Interactive comment on "Estimation of regional differences in wind erosion sensitivity in Hungary" by G. Mezõsi et al.

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We would like to thank the anonymous referee for an extensive review of our manuscript and for providing us with helpful and constructive comments. For ease of reading we have copied the reviewer comments, as well as our response.

Medium level:

A- UNCERTAINTY. The words 'uncertain' or 'uncertainty' only appear twice in the paper. Although the data, methodology, results, are clearly explained as to what was done, it is unclear the uncertainties that would be involved in the data inputs themselves, in the resultant methodology, and finally the results. It would improve this paper to have a much more engaged discussion on uncertainties, and if possible, to introduce them so that the results can be put into a greater context.

AUTHOR RESPONSE: According to the suggestion the following discussion about the uncertainty was added to the section 4.4:

"There is a practical demand for estimates of t ha-1 soil loss values on the basis of the sensitivity map. However, the uncertainty in the estimates of several of the contributing factors, the applied method and their cumulative effects is hardly quantified and these factors can highly modify the actual rate of soil losses. Uncertainties can be arisen on the one hand from the applied datasets. These datasets are low resolution datasets (e.g. MODIS satellite images have 250 m resolution, wind speed data are available only on 52 stations) which are suitable for regional scale estimations, however the spatial variability of the local conditions has much smaller scale, thus the results are not valid in local scale. On the other hand uncertainty is arisen from the applied fuzzy membership functions and the integration of the sensitivity layers even if the applied fuzzy logic reduces the uncertainty compared to rough classification. Moreover the same t ha-1soil loss value can be produced by different combinations of the contributing factors."

B- FIGURES. Were these all meant to be in colour? So for example, Figure 1 was very hard to see as it came out as a grey scale (on the screen and in print). This was true for many of the figures, that it was hard to see what were otherwise well done figures. In places, text was so small (when printed "A" e.g., look at numbers in Fig. 2) that I could barely read them, and needed to go back to the online version. Then I had to blow them up to the full screen size to see some of the smaller parts of the figures. Please go through and reevaluate figure

colour/grey scale and all font sizes, to make sure the reader can see them, from what is otherwise some really nice figures.

AUTHOR RESPONSE: According to the suggestion all figure were converted from grey scale to colour scale and larger texts were added to the legends of the Figures.

C- INTRODUCTION. (1) You have a lot of useful information in your introduction, and set the tone, but it is very long. Either break out the introduction into Intro and then another section on background, or signal somewhere early on in the intro, what you will be discussing. (2) Put something towards the end of the introduction letting the reader know the organization of the entire paper.

AUTHOR RESPONSE: The Introduction was broke out into two parts: 1. Introduction and 2. Wind erosion modelling in local and regional scale. Some overview of the article was formed at the end of the introduction part.

D- IN-TEXT CITATIONS. Make sure it is clear everywhere what your 'source' of material is. So for example, p. 4714, line 26, it is unclear that you are now going on to discuss the map by Loczy et al. (2012), and we think, where is this fact from? This is solved here by putting in a "They find that in 17.1% of the country". Do this throughout, being clear where your sources are, and don't assume because you discuss something in one sentence, the reader knows you will then be continuing to use that source of information.

AUTHOR RESPONSE: In-text citations were checked throuout the manuscript, and texts were modified to be more clear.
The suggested modifications in case of Loczy et al. (2012), were applied in the manuscript.
The modified text is: "*They find that in 17.1 % of the country, where sand and loamy sandy soils cover the surface and the critical friction velocity is lower than 6.5 ms-1, the effects of wind erosion are high, moreover approximately 9.4 % of the country is moderately affected, where sandy loam soils occur and the critical friction velocity is 6.5-8.5 ms-1.*"

E- FUZZY METHODS You might consider adding just a bit more on what fuzzy analysis is and who has used it, as it plays such a key part of your paper. You describe what you did, but don't give the reader much intuitive feel for the method, or how it has been used.

AUTHOR RESPONSE: According to the suggestion the following text was added to the Method section:
"*The sensitivity of the factors was first calculated separately by using fuzzy analysis (Klir and Yuan 1995; Shi et al. 2010; Borelli et al. 2014).The fuzzy analysis was carried out by IDRISI software In this software the relation between two parameters is described by fuzzy membership functions. The fuzzy membership function can be linear, exponential, logarithmic or polynomial (Eastman 2006).*"

F- Figure 5 and associated text. (1) I became somewhat confused on this figure and in the text, if you were talking about number of days per month, number of days per year, or number of days over 12 years. (2) In terms of the 52 stations used to do your kriging, can you give some

sort of a figure when you are talking about data, with the 52 stations spatially located on the map, so we know that they are not all clustered in one place.

AUTHOR RESPONSE: (1) Figure 5 was modified by added "(days/month)" to the legend. (2) Meteorological stations were added to the map.

Minor level:

A- Figure 1. Caption can be more complete (tell us it is Hungary we are looking at!). Your scale has something strange with itâˇA ˇTyou go 50, 0, 50, km, 150. The "km" should be "100" and then km farther to the right.

AUTHOR RESPONSE: The Scale of the Figure was changed and a caption: "Hungary" was added to the Figure.

