

Response to Referee Comments

We thank the reviewers for their detailed and insightful comments and helping us strengthen the manuscript. Our point-by-point responses to the critique are outlined below, with reviewer comments in black and [responses in blue](#). Reviewers are ordered by the order in which their comments were received.

Reviewer 4

The paper is basically an application of [7] to modeling error demonstrated with rather transparent problems in 2D flow. The authors ignore the first papers on Goal-Oriented Estimation and modeling error laid out in the papers of Oden and Vemaganti in JCP in 2000, and extended by these authors in CMAE in 2001. The relationship between the current work and these papers should be clearly explained and cited. These revisions and re-review would be advised.

[We apologize for not referencing the aforementioned papers; we had not encountered them in our literature review and did not intend to imply their irrelevance. Citations of these papers and explanation of their relevance to our work has been added in \[Section x.x.x\]\(#\)](#)

[Changes not yet made.](#)

Reviewer 1

On page 8 (before equation 10), the sentence Note that, .. references equation 11 before it is presented. It may be better to move this comment to immediately follow the description of equation 11.

[blah](#)

[Changes not yet made.](#)

I found the motivation in the beginning of the manuscript somewhat lacking. The description of use cases, and conditions for which the algorithm is suitable, from the last paragraph on page 9 were very helpful. I believe the presentation would be strengthened by mentioning some of this earlier in the introduction.

[Changes not yet made.](#)

Although it is represented graphically in Figure 8, Ω_I for the final example is not defined in the text.

[Changes not yet made.](#)

At the beginning of the second paragraph of Section 4.3.2 (pg. 25) I think the reference to Section 4.3.2 should be Table 1.

Changes not yet made.

The sub-figures of Figure 9 could be larger. It is difficult to verify the claim in the text that . . . the domain is refined completely in the x_3 direction first around the QoI region. . . . Even going as far as to include 2-D slices (as in Figure 8) may be warranted.

Changes not yet made.

The second to last paragraph on page 28 starts Section 4.3.2 shows the average QoI. . . . Again, I believe this is a reference to a table, Table 2 in this case.

Changes not yet made.

I find the potential to apply this approach to surrogate design, as discussed in the final paragraph, very interesting. I believe this is a good case for overcoming the cumulative cost of performing multiple adaptive steps where the overall cost is comparable to evaluating the high-fidelity inverse problem. If the final adaptive step was significantly cheaper to evaluate (say 2X as in the last example) the cumulative cost of the adaptive algorithm would be amortized across a large number of posterior samples with the final mixed-fidelity model.

Reviewer 2

Reviewer 3