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Dr L. Danciu:
Guest Editor, Special issue on European Seismic Hazard and Risk models

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Dear Editor,

Please find enclosed the revision of our work entitled 'The quest for reference stations at the National Observatory of Athens, Greece'.

We would like to sincerely thank the reviewers who gave us constructive comments and suggestions, as well as yourself. In what follows, we describe the main changes made to the manuscript. These are also clearly marked on the annotated documents using 'track changes'.

Thanks again for your time and consideration of our work. We are looking forward to hearing from you.

Yours sincerely, for the authors,

Olga-Joan Ktenidou

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AUTHOR RESPONSE TO ACCOMPANY REVISIONS:

Dear Reviewers,
We would like to sincerely thank you for the constructive comments and suggestions, which helped improve this article considerably, as they led to an extensive revision in terms of content as well as presentation.
Below we summarise the changes we made to the manuscript as a result of your comments. We have addressed all comments and implemented almost all of them (where we did not, detailed explanations and rationale are given in our point-to-point response, this description of changes, and the amended manuscript.
With many thanks,
Olga Ktenidou, for the authors


Major changes:

- We added 2 years of data to all stations: 1/1/2022-31/12/2023, to make the results as up-to-date as possible. This increased the total Nrec from 6840 to 7512 and the mean Nrec per station up to 125. All analyses/interpretations/visual inspections etc. were redone for the new populations, and as a result all tables and figures were updated. An additional author is added due to this extra work.
- We rewrote the manual data processing steps extensively and improved fig. 3 to explain it. We clarified all novel/in-house aspects and differences from existing workflows, to highlight this

paper's contribution to making a new database with its own consistent and targeted processing flow.

- We rewrote the entire empirical HVSR part, creating subsections for the study of the mean HVSR, the rotations and sensitivity study, the VACF correction, and the clustering.
- We redid the clustering in a proper and systematic way, trying various algorithms, and in the end choosing hierarchical agglomerative clustering. We decided to cluster not only for the shape/level of HVSR, but also the VACF-corrected one.
- Figures 5 and 6 are added, which show a mosaic of some of the most and least 'passable' HVSR results based on mean shape/level. We decided that such a visual illustration would benefit the reader and enhance readability.
- The issue of sqrt(2) (1.4 as opposed to unity) that was brought up is discussed in detail, and the criteria for selecting the f0 (or not selecting any) are reconsidered based on that. Instead of considering A0>2 to identify peaks, we now use a stricter A0>2.8, while for identifying reference stations, we still ask that A0 not exceed 2. The tables are updated accordingly.
- We also added some columns in Table A1 to better analyse the empirical/data-derived results: 1. we add a characterisation of the HVSR shape as 'flat' or 'peaky' in the case where no f0 is chosen. 2. we add a new f0 where it is identified by virtue of the VACF-corrected HVSR (in cases where simple HVSR did not show a clear f0,which is sometimes the case with peaky HVSR). 3. We add a qualitative characterisation of directional sensitivity per frequency range (low, high, very high). 4. We add the number of the clusters as per HVSR and VACF-corrected HVSR. All these better inform our selection of reference site conditions based on seismic data.
- The physical significance of rotational sensitivity is explained better, as well as the metrics introduced to quantify it (SD1-10, SD0.3-30). Indicative values of SD are proposed for characterizing low, high and very high variabilities in HVSR.
- The VACF correction of the HVSR is assigned its own section and explained in much more detail. Figure 9 is added to the main text (it was in the annex before), and it is now updated and improved to include uncertainties. A mosaic plot of all VACF-corrected HVSR across the 60 stations is added to the annex (new fig. A4).
- We stress the limitations of HVSR, that a flat JVSR is not a panacea, and that even the VACF-corrected version of it is not immune to the limitations of the method
- We add a machine-readable excel file as a supplement, containing all tables given in the article to maximize usability of the numerous resulting metadata and parameters.

Moderate/minor changes:

- The abstract was rewritten to better reflect scope and content.
- The initial 60-station rock site selection criteria were better explained. They included many factors used in an inclusive way, and were not based only on belief, so this misunderstanding has now been amended.
- We stress the scientific outcomes and timeliness of the work (for instance, the products of this paper are fully in line with needs identified in the literature, e.g. Zhu et al 2020) and we also plant the work better in context, e.g. in relation to EFEHR, and with Greek and European hazard/risk efforts and models.
- We explain why we do not opt for the data-derived parameters ds2s and k0.
- We explain why we do not present collocated station results for HVSR, and discuss issues of differences at high frequencies based on the suggested literature.
- We explain what we do in cases of double events in the processing.

Editorial changes:

- All individual tables (tables 2,3,4,5,6) are moved to the annex (A1,2,3,4,5) to improve the flow of the article and avoid causing disruption due to their length. We keep 2 tables: one with the basic information of the stations (t1) and another with all criteria are combined to reach a final disposition as to each site's capability as a reference station (old t7, new t2).
- In the final summary table we had omitted the installation column - that is now corrected.
- We now avoid using the term transfer function where it could create misunderstandings.
- All recommended references have been added.

- Added a range of depths in Table 1.
- Improved/clarified figs 1,2 and added letters a and b.
- Improved fig. A1 to allow for colour density to indicate population density.
- Fig 4 is better described in the text.

Not done:

- Although we mentioned we would try, we did not compile DEM data to compute topographic slope for the stations where it was unavailable from external sources. However, as explained in the response and the text too, we feel that the site visits allow for a more accurate assessment of the actual slopes in the vicinity of the station. One of the points we try to make is that we prioritise site-specific operator information to large-scale, poor-granularity data.

We thank you again for all your help and ideas. We hope this new version satisfies your main concerns.