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Solid Earth Discussions

Interactive comment on "The stochastic quantization method and its application to the numerical simulation of volcanic conduit dynamics under random conditions" *by* E. Peruzzo et al.

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We thank referee #2 for his advice.

We have now included in the introduction (page 45 of the manuscript, after line 2) the following brief explanation of O'Hagan's approach to the problem, trying to point out what is the main difference with respect to ours and giving some references:

The strategy presented in this paper is indeed general, since the choice of the optimal sets of input data does not involve the numerical code at all. In this respect, a different

(and somewhat complementary) approach to the problem would be that of using the simulations to construct a function which is a reasonably good approximation to the complex code and, at the same time, can be evaluated with a low computational effort (Currin et al. , 1991; Sacks et al. , 1989). The simplified function produced could then be used in a Monte Carlo simulation. In this case, the choice of the sets of input data used to find the approximating function is less critical, while the focus is on the approximation of the numerical code. A possibility that has been explored in the mathematical literature is that of employing Bayesian inference to select a function with the required properties (Kennedy and O'Hagan , 2001). Our approach, on the other hand, aims at defining an optimal set of input data, that sufficiently describes the output distribution. Future developments may involve a mixed approach, whereby some gross properties of the numerical code are exploited to guide the choice of the optimal sets of input data and corresponding output distribution.

References

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2, C33–C34, 2010