Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2021-535

Anonymous Referee #2

Referee comment on "Coupled effects of observation and parameter uncertainty on urban groundwater infrastructure decisions" by Marina R. L. Mautner et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-535-RC2, 2022

The study analyses the joint impact of parametric and observational uncertainties on decision objectives of a groundwater resource management problem. The manuscript makes a novel contribution towards understanding the impact of endogenous uncertainties on ranking of alternatives. Overall, the manuscript is well-written with well designed figures. Listed below are some minor corrections and a few recommendations that may help further improve the manuscript.

1. Abstract uses the term ‘external’ and ‘endogenous’ uncertainties. This interpretation of this may vary widely across audience so may be better to rephrase by giving examples of what are ‘external’ uncertainties briefly.

2. Line 11-12 ‘model errors are not …’ this is not surprising as previous studies have shown that across different choice of objective functions, sensitivity of inputs may vary widely. It may be useful to rephrase this or make this specific say ‘statistical sqaured error metrics based on piezometric head’.

3. Line 40, possibly missing ‘and’ after ‘system’.

4. Line 57 on Etter et al. (2018) is not clear, consider rephrasing.

5. Lines 116-118: This part may benefit from first introducing the rationale for a flood risk objective in a groundwater management context before moving on to the definition. Similarly Lines 112-113 state that ensuring hydraulic head ‘above’ the confining layer reduces the water quality risk, but the immediate next sentence suggests that keeping the levels ‘below’ is better. Please clarify.

6. Lines 134: useful information on run time, may add the run time for a single model run.

7. Line 146: one point per well implies one observation at an t in the results section to show that the two choices perhaps yield similar outcomes.

12. Line 176-177: using across twice in the sentence makes it harder to understand

13. While the overall methodology is clear, more details related to the global sensitivity analysis may help in improving the reproducibility of this analysis. For example, if possible the equation for calculating sensitivity index (delta), may be useful to include in a generalized form. The specific application of this general equation can be discussed for the case study. For example, using a consistent term Y for output on which sensitivity is estimated and then X for the possible input terms and then elaborated with Y and X are for this particular experiment.

14. Line 201 is quite similar to Line 199 – is it possible to rephrase this or present this as bullet list?

15. Figure 4, units of 'error' may be mentioned. The lower limit is quite high (10^5), not sure whether this range of error is expected.

16. Figure 5: using bootstrapping to check the convergence of the sensitivity index or to identify a confidence range on the indices might be helpful in discussing which differences are significant.

17. Figure 6 caption states '33' parameters but shows 8.