**General reply to the second reviewer (3-C414-2015)**
**"Landslide susceptibility mapping in Mawat area, Kurdistan Region, NE Iraq: a comparison of different statistical models"**

A. A. Othman, R. Gloaguen, L. Andreani, and M. Rahnama

We want to thank the second reviewer for his considerate contribution and comments, which we believe have improved the quality of the manuscript. We have implemented the suggestions and tried to modify the paper in order to answer all critics (the revisions are highlighted in green and gray colors).

- The authors should check the grammar and tenses. The tense keeps changing as the paper progresses and it would be good to be consistent and stick to one tense.
  ***We agree with the second reviewer, we improved English form (highlighted in magenta color).***

- A huge part of the paper goes into the explanation of slope, aspect, curvature etc. This is unnecessary and does not add any value to the paper.
  ***We agree with the second reviewer, we removed the explanation of the common factors such as slope, aspect, curvature, plain curvature and profile curvature.***

- The section on model validation is not well written. It has been specified that the dataset was split between training and validation dataset but this was not emphasized in the validation section. It should be made clear if the validation only involved the training dataset or only the validation dataset or both. If the validation only involves the training dataset then it cannot be termed as validation. At present the whole validation section is not clear and it appears that a success rate curve has been made.
- ***We thank the second reviewer for this comment. In the section 3.5 (lines #318-352), we emphasized that validation dataset was used to test the prediction skill of the models. In addition, we clarified and modified this section and used the term "prediction skill" instead of "validation" as the first reviewer asked (e.g. line # 318, 319, 325…etc.).***

- Model uncertainty, a very integral part of model calibration and validation, has not been assessed and it might be interesting to know if the differences in the results are purely because of model uncertainties.
  ***We thank the second reviewer for the suggestion; we tested the uncertainty associated to the susceptibility models. Two type of uncertainty were tested (1) Landslide susceptibility model error (Figure 10) and (2) Sensitivity analysis (Figure 11). Moreover, the method and outcome of these two uncertainty types were stated in lines # 340-352 and 487-504, respectively.***

## Comments and suggestions for the author

- **Title** Substitute "Landslide susceptibility mapping in Mawat area" to "Landslide susceptibility mapping in the Mawat area"
  ***We implemented that (title).***

- **Page 1790** Line 26: Grammatical error. Please rephrase.
  ***We put "Moreover, the landslide investigations are categorized into three main groups" instead of "Moreover, the landslide investigation can categorized into three main groups" (lines #26-27).***

- **Page 1792** Line 12: Remove "in this area".
  ***We did that.***

- **Page 1792** Line 22: Substitute "without any consideration of time the occurrences" to "without any consideration of time of occurrences".
  ***We modified the phrase (line #74).***

- **Page 1794** Line 23: Please rephrase.
  ***We rephrased the sentence (lines #125-129).***

- **Page 1795** Line 5: Please add some more information about the characteristics of landslides which have been studied.
  ***We added more information about the characteristics of landslides, which have been studied (lines #120-124)***

- **Page 1796** Line 4 to 10: The whole paragraph changes tenses. Please be consistent.
  ***We agree with the second reviewer, we modified the paragraph (lines #156-159).***

- **Page 1797** Line 4: This is not a good definition of aspect.
  ***As the second reviewer asked in the previous command, we remove this definition from the manuscript.***

- **Page 1797** Line7: The definition of curvature is not satisfactory.
  ***As the second reviewer asked in the previous command, we remove this definition from the manuscript.***

- **Page 1797** Line 24: This is not 'HI'. It should be 'TPI'.
  ***We thank the second reviewer for this comment; we corrected the Equation (1) and (2) because it was inverted (Equation #1 and 2).***

- **Page 1797** Line 26: This is not correct. TPI has been used in many papers e.g.
  1. VORPAHL, P., ELSENBEER, H., MAERKER, M. & SCHROEDER, B. (2012) How can statistical models help to determine driving factors of landslides? *Ecological Modelling,* 239**,** 27-39.
  2. COSTANZO, D., ROTIGLIANO, E., IRIGARAY, C., JIMENEZ-PERALVAREZ, J. D. & CHACON, J. (2012) Factors selection in landslide susceptibility modeling on large scale

following the GIS matrix method: application to the river Beiro basin (Spain). *Natural Hazards and Earth System Sciences,* 12(2)**,** 327-340.

