

Interactive comment on “Multi-objective optimization using evolutionary algorithms for qualitative and quantitative control of urban runoff” by S. Oraei Zare et al.

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Dear Referee #1

The authors wish to thank the reviewers for their accurate and constructive comments on the manuscript entitled "Multi-objective optimization using evolutionary algorithms for qualitative and quantitative control of urban runoff".

Most of the revisions in the article have been performed in the following sections:

I: Abstract and Introduction sections were modified and innovations were highlighted.

C1700

II: The language of the text has been revised and many parts were rewritten.

III: Formulations and the methodology of the paper was rewritten for sake of more clarity.

IV: In the Results and Discussion section, more interpretations were added such as on k-means method for classification, how to reduce pareto for selection of appropriate scenarios (for planners and policy makers in urban management), introducing an indicator for convergence evaluation. Moreover, the results were explained with more clarity.

V: Tables and figures were upgraded according to referees' comments

VI: More references relevant to some of the employed methods were added.

VII: The response to each referees' comments were carefully prepared as attached. The revised paper is also attached for further consideration.

Response to Referee 1:

1) The quality of English is not good enough. I suggest the authors to revise the paper completely regarding English language. I try to help as much as possible, however some phrases should be changed completely in my point of view.

Answer: The paper was fully revised. We hope that the revisions meet the standards of the journal.

2) The topic seems interesting and fascinating however the choice of Multi-Objective Evolutionary Optimization Algorithms seem to be arbitrary, it would be nice if the authors justified the use of these two methods rather than more efficient algorithm like MOSCEM-UA (Vrugt et al., 2003).

Answer: MOPSO and NSGAI optimization algorithms that were used in this paper enjoy a wide range of applications and a long history in water resources management. Nevertheless, we understand that there are more choices, some newer and more effi-

C1701

cient ones as well, that we will be part of our future research in this interesting subject.

3) I would suggest instead of comparing mean and standard deviation, the authors should show whether the distribution and frequency of Pareto-optimal parameter sets are different or not.

Answer: The distribution and frequency of Pareto-optimal parameters were studied. The results showed that the distribution functions were different for the two optimization algorithms. Furthermore, the results showed that although MOPSO variation range was wider, the NSGAI data scatter was more than MOPSO.

4) Although the paper is not about modeling, it would be nice to justify the model structure used in this study.

Answer: The modeling structure used in this study is presented in sections 3.1, 3.2 and 3.3. also Figure 7 that it was revised also shows the model structure used in this study.

5) I strongly suggest the authors to improve “result and discussion” section by further elaboration of graphs and tables.

Answer: The results and discussion section was further completed. Please see the revised text.

6) Try not to use identical sentence and phrases, tell the story with new sentences even if they seem to be obvious and general.

Answer: Thank you. We did our best in the revised form.

7) Make figures and graphs more illustrative and try not to copy them from different sources, instead, try to make coherent version of figures with the same line weight and color, text font and size. Include units everywhere in figures and tables.

Answer: Appropriate corrections were made to the figures.

C1702

8) What is the conclusion of the paper? I suggest making it clear for readers. What is the aim of this paper, finding the best management practice or finding which optimization proactive works better?

Answer: The conclusions were revised based on the reviewer comment. Generally, the aim of this paper was to find the best flood/quality management scenarios that could be obtained based on optimal trade-off curve.

9) The efficiency of each optimization algorithm may change significantly by changing its parameters; did the authors take this into account?

Answer: The comment is entirely appropriate. Since the selection of parameters has a significant impact on the acceptability of the optimal solution, we first considered the recommendations about the selection of relevant parameters based on available literature (as below). Then, the effects of the parameters' variation on the solution were assessed and suitable parameters were selected.

Eberhart, R.C., and Kennedy, J.: Particle swarm optimization, Proceedings of IEEE International Conference on Neural Networks, Piscataway, NJ, pp. 1942-1948, 1995.

Parsopoulos, K.E. and Vrahatis, M.N.: Particle Swarm Optimization Method in Multi-objective Problems, Proceedings of the ACM 2002 Symposium on Applied Computing (SAC'2002), pp. 603-607, 2002.

Carlisle, A. and Dozier, G.: An off-the-shelf PSO, paper presented at the Particle Swarm Optimization Workshop, Purdue Sch. of Eng. And Technol., Indianapolis, Indiana, 2001.

Deb, K., Pratap, A., Agarwal, S., and Meyarivan, T.: A Fast and Elitist Multi-Objective Genetic Algorithm-NSGA-II, IEEE Transactions on Evolutionary Computation 6 (2): 182–197, doi:10.1109/4235.996017, 2002.

specific comments:

C1703

Answer:

All specific comments were incorporated into the revised paper.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/9/C1700/2012/hessd-9-C1700-2012-supplement.zip>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 777, 2012.

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