

## ***Interactive comment on “GIS and remote sensing techniques for the assessment of land use changes impact on flood hydrology: the case study of Yialias Basin in Cyprus” by D. D. Alexakis et al.***

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Received and published: 22 December 2013

### REPLY TO THE REVIEWER 1

We thank the reviewer for the very useful and constructive suggestions on our submitted manuscript. As suggested, we revised our manuscript. We are providing clarifications to the comments below (please find the revised manuscript in the supplementary file):

C2112

1. The title is too long and not fully corresponds to the contents of the paper. The study actually not uses GIS analysis. The only mention of the “GIS environment” concerns solely the soil map. Ans: We believe that the title corresponds to the content of the paper. Besides the construction of soil map in GIS environment, the HEC-HMS is also implemented in GIS environment. Therefore GIS was used firstly for management of the heterogeneous data (e.g. classification results; soil maps; hydro data etc) and afterwards spatial analysis was applied. For that reason we added relevant references concerning GIS into the manuscript. However an alternative shorter manuscript title could be: “Techniques for the Assessment of Land Use Changes Impact on Flood Hydrology: the Case Study of Yialias Basin in Cyprus”.

2. Introduction: p.4834, line 24 – “exposurevulnerability” – What it is? Ans: We corrected the expression with “exposure vulnerability”.

3. p.4834, line 25 – Please clarify how “flood risk will continue to rise, as a consequence of”: : : a “value increase in endangered areas”. It is not obvious. Ans: We thank the reviewer for the comment. However we believe that the potential increase of flood risk is explained through the phrase “as a consequence of a combination of climate change (e.g. Kundzewicz et al., 2005; Tsanis et al., 2011; Grillakis et al., 2011) and an increase in exposure vulnerability (e.g., due to increasing flood plain occupancy), increase in endangered areas and changes in the terrestrial system (e.g. land cover changes and river regulation; see Elmer et al., 2012).”

4. p.4835, line 3 – Punctuation error: “;” should be replaced by the point. Ans: A suggested we replaced by the point.

5. Methodology: p.4838, line 7-8 – “the area’s soil map was developed in a GIS environment”. – Please, clarify (see comment to p.4841 - 3.3 Soil map). Ans: As suggested the text was enriched. Please see the answer in Question 10.

6. p.4840, line 19 – “ondividual” - typing error. Ans: We corrected with the right “individual”.

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7. p.4841, line 9 – I did not find the “Fig.4c”. Ans: We corrected with the right “Fig. 5a”.
8. p.4841, line 13-14 – Please, clarify what land use types includes each of “seven major different classes”. For example, it is not clear what difference exists between “Agriculture Generic” and “Agriculture Close Green”, what is “Herbaceous”? Ans: As suggested the land use types were clarified in detail in the manuscript. Specifically, “agriculture generic” class is assigned to general unidentified croplands and “agriculture close grown” is assigned to dense cultivated croplands (usually wheat). Concerning Herbaceous class is “a mixture of grass, weeds, and low-growing brush, with brush the minor element”.
9. p.4841, line 18-20 – “At the end, with the specific classification approach, the Kappa coefficient values were increased from the initial values of lower to 0.6 to 0.78 and 0.80 for 2000 and 2010 cases, accordingly”. – The sentence is not clear. Ans: The sentence was changed to : “At the end, with the specific classification approach, the Kappa coefficient values were increased from the initial values of lower to 0.6 for both 2000 and 2010 images to 0.78 and 0.80, accordingly”.
10. p.4841 - 3.3 Soil map – The chapter is too short. Please, explain in more detail how “The soil map was constructed” and what characteristics of three soil classes are. Ans: The soil classes are now described in detail within the text: “Specifically, Vergennes is a very deep, moderately well drained soil of sandy loam composition concerning the specific area. Windsor consists of very deep, excessively drained soil which for the specific area is of coarse sandy loam composition. Covington consists of very deep, poorly drained soil that is formed in calcareous glaciolacustrine and estuarine clays mainly found in the northeastern part of the basin.”
11. p.4843, line 4 – “CA” – The abbreviation needs an explanation. Ans: As suggested the abbreviation was explained: CA-Cellular Automata.
12. p.4843, line 7-9 – “As it is indicated in Table 2, the Forest Mixed and Olive Trees classes have significant possibility to change to urban land cover in the near future”. - It

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is not obvious from the table. The probability values are too low. Ans: The phrase was changed to “. . . . .moderately to significant possibility to change to urban land cover in the near future”.

13. p.4843, line 11 – “a steady increase of land cover” – Please, clarify of what “land cover”. Ans: The phrase was corrected as : “a steady increase of urban land cover.”
14. p.4847, line 17 – “A list of the rainfall runoff events is given in Table 1.” – It is not. Ans: We thank the reviewer for the comment. We added Table 3 in the text.
15. p.4847, line 20-21 – “A list of the rainfall runoff events is given in Table 3.” – It is not. Ans: The phrase was deleted.
16. Results: The chapter is too short. The authors should discuss their results. Ans: As suggested the results were enriched in the new integrated “Discussion – Results” chapter.
17. The paper needs a discussion chapter. Ans: A new integrated “Discussion – Results” chapter was added to the manuscript.
18. Figure 7 provides no data for “water”. Ans: The water land cover is negligible compared to the other classes.
19. Figure 8 and 11 are redundant, they should be combined. Ans: As suggested these two images were merged to a single one.
20. Other typing errors need corrections: for example, p.4848, line 17; p.4849, line 2. Ans: As suggested all the typing errors were corrected

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/1/C2112/2013/nhessd-1-C2112-2013-supplement.pdf>