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Discussions
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Interactive comment on "Active fault databases: building a bridge between earthquake geologists and seismic hazard practitioners, the case of the QAFI v.3 database" *by* Julián García-Mayordomo et al.

E. M. Cushing (Referee)

edward.cushing@irsn.fr

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This paper provides a comprehensive overview of the QAFI V3 improvements focused on the reliability and homogeneity of criteria used to address important parameters for seismic hazard assessment (Maximum Magnitude and Recurrence Interval associated to Quaternary Active faults and their Slip rate evaluation implemented in the DB). It does not go in detail in the QAFI database description of its structure since it has already been done in previous papers and because all relevant information is directly available on the QAFI web site. This new version is a real improvement and brings

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confidence in the parameter that can be used in SHA by providing simple quotation (A,B,C (D)) on the reliability of the used parameters. Regarding the important work done after a complete revision of the database information after “testing” the new criteria on a new dataset, it represents a substantial contribution to the understanding of natural hazards and their consequences within the scope of NHESS.

Scientific Quality

Usefulness and the significance of new criteria are discussed and well explained. The quantification proposed is founded on “classical” and updated fault to magnitude and moment rate relationships. All the “geologic” parameters taken into account to determine the fault seismic parameters are relevant. Thus, one important contribution is that SHA analysis can directly consider these “seismic parameters” to support decision making when building logic trees (such as weight decision) or managing epistemic uncertainty in general. A short, but sufficient references list is provided and relevant, the comprehensive reference data being included in the QAFI DB.

Presentation Quality:

The papers is well written, clear, concise and structured. The objective and context is presented (mainly directed to earth scientists, practitioners, and civil society (media, scholar)). The few figures are clear, may be bar graphs be “compacted” together (4 in one page) and presented at the same scale.

"Technical corrections": typing errors, etc.

Sometimes: maximum magnitude or Maximum Magnitude: MM is for the Mmax parameter in the database, maximum magnitude describes the ”quantity” addressed? It should be made homogeneous. Idem for Reccurence Interval – see by example line 195) Two typing errors (line 241 : Strength (not Strenght); Figure 1, idem) Line 263 BSQE in place of BSE ? Line 265 ASQE in place of ASE ? Line 166 : ASQE in place of AQE

General comments

Lines 25-28 : Knowledge about the location and activity degree of faults is crucial for seismic hazard and risk assessment, as well as for planning anthropic activities that may involve changing the natural stress-state in the crust: water reservoirs, underground gas storage, fracking, etc.

Comment : Not only as well as critical facilities where low probabilities of hazard are to be taken into account (e.g. radioactive waste storages, nuclear power plants and chemical plants). You could list such as the provide list (water rerservoirs. . .)

Line 30 : Eurocode-8 (part 5) : It may be perhaps useful to remind that there are two kinds of hazard addressed 1) is fault capability (surface rupture hazard for which I guess, QAFI is not well adapted in term of scale for siting) 2) Seismic hazard assessment (either deterministic or probabilistic) , where the local scale is less important and for which QAFI is well adapted.

Line 48 : GMPE or GMPEs (are there several GMPEs ?)

Line 158 : For instance, in the ESI scale, surface-rupture earthquakes appear from Intensity VIII onwards, so it would not be reasonable that pre-instrumental events with lower intensities could be converted to Mw>6.0. An additional issue is the estimation of the upper bound of the Gutenberg-Richter distribution when characterizing seismogenic sources. In seismic hazard assessment practice this is usually done based on the maximum event recorded in the zone, and desirably it should be consistent with the maximum Mw that could be derived from the active faults contained in the zone.

Comment : When scattered macroseismic (Idp) data is poorly documented with no data near the epicenter (e.g. deep earthquake with distant macroseismic field) lower intensities may however be associated with strong earthquake (so may be, surface rupturing).

Comment : Could you provide an example of the “practice” (I guess like deterministic

maximum historical earthquake?)

Comment : Why should it be consistent with Mmax associated with fault, since the historical data is not representative of the whole seismic cycle in western Europe ? The answer is provided in the following sentence but the writing is surprising.

Line 173 : For example, the Palomares fault (ES609), a 5-10 km wide N-S shear zone that forms part of the Eastern Betic Shear Zone, is ca. 60 km long, although to estimate maximum magnitude in QAFI v.3 we used 10 km, which is the maximum length of single fault traces inside the shear zone.

Comment : So Mmax may be much more ? With longer recurrence intervals? What is the explanation?

Line 189 : In QAFI v.3 we calculated recurrence intervals considering the ratio between the seismic moment released from a maximum event and the seismic moment rate defined by slip rate. Maximum seismic moment is calculated from Mw using Hanks and Kanamori (1979) equation, and seismic moment rate is obtained using Aki's equation (Aki, 1966) substituting average fault displacement (D) for slip rate.

Comment : Could you show and develop the equations leading to the "Recurrence Interval"?

Line 302 : a net slip rate is usually estimated additionally to the vertical/horizontal components.

Comment : May be comforted by focal mechanisms if available for active faults (presently seismogenic faults)

Line 338 : A Highly Reliable level (AMM) is assigned only when the SQE of the fault has been rated A+ –i.e., the Quaternary activity of the fault is clearly evidenced and consistent along its trace; Hence, the occurrence of past earthquakes that ruptured all the fault or segment trace is very plausible (Figure 3).

Comment : There is no discussion about identifying present fault activity underlined by microseismicity and /or macroseismicity all along one or more segments ? That may be a complementary criteria for Quaternary activity+ Mmax ?)

Full comments in the enclosed zip (word file)

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-128/nhess-2017-128-RC1-supplement.zip

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