below)

We have added text more thoroughly explaining methods.

3. It is sometimes difficult to understand which parts of the text are original research carried out for this paper, and which parts are summaries of past research. It would benefit the paper to make a clearer distinction

We have tried to clarify the original contributions of this paper, especially at the beginning of the Data and methods section.

4. There is overreach in terms of recommendations (see detailed comments below).
Specific comments:

- In general, the methods would benefit from more detail so that they are reproducible. Some examples of required improvements are:

- a) L140: The paper states that the assumed power 3km radius for each station would be an overestimate in many cases. How much of an overestimate? Any idea for how many this is an overestimate? What does it mean for the findings?

Data were incomplete for both sound power (only available for 32% of sirens) and the date sirens were installed (28%). We finally chose to use a 1.4-km radius based on prior research (Bopp, 2021; Reed et al., 2010; Zunkel et al., 2015; Mathews et al., 2017) and by taking into account sound attenuation and the ambient sound volume (Aumont et al., 2017), making the assumption that sirens could diffuse sound with a maximum power of 7kW.

- b) L141+: It is not clear to me what population data are used for the analysis. At line ~141 it is stated that municipality level data are used, which left me wondering whether there are no reliable gridded population data that could have been used? Later, around lines 163+, a square mesh population density is mentioned, but which datasets is that? And how does this relate to the data mentioned in line 141?

We use both: 1) the census population gives first estimates, to study the nature of the municipality, equipped or unequipped ; 2) the gridded data were used with a buffer around sirens.

- c) Section 2.1.1: what kind of a method was used for carrying out the questionnaire? Could the questions be provided in the appendix?

We conduct a semi-directive questionnaire, and questions are provided in the appendix.

- d) Section 2.3.1: Please provide a bit more detail on the survey approach. Were the answers open for example?

See appendix.

e) Section 2.3.2: please provide details here of the statistical methods used, for example those to assess the correlations mentioned. See also for example L370+ in the results, where P values of statistical tests are described – what tests have been used and how are the P values calculated?

For the results of the questionnaire (score out of 10), we did :

- ANOVAs for a multivariate analysis of the scores

- when it was bivariate (like experienced/not experienced disaster) --> student test (T test)

- Spearman correlation (I don't remember the data involved, but they don't necessarily follow a normal distribution (otherwise I would have done pearson)). In any case, these three elements must be specified. If you send me the latest version, I can check this by 10am tomorrow.

• L323-338: the relevance of this information in the results section is not clear to me. This seems to be derived from literature review, which in my opinion should not be part of this section. More generally, please attempt to make more distinction between the results of this study and the results of previous studies.

OK we clarify this at the beginning of the paper. The interview allows us to have more information in the situation of siren activation, for authorities, and it is not a literature review. For us it is more interesting to add this in the method and in the results.

• L383-389: again, this text feels out of place in the results section. The paragraph starts with a statement that <8% recognize the sound for what it is etc, but the next ~7 lines appear to be general observations from literature not per se related to the findings of this survey, whilst in line 389 the text returns to the results of the survey. Again, there should be a clearer distinction between results of this study and discussion of results.

OK.

• L422-471: This part of the discussion contains rather lengthy recommendations for the warning systems in France. Whilst some of these seem like good suggestions, often taken from the literature, I do not really see a link between the results coming from this study and these recommendations. As this is a research paper, I believe that this entire section should be greatly reduced in length, and only recommendations that can be drawn directly based on the results of this study should be provided.

Parts not related to the paper have been deleted and recommendations are now consistent with the findings.

• Conclusions: There is a disconnect between the conclusions and the aim stated at the beginning of the paper. In lines 473-474. It is stated that "...This study aimed to understand the reasons why sirens are the only alerting tools available in France, and why successive governments have maintained their trust in these tools since the end of World War II, ...". However, in the introduction it is stated that "...the main goal of this paper is to answer the question: "Are siren alerts effective tools for risk management in France?"" These are actually two very different questions, and the authors need to provide a clearer focus as to what the value-added of the paper is.

The conclusions have been changed to be consistent with the aim of the paper.

Smaller comments

• L190: RGPD to GDPR

Corrected.

• L328: "he is responsible for" – please use "they" (or if not, at least "he/she" or "she/he") (also check for similar cases in the rest of the manuscript).

Corrected.

- L365: Why “surprisingly” – this seems like an a priori value judgement that CBC/LB-SMS should be the better solution.

Corrected.

Typos (note that there are more typos, and only a few have been stated below – as mentioned earlier, a thorough proof-read and/or copy-edit is required)

- L11: replace “much use them” with “must use them”?

Corrected.

- L14: replace “to issues alerts” with “to issue alerts”

Corrected.

- L232: Typo: 76.7.3%

Corrected.

- L242 & L297: replace “yo” with “to”

Corrected.