

Interactive
Comment

Interactive comment on “Municipal solid waste open dumping, implication for land degradation” by M. Yazdani et al.

M. Yazdani et al.

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Received and published: 29 April 2015

Dear referee 1 Thank you for reviewing our manuscript. Thank you very much for your comments, we pleased to find our research is interesting for you. We hope that our responses and the revisions in supplement file will be sufficient to make our manuscript suitable for publication in Solid Earth.

The topic have been changed to “Comparison of two suitability methods to assess a landfill site using Geographic Information System Analysis” in the supplement paper as you have proposed.

Page 1098: Line 2: MSW have been altered by Municipal Solid Waste. Line 2-5: This text has been rewritten to “Several environmental pollutions and land degradation have

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caused in Iran because of poor planning, insufficient financial resources, lack of rules, guidelines and regulations in MSW management system.”

Line8-12: It has been rewritten according to your comment.

Line 12-17: This text has been rewritten to “In order to carry out this evaluation, two guidelines are used, Minnesota Pollution Control Agency and Regional screening guidelines. Eventually the authenticity of the deposit site and also the entire city was examined and the appropriate areas were identified. The results indicated the incoherence in appropriateness of the existing landfill site, with two mentioned methods and field view and the shortage of suitable areas in Tonekabon city based on Regional screening method.”

Line19-20(Introduction): This line has been rewritten to “In the developing countries, due to population increase and urbanization, it is necessary to develop an efficient waste management system.” as you had mentioned.

Line21-24: All the changes have been performed according to your comment.

Page 1099:

Line 7-13: All the changes have been performed according to your comment.

Line 13-1(Page 1100): Referee comments: Delete this. This do not have nothing to do with the problematic that you are working. Response: Unfortunately, in most Iranian cities, the simplest method of waste disposal is still open dumping. An open dump site is a great environmental hazard which causes natural resources degradation and environmental pollution. Our research is an example for improper landfill site siting which causes the Pordesar forest degradation (soil, air, water, ..) . Open air burning because of gases emitted from waste degradation is a common process in the Tonekabon landfill site(Please refer to fig.2). So to emphasize these improper land use and pollution problems and fire impact on land, we used some citations to show the impacts of these pollutants on land degradation, we have rewritten this text. Please refer to supplement

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file.

Line 2-10: All the changes have been performed according to your comment.

Line 15-1(Page 1101): These citations have been deleted.

Line 1-2: This citation has been deleted too. Line 4: The “were” has been changed by “are”. Line15-16: Yes it is in Iran. It has been mentioned in supplement.

Line 18: We have rewritten the citations with details.

Line23: The text has been altered according to your comment.

Line 25-(2-1102): This text has been removed here.

Page 1102

Line 5-9: All the changes have been performed according to your comment.

Line12: The source has been added.

Referee comment: Why you did not considered the wind direction ĩñĆuxes? Response: We agree with you that wind direction is an important criterion in landfill site sitting but in this research we evaluated Tonekabon landfill site based on two methods: Minnesota Pollution Control Agency (MPCA) and Regional screening, these standards have some criteria which mentioned in the paper (MPCA in Table 1 and regional screening in section2.3.2 in page 5-7 in supplement file), unfortunately wind direction fluxes is not included in none of the methods. It is one of the defects in these two methods which have discussed in Discussion.

Referee comment: I suggest you to do a figure explaining the model that you used. Response: We have designed a model for methodology in supplement. Please refer to fig.3. in supplement file .

Line 22: “were considered” has been deleted.

Attention: The Materials and methods section have been rewritten in supplement file.

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In Materials and methods we have altered the section “Investigate the evaluation criteria” before section “Preparation and investigation of thematic maps and overlaying these maps in Geographic Information Systems (GIS)” in supplement file to reduce the ambiguity.

Page 1103

Line 2-5: All the changes have been done according to your comment.

Line 7: Some references have been added about GIS in MSW landfill site siting in this paragraph. (under lined text in line20 page 6-line 3 page 7 in supplement file).

Line 7-9: We’ve removed it, as you have mentioned.

Line 9-13, we have rewritten this text. Please refer to supplement file section 2.3. (red font text: line 23 page 6-line 1 page 7)

Line 16: we used Arc GIS version 10.2 in this research and it has been mentioned in supplement file.

