Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC1
https://doi.org/10.5194/gmd-2021-377-RC1, 2022

Comment on gmd-2021-377

Anonymous Referee #1

Referee comment on "loopUI-0.1: indicators to support needs and practices in 3D geological modelling uncertainty quantification" by Guillaume Pirot et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-377-RC1, 2022

The paper is technically sound and generally well-written. It proposes and showcases tools for the assessment of geological models in the minerals industry, from the green-field scale to the mine scale, therefore it is of interest to the readership of Geoscientific Model Development.
I recommend publication subject to the following revisions:

Main comments:
1) Lines 30-31: when the authors refer to measurement errors, what about geological mapping or logging errors (due to the geologist's criterion, for example) that may not cancel out after replication of the measurement? Some comments on this issue would be welcome.
2) Line 197: isn't it too strong to assume "isotropy"? I believe that anisotropic variations are common in geological modelling
3) Lines 207-208: the experimental variogram is not always well-behaved at short distances, to the weighting may render the indicator in Eq. (3) highly sensitive to the short-distance behavior and nugget effect.
4) In addition to the presented indicators, would contact relationships between lithocodes (measured through transition probabilities, transiograms or cross-to-direct indicator variogram ratios) be worthy of interest? Again, some comments would be welcome.

Minor comments
1) There is a mix of US (e.g.: "minimize", "summarize") and UK ("summarises", "anonimised", "modelling") English
2) I am not familiar with the word "voxet" (seemingly, a set of voxels): this could be defined to avoid confusion
3) Line 41: the date of the reference is 1978, not 1976
4) Line 45: there is a question mark before Sambridge
5) Lines 72-72: what/where are the Centre for Exploration Targeting, Loop researcher and related networks?
6) Figure 6: does the fourth row represent the "average normalized range and standard deviation", or the "average squared normalized range and variance" (the caption of the subfigures is not consistent with the figure caption)
7) Line 167: can be computed
8) Lines 196-199: "s" is a vector, but is "h" a distance or a vector? Is Z a "random variable" or a "random field"? Notation should be revised for consistency
9) Line 203: inside the norm, it should be s_j - s_k, rather than Z(s_j)- Z(s_k)

10) Line 236: considered classes
11) Figure 10: the caption in the top right subfigure should be \Gamma(p)^c
12) Line 324: overlap
13) Lines 526 and 533: who are "et al."?