

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

**Anonymous Referee #1**

Received and published: 25 February 2012

The paper is about incorporating multi-objective optimization in finding the best management practice. The proposed method is presented by a case study for north-western part of Tehran. The paper scientifically sounds. However it can be significantly improved in my point of view, specially the use of English language, structure of the paper and elaboration of result in “result and discussion” section.

### ***General comments :***

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,

C152

however some phrases should be changed completely in my point of view.

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).

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.

4- Although the paper is not about modeling, it would be nice to justify 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.

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

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.

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?

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

### ***Specific comments:***

Page 778, line 2: “and” should be removed.

Page 778, line 3: “include” should be changed into “includes”

Page 778, line 4: “is in a region” should be modified, “is” is extra.

Page 778, line 6: “for” seems to be more suitable instead of “from”

C153

Page 778, line 7: "relating" should be changed to "related", because the objective function are related separately to one of three aspect and they don't relate anything to each other.

Page 778, line 10: A dot seems to be missing. The sentence started from line 6 is too long and ambiguous, please make it clearer.

Page 778, line 13: It seems "was" should be change into "were".

Page 779, line 3: "of" or "locating" seems missing.

Page 779, line 1-5: the sentence is too long and ambiguous; please clarify this sentence with its related cited papers.

Page 779, line 25: An "of" seems missing in "target single".

Page 780, line 13: "some environmental hazard" is not scientifically acceptable, what do the authors means by some and how do they quantify it.

Page 780, line 23-24: The sentence "the study area..." is ambiguous and doesn't seem corrects.

Page 780, line 22: "of floods in the part of city of Tehran" is not clear enough

Page 781, line 17: The abbreviation from is better to be accompanied by all the word, so I suggest using "Kinematic wave (KW) or dynamic wave (DYW)"

Page 782-783, line 18-2: The first and the last sentence of this paragraph are almost identical, please change the structure of this sentence.

Page 782, line 22: The sentence "Mass is expressed..." seems to be redundant. Did the author use both units in this study?

Page 783, line 11: Please indicate dimensionless variable by [-] in text.

Page 783, line 15: "for city of Tehran" seems more appropriate than "in Tehran city".

Page 784, line 3: "and into" can be reduced to "into".

Page 784, line 4-5: This sentence is a bit ambiguous what do the authors mean by temporarily stored, do they mean that the pervious pavements have retention capacity?

Page 784, line 7-9: This sentence seems too long; it is suggested to break it into smaller sentences which are less ambiguous.

C154

Page 784, line 11-12: In this sentences rain barrel is both subject and object, try to make sentences with clear subject and object.

Page 784, line 12-13: This sentence look like an advertisement "... around your property". Make sure to change sentences from other sources accordingly and coherently.

Page 784, line 1-13: I suggest elaborating more on these BMPs by providing related literature.

Page 785, line 2-3: What do the authors mean by this sentence and paragraph?

Page 785, line 11-13: The sentence is repeated.

Page 786, line 7-13: I suggest the authors to include these explanations in text rather than writing it with "=" which may make confusion.

Page 786, line 15-17: What are the unit of X and its limits?

Page 787, line 2: I would rather change the sub-sections as follow, 3.5.1.1, 3.5.1.2, 3.5.2.1, 3.5.2.2.

Page 787, line 3: Holland (1975) is not mentioned in the references. Preferably not use "in".

Page 788, line 16: Do not use "in" preferably. Instead use authors' names and year of publication.

Page 790, line 6: Please change the "Coello Coello C. A., 2011" to "Coello Coello (2011)".

Page 795: Please change the order of table from left to right.

Page 795: It is suggested that the authors clarify the unit of  $C_1$ ,  $C_2$  and  $C_3$ .

Page 796: ASCE, 1970 is not listed in references.

Page 800: I suggest "values" instead of "amount".

Page 801 and 802: Instead of  $(\text{Lit}) \times 10^6$  I suggest to use CM (cubic meter) with complete explanation in the text.

Page 803: I suggest adding another panel showing the relative location of study area in Tehran.

Page 806: Please include a figure with higher resolution, in the case the authors want

C155

to use the same figure exactly write "(source: Rossman, 2010)".

Page 807 and 808: If the authors copied these figures please provide the sources or references.

Page 809: Please change the "Coello Coello C. A., 2011" to "(source: Coello Coello, 2011)". What is the advantage of including this figure here? In my point of view it should be explained in text as well.

Page 810, 811 and 812: The grids are not exactly representing the values please shift the grid in a way that each grid line corresponds to one value.

Page 810: How the values of Fig. 8 and table 7 and 8 for runoff are related? I mean  $(\text{Lit}) \times 10^9$  and  $(\text{Lit}) \times 10^6$ .

Page 811: "Pollution" for y axis is written wrongly.

Page 813: What is LID? Is it low-impact development? Maybe I missed it but where did the authors mentioned it?

Page 816 and 817: What does the "Etc." stand for? Do the authors mean the "other options" mentioned in earlier tables? What do the authors mean by "None"?

To sum it up, I think that this paper is a new contribution and can be published but the authors should improve their paper and make it crystal clear for readers. I hope my comments help the authors to improve this discussion paper.

### **References :**

Coello, C. A. C.: An Introduction to Multi-Objective Particle Swarm Optimizers, Springer, 2011.

Holland, J. H.: Adaptation in natural and artificial systems, University of Michigan Press, 1975.

Vrugt, J. A., Gupta, H. V., Bastidas, L. A., Bouten, W., and Sorooshian, S.: Effective and efficient algorithm for multiobjective optimization of hydrologic models, Water Resource

C156

Research, 39(8), 1214, 10.1029/2002WR001746, 2003.

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