

Referee Comments for Geoscience Communication gc-2020-42-RC2

We would like to thank the second referee for the opportunity to revise our manuscript. We would like to thank the referee for their time and for the constructive comments they have provided. We have revised the manuscript based on your suggestions. We reply to each of the comments below. Our suggested edits in the paper are in blue below, with line numbers indicating where we wish to make the changes.

Referee Comment	Author Response
<p>The paper includes a lot of statistical terminology and detail of methods. I assume intended audience is those with knowledge of statistical terminology and methods. Possible lost opportunity to appeal to a wider audience given that emphasis on communicating uncertainties.</p>	<p>Thank you for the suggestions, which parallel the first comment from Referee 1. Please see our responses there. In summary, we have removed some of the statistical detail to an Appendix, including text and figures, so that the key arguments should be clearer to a general reader.</p>
<p>Table 1. Would like to see the poster designs. This would add context to the subsequent discussion</p>	<p>We thank the referee for raising this concern. In the manuscript we mentioned on L75 to L76 that the posters are presented in the supplementary materials. In order to make this clear for the reader we propose to add the figure number on the following lines in the manuscript:</p> <p>L129 – “To investigate the utility of the kriging variance as a method to communicate uncertainty, one poster showed a map of conditional mean of Se concentration in grain (Section 2.1.1), with a map of kriging variance (see Table 1, Fig S1)”</p> <p>L134- “One poster showed a map of conditional mean of ¹³⁵Se concentration in grain plus the lower and upper bounds of the 95% confidence intervals mapped separately to communicate the uncertainty (see Table 1, Fig S3).”</p>

	<p>L159- “Therefore, we presented three posters, each showing a map of conditional mean of Se concentration in grain (Section 2.1.1.), plus probability presented as (1) raw probability scale (see Fig S4), (2) IPCC verbal scale (see Fig S2) and (3) raw probability scale plus pictographs (see Fig S5), communicating the uncertainty (see Table 1).</p>
<p>Might the questions in Table 3 encourage participants to say ‘Message clear’ to show they understand what they are being shown? Does this introduce bias in the way the question is worded? If author agrees, there is an opportunity here to acknowledge this or show how this has been accounted for in subsequent questions.</p>	<p>We do not think that such a bias was likely in the context of the workshops. All responses were anonymous, and this was made very clear to participants at the start of the meeting. Furthermore (i) in the workshop we emphasized the point that the questions were not tests of the participants’ understanding but rather of the efficacy of the methods for communication. (ii) It is clear in the questionnaire (and again, was emphasized in the workshop) that the participant was not being asked to interpret the representations. Rather, the interpretation was stated (e.g., “Our confidence that grain Se concentration exceeds $38 \mu\text{g kg}^{-1}$ is greater at x than at z”) and the participant was then asked whether this was made clear by the representation. (iii) the fact that the participant was being asked to answer the same question about different methods to convey the same information emphasizes that their responses may differ between methods, even though the fixed interpretation is clear in their minds. This appears to have happened. We noted at L397 that in Malawi a large proportion of respondents selected “Not clear” as a response for the poster which used confidence intervals.</p> <p>In response to comments raised by Referee 1, we proposed to include a paragraph the end of the discussion with the</p>

	<p>reflection on possible limitations of the study, from L404. We would like to add the following text to the paragraph from L404:</p> <p>“We accept that a possible source of bias in any such study is that a participant feels that they are being tested on their interpretative skills, and so might select a response which suggests, in a general sense, that they understand the input (e.g. “Message clear” for the case in Table 3). However, all participants were aware that their responses were strictly anonymous, and it was emphasized that the task involved their evaluation of several methods for the communication of an interpretation which was provided. In future studies it might be useful to include some final questions which actually are “tests of interpretation” secondary to the main task, to see whether this affects the responses given for different methods.”</p>
<p>Figure 2 – Perhaps add a key to explain what the O indicates. This isn’t that clear to a non-specialist</p>	<p>We propose to add a key to Figure 2 as suggested (renamed as Fig A1 in the appendix section).</p>
<p>L21 – Perhaps worth alluding to the ethical issues surrounding the ethics of interventions to improve the dietary intake of Se. Whilst this is not the subject of the paper, worth noting perhaps.</p>	<p>This is an interesting suggestion. We do not think that the general ethics of food-based interventions is within the scope of this study. However, we propose to the following comment in the Conclusions from L412:</p> <p>“Because decisions on interventions to address nutrient deficiencies may have positive and negative effects on peoples’ health and well-being, the interpretation of information such as that we have used is not value-neutral, and uncertainty in information has ethical implications (given</p>

	<p>that all spatial information is uncertain, how much uncertainty is ethically acceptable in the decision process?). While these considerations are outside the scope of the study reported here, it would be interesting in future research to examine how individual attitudes to the ethics of fortification interventions affect their responses, and whether individuals' perspectives on the ethical implications of basing decisions on uncertain information differs between different methods to communicate that uncertainty.”</p>
<p>L32 – Nugget variance – assumption that readers will know what this is. Author could include glossary/footnote</p>	<p>We propose to edit the sentence which starts at l30 of the paper to read:</p> <p>“Predictions are subject to uncertainty because of spatial variability resulting from multiple factors operating at different scales (Lark et al., 2014). In addition to environmental factors (geology, climate), there is also uncertainty due to measurement error in the analysis of material, and sampling error in the field where a single crop or soil sample is collected.”</p>
<p>L225 – Good to see acknowledgement off possible differences between different groups. Suggest further group work with other participants may increase validity of study. Could this be a suggestion for future work?</p>	<p>The reviewer makes an important point, and we propose the following edit to the text on L389 to emphasize this point.</p> <p>Further work to address this question and examine how stakeholders interpreted each poster will require an elicitation with sufficient numbers of participants with different mathematical background.</p>
<p>L225-232 Good recognition of potential for bias</p>	<p>Thank you for the acknowledgement.</p>

<p>L232 Different learning styles may also affect how people interpret posters</p>	<p>We agree and therefore we expected this to affect their responses. However, due to unbalanced numbers of participants when we categorised them by level of mathematical education, it was not possible to do further analysis and we propose editing the text on this at L389 to read:</p> <p>“Further work on this question would require an experimental design which ensured sufficient numbers of participants with different mathematical backgrounds. This would be useful to understand better how different learning styles influence the interpretation of uncertain information”.</p> <p>.</p>
<p>L350 – Conclusion about users finding information presented accessible and clear – responses could have been affected by the desire to show understand the representation. I think the leading nature of the question could be seen as significant. Suggest consider acknowledging this possibility</p>	<p>Please see our response to the third point above. We do not agree that the participants were asked a leading question. They were asked to select among responses to a question about whether it was clear from the poster that a certain statement was true, and possible responses included “Not clear” and “More information needed” as well as “Message clear”.</p>
<p>L360-362 – Agree with statement that further work is needed</p>	<p>Thank you for the acknowledgement.</p>
<p>L419-420 – Would like to see how measures of uncertainty are presented – and how These less effective methods of communication (kriging variance and confidence intervals) could be presented in a more effective way</p>	<p>Thank you for acknowledging this point and we strongly believe this is a scope for future research work on methods of communicating uncertainties in spatial predictions.</p>