Referee comment: Line 16-17: Please explain what means 0 and 1 (perhaps a range) and what classifies. Response: In this paper 2 mentioned methods were used in each method some do’s and don’ts exist, Boolean logic is a form of algebra in which all values are reduced to either TRUE or FALSE or one and zero. In this research to prepare buffer maps and restricted maps, we use this algebra in Arc GIS, so the restricted areas and their buffer zone change to 0 which are don’ts (False) which means unacceptable, and the all other area change to 1 which are do’s (True) which means acceptable. All of the factor and restricted maps are overlaid and then final suitability map layers prepared. Please see the methodology flowchart and Please see Fig.4 to Fig.7 the areas which are unacceptable deleted in the final suitability maps (fig 6 and fig 7).

Line 17-20 Referee comment: Show the meters that you used in buffer analysis. Response: The criteria and their constraints are mentioned in guidelines of every method.

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Please refer to Table 1 and page 1104-1105. Also we have designed two tables for each method in supplement file. Please refer to (Table 2) and (Table 3).

Line26: For these ambiguities we changed the status of section 2.3 before section 2.2 in Materials and methods in the supplement file and we have rewritten each section. MPCA is abbreviation for Minnesota Pollution Control Agency.

Page 1104:

Line 2-11: we have rewritten this section. Please refer to section 2.2 in supplement file.

Line 13- 14: All the changes have been done according to your comment.

Line 19: The sections have been merged to 2.2 in supplement file.

Page 1105

Line 21-22: Yes, It is an economical factor that had been proposed in regional screening method to reduce transportation costs, it is not mandatory criterion.

Page 1106

Line 4-13(1107): We have added a new section as “Data and Evaluation criteria” in methodology as section 2.3.1 in materials and methods as you had mentioned, please refer to supplement file.

Page1107 Line 13 to (line 7page:1108) have been rewritten please refer to supplement file.

Line 14: we have described the result according each method separately in two tables according to your comment. Please refer to Table 2 and Table 3 in supplement file.

Line 14-15: These criteria have been described in Data and Evaluation criteria in Materials and methods section.

Line 14: we have prepared two tables according 2 methods in revised version as you mentioned.

Line 14-15: we have rewritten the methodology and result sections in supplement file as you have mentioned.

Line19-20: we have added some maps in the supplement file as you have mentioned.

Line 25-27: Referee: Which criteria? Which Guidelines? Response: These maps have been added .MPCA and regional screening

Line 29: Referee: Which maps were analyzed? Response: Criteria which defined in 2.3.1 Data and Evaluation Criteria section, Some of these maps have been added according to Regional screening method, refer to fig.3 and fig.4 in supplement file.

Page 1108

Referee comment: Line 2: Which algorithm was used? Response: We have two kinds of maps in this research: factor maps such as geology, land use, . . . and Constraint maps such as distance to residential area, distance to faults, distance to river, protected area, Since each of the 2 methods have some do's and don'ts to evaluate landfill sites, we standardized the constraint and factor map layers based on Boolean logic. Thus with the reclassified module in Arc GIS software, the restricted area's value was zero (unsuitable area) and the other area's (suitable area) value was one, as a form of coefficient. A GIS-based overlay analysis of generated Boolean factor maps and Boolean constraint maps was done in order to identify the landfill site suitability. After reviewing all specified criteria in each of the guidelines, the authenticity of deposit site in the study area was identified. Fig.3, show the flowchart of the methodology followed in the study.

Referee comment: Line 4-5: Please mention what you studied in the field. Response: The landfill site map layer is prepared by locating the GPS coordinates of Tonekabon landfill site in field view and entering it as latitude and longitude in the GIS software database, and then converting it into the point data. Also the condition of Tonekabon landfill site such as, lack of sufficient soil to cover, open-air waste burning, open-pit

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dumping, and uncontrolled waste disposal. Please see Fig 2 which shows the condition of Tonekabon landfill site.

Line 6-8: Figure 2 and 3 had been shown the suitable area based on MPCA and Regional screening method. We have altered these figures with 2 new ones. Please refer to Fig6 and fig7 in supplement.

Line9: We have rewritten the discussion section.

Line13-17: We wanted to compare our methodology with the other researches in evaluation of the municipal landfill site and discuss about the suitability of these methods.

Page 1109: We have rewritten the conclusion please refer to supplement.

Line 10-11: We have added these citations.

Line 11-21: These texts have been deleted according to your comment.

Page 1110:

Please refer to conclusion section in supplement file.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/7/C550/2015/sed-7-C550-2015-supplement.pdf>

Interactive comment on Solid Earth Discuss., 7, 1097, 2015.

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