3. MOHAMMADY, M., POURGHASEMI, H. R., & PRADHAN, B. (2012). Landslide susceptibility mapping at Golestan Province, Iran: a comparison between frequency ratio, Dempster–Shafer, and weights-of- evidence models. Journal of Asian Earth Sciences, 61, 221-236.

***We thank the second reviewer for this information, we modified that by removing "for the first time" from the sentence, and we cited the suggested citations (lines #198).***

- **Page 1804** Line 1: Is the LSI rank for the training dataset or validation dataset?
  ***We calculated the LS rank by using training dataset. However, the validation datasets were used in the y-axis (lines 323-324).***

- **Page 1805** Line 8: Substitute "Only curvature, plan" to "Since curvature, plan".
  ***We did that (lines #365-366)***

- **Page 1805** Line 24: Substitute "smaller 0.22" to "smaller than 0.22".
  ***We thank the second reviewer for this comment; we implemented that (line #379)***

- **Page 1806** Line 7: Why are the tables numbered as Table 1 and Table A1. They should be renumbered and referenced in the paper accordingly.
  ***We thank the second reviewer for this comment; we renumbered the tables in the paper accordingly (table 1 and 2).***

- **Page 1806** Line 20-25: Please rephrase. The section is difficult to read.
  ***We thank the second reviewer for this comment; we rephrased this section (lines #400-406).***

- **Page 1808** Line 1: Substitute "withheld of" to "withheld from".
  ***We substitute "withheld of" to "excluded from" (line #435).***

- **Page 1808** Line 2: No full stop needed. Both sentences can be merged.
  ***We modified both sentences (lines #434-437).***

- **Page 1808** Line 21: "GIS based techniques" is very vague and too general. Please be more specific.
  ***We thank the second reviewer for this comment; we already explained the GIS techniques, which used (lines #69-70).***

- **Page 1810** Line 17: Substitute "noted that number" to "noted that the number".
  ***We implemented that (line #517).***

- **Page 1810** Line 23: Substitute “significant impact for landsliding” to “significant impact on landsliding”.
  ***We implemented that (line #523).***

- **Page 1810** Line 28: Substitute “Thus it can reflects slope” to “Thus it can reflect slope”.
  ***We already remove this sentence, as the first reviewer mentioned.***

- **Page 1811** Line 23: Substitute “most of them were” to “most of which were”.
  ***We modified the sentence (line # 550).***

- **Page 1812** Line 8: Substitute “simple and easier” to “simple and easy”.
  ***We did that (line # 557).***

Figure

- **Figure 1:** The patter used is too dense making it difficult to read the text. Consider changing the shading pattern.
  ***We thank the second reviewer for this comment; we modified the figure (Figure 1).***

- **Figure 2:** Add ±1 Standard deviation on precipitation bars.
  ***We thank the second reviewer for this comment; we added ±1 Standard deviation on precipitation bars (Figure 2).***

- **Figure 3:** The scales on the snaps area incorrect. The snaps have not been taken at nadir and the scale changes from one point of the snap to another. If you want to put the scale, please make sure which point on the snap represents that scale.
- ***We thank the second reviewer for this comment; we used the pictures, which are more descriptive. Moreover, we added the width and the length of the landslides instead of picture scale.***

- **Figure 4:** The texts in legends are too small and difficult to read.
  ***We thank the second reviewer for this comment; we clarified the legend to be readable (Figure 4).***

- **Figure 6:** The texts in legends are too small and difficult to read. 6(a) looks like a hillshade map, instead of TWI map.
  ***We thank the second reviewer for this comment; we clarified the legend to be readable (Figure 4). Moreover, The TWI map was missing and we plotted again (Figure 6A).***

- **Figure 8:** Are these results from ‘combination models’? Please correct this.
  ***We thank the second reviewer for this comment; we modified the caption of figure 8.***