“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

Remarks for the author

Comments:

The paper focuses on landslide susceptibility mapping in the Kurdistan Region of Iraq by using four statistical methods (frequency ratio, weight of evidence, logistic regression and probit regression) and comparing their results. The authors have done a satisfactory job in mapping landslide susceptibility in the Mawat area of Kurdistan region which has never been mapped for landslide susceptibility. The use of probit regression model in landslide susceptibility mapping is a new technique used in the paper. The methods used in the landslide susceptibility model are satisfactory and have been extensively used in the literature (except the probit regression model).

The paper, however, requires some modifications. 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. 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.

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.

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.

Comments and suggestions for the author

Title Substitute “Landslide susceptibility mapping in Mawat area” to “Landslide susceptibility mapping in the Mawat area”

Page 1790 Line 26: Grammatical error. Please rephrase.

Page 1792 Line 12: Remove “in this area”.

Page 1792 Line 22: Substitute “without any consideration of time the occurrences” to “without any consideration of time of occurrences”.

Page 1794 Line 23: Please rephrase.

Page 1795 Line 5: Please add some more information about the characteristics of landslides which have been studied.

Page 1796 Line 4 to 10: The whole paragraph changes tenses. Please be consistent.

Page 1797 Line 4: This is not a good definition of aspect.

Page 1797 Line7: The definition of curvature is not satisfactory.

Page 1797 Line 24: This is not 'HI'. It should be 'TPI'.

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 modelling 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.

Page 1804 Line 1: Is the LSI rank for the training dataset or validation dataset?

Page 1805 Line 8: Substitute "Only curvature, plan" to "Since curvature, plan".

Page 1805 Line 24: Substitute "smaller 0.22" to "smaller than 0.22".

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.

Page 1806 Line 20-25: Please rephrase. The section is difficult to read.

Page 1808 Line 1: Substitute "withheld of" to "withheld from".

Page 1808 Line 2: No full stop needed. Both sentences can be merged.

Page 1808 Line 21: "GIS based techniques" is very vague and too general. Please be more specific.

Page 1810 Line 17: Substitute "noted that number" to "noted that the number".

Page 1810 Line 23: Substitute "significant impact for landsliding" to "significant impact on landsliding".

Page 1810 Line 28: Substitute "Thus it can reflects slope" to "Thus it can reflect slope".

Page 1811 Line 23: Substitute "most of them were" to "most of which were".

Page 1812 Line 8: Substitute "simple and easier" to "simple and easy".

Figure

Figure 1: The patter used is too dense making it difficult to read the text. Consider changing the shading pattern.

Figure 2: Add ±1 Standard deviation on precipitation bars.

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.

Figure 4: The texts in legends are too small and difficult to read.

Figure 6: The texts in legends are too small and difficult to read. 6(a) looks like a hillshade map, instead of TWI map.

Figure 8: Are these results from 'combination models'? Please correct this.