

Geosci. Model Dev. Discuss., referee comment RC2
<https://doi.org/10.5194/gmd-2022-210-RC2>, 2022
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Comment on gmd-2022-210

Anonymous Referee #2

Referee comment on "Addressing challenges in uncertainty quantification: the case of geohazard assessments" by Ibsen Chivata Cardenas et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-210-RC2>, 2022

Summary:

The authors consider the problem of quantifying uncertainty in the context of geohazard risk assessments. By studying the common challenges faced in current approaches to this problem, the authors formulate a list of seven proposed mitigations which may lead to more credible and trustworthy predictions in this area. Various results in the current literature are reinterpreted using the authors' new framework, and it is shown that relevant geohazard uncertainties can be understood as probabilities conditioned on natural priors resulting from their proposed considerations.

I have a mixed opinion of this paper. Scientifically, I believe it is of high quality, providing a useful framework in which to view uncertainty quantification along with useful insights gleaned from various works in the current literature. Linguistically, I found it quite difficult to read even as a native speaker of English. I believe this is due to the repeated (mis)use of lengthy compound sentences and relatively complicated rhetorical devices which are easy to confuse and do not add value to the exposition. I do recommend this work is eventually published, but I strongly suggest that the authors go carefully through their exposition and aggressively simplify their sentence structure. This will have a dual benefit: not only are simple sentences clearer to the reader (therefore increasing the potential readership), they also provide less room for confusing grammatical errors which I noticed in many places, particularly in the placement of commas. An example of this simplification is provided below, as well as more specific comments which may be useful to the authors during the revision process. Note that my comments do not provide an exhaustive list of corrections to all of the linguistic mistakes I noticed.

General and specific comments:

--- Here is an example of what I mean by sentence simplification. In lines 307-310, it is

written,

``Analysts, for example, may simplify the analysis when, according to the scrutiny of Ω , increased knowledge about, e.g., X_1 will not result in increased knowledge about another quantity, e.g., X_2 , and, for example, if a distribution $f(y|x_1, x_2)$ is to be specified, we may have then that $f(y|x_1, x_2)$ reduces to $f(y|x_1)f(y|x_2)$, according to probability theory."

This sentence is very difficult to read and could easily be replaced with the equivalent sentence,

``For example, when increased knowledge about a quantity (say X_1) will not result in increased knowledge about another quantity (say X_2), analysts may simplify the analysis according to the scrutiny of K , meaning that a distribution $f(y|x_1, x_2)$ to be specified may reduce to $f(y|x_1)f(y|x_2)$ according to probability theory."

Note that this carries the same meaning while reducing the amount of unnecessary commas by 9!

--- Stylistically, I think it would be good to put commas at the end of the broken-out equations when they appear in the middle of a sentence, and periods when they appear at the end. This way the lines of equations feel connected to the surrounding exposition.

--- The text in Tables 5 and 6 should not be indented.

--- Please check that the notation in section 4 is consistent with that in section 2, specifically regarding bolded/unbolded variables.

--- Data availability statement: ``generated" should be replaced with ``generate any".

--- Line 240: The phrase ``on the basis on the scrutiny" should be replaced with ``based on the scrutiny".

--- Line 283: I recommend ``the maximum entropy principle" instead of ``the principle".

--- Line 306: I recommend removing the comma after X_2

--- Line 323: Should θ_{ϵ} symbol be in bold font?

--- Line 356: The phrase ``We use an analysis and information by Zhao et al. (2021), which refer to" should be replaced with ``We use analysis and information from Zhao et al. (2021), which refers to".