B- ENGLISH. Throughout, there will need to be some minor checks on English, but that can come at a later stage (I think that the journal does copy-editing).

AUTHOR RESPONSE: The text was checked and some language corrections were made.

C- p. 4715, line 23 "100 m x 100 m" not "100 x 100 m"

AUTHOR RESPONSE: The suggested modifications were applied in the manuscript.

D- Wherever you mention 'averages' of precipitation or temperature, always state the period over which the average is. So for example, p. 4717 lines 19-21, average over what period? In addition, this is a very dated reference (1998).

AUTHOR RESPONSE: Means of averages were clarified in the text by stating the periods.

E- p. 4718, line 9. This might be an 'English' item, but it was confusing discussing "The calculation methods from plot-sized models cannot be applied: : :." Without knowing what these calculation methods being discussed were. It is the 'the' which is causing the issue. You might just state "Calculation methods from plot-sized models: : :"

AUTHOR RESPONSE: The suggested modifications were applied in the manuscript.

F- p. 4719, line 22. It should be >35% (not "35%<") and >9 m sˆ-1 not "9 m sˆ-1>".

AUTHOR RESPONSE: The suggested modifications were applied in the manuscript.

G- p. 4719. Last line. "(See Fig. 3 for flow chart)" otherwise reader doesn't know why they are being asked to see Fig. 3, and think that Fig. 3 is the map.

AUTHOR RESPONSE: The suggested modifications were applied in the manuscript.

H- FIGURE ORDER. Please introduce figures in the text in order 1, 2, 3, 4, : : :, 14. In section 3.2.1. you jump from figure 4 to 7 to 10, skipping 5, 6, 8, 9.

AUTHOR RESPONSE: Figure order was corrected in the text, figure 4, 7 and 10 were excluded from the text in section 3.2.1.

I- ROSE DIAGRAMS. Would it help to have some background rose frequency diagrams to supplement Fig. 2? I found it strange not to have background wind speeds by frequency and direction, even a few localities.

AUTHOR RESPONSE: We think that rose diagrams are not necessary as additional figure elements on Fig. 2. A frequency of wind direction not provides crucial information beside the dominant wind directions. The conducted regional scale analysis not includes data about wind direction, only wind speed, thus in this scale, that information has less relevant and hard to calculate.

J- Figure 2. (1) y-axis, should be 2.0, 2.5, 3.0, 3.5. (2) Put the std. dev. (or +- 2 s.d.) error bars on the averages so we have some idea of variability over these months, and then bring into the text where you discuss the averages. (3) In legend of wind speeds, include .0. (4) Make clear the arrows for dominant wind speed do not have length that varies according to the average dominant wind speed (although it would be better if they did!). (5) For wind speed information, what is the spatial resolution on which the left figure is based? (6) Consider (for size) having one figure over another for Fig. 2, and label them A and B.

AUTHOR RESPONSE: (1) y-axis was modified to 2.0, 2.5, 3.0, 3.5. (2) That figure is a cited figure thus std. dev. is not known (3) In legend of wind speeds, .0 were included. (4) in the figure caption description was added, that „arrow lengths not indicate wind speed, only the direction of dominant wind is shown" (5) That figure is a cited figure thus spatial resolution is not known (5) Fig. was labelled as A and B

K- Fig. 6. State the resolution of the NDVI map in the caption.
AUTHOR RESPONSE: The suggested modifications were applied in the manuscript.
"Fig. 6. NDVI map from 250-m resolution MODIS satellite images (average values from March-April (in the period of 2000-2011) generated from the 16-day composites)."

L- Fig. 7. In the caption, consider stating that this is an exponential distribution, and giving the parameters.

AUTHOR RESPONSE: The exponential distribution was referred in the caption, and name and source of the applied soil parameter was added to the figure caption. The equation was added to the Figure.
"Fig. 7. The applied exponential fuzzy membership function of the relation between soil texture (soil erodibility index based on the modelling results of the NAM (2002) and Klik (2004)) and the sensitivity to wind erosion."

M- Fig. 8. (1) Units of days/month, should be (??) dy mthˆ-1. (2) Give the parameters of the best-fit line.

AUTHOR RESPONSE: The legend text was modified to "*Frequency of wind speed over 9 m/s (dy mth-1)*" on the Figure.

N- For figures 7 to 9, I recommend that you put a variable on the x- and y-axes, in addition to the text already there, making it easier to give the equations with the parameters for the fits.

AUTHOR RESPONSE: The figure captions were extended; the variables are explained in the caption. The equations were added to the Figures.
"Fig. 8. The applied linear fuzzy membership function of the relation between the frequency of erosive winds and the sensitivity to wind erosion. To define the frequency of erosive winds, days with a maximum wind speed above 9 ms-1 were used."
"Fig. 9. Relation between the vegetation cover and the sensitivity to wind erosion (NAM, 2002). The vegetation cover was calculated on the basis of a well-established direct relationship exists between the vegetation intensity and the NDVI (Huete et al., 2002)"

O- For all figure captions, can they be slightly more complete (not discussion, but enough there so we don't have to go back to the text to read about what is being presented.

AUTHOR RESPONSE: Figure captions were completed with some additional information as it was suggested in case of Fig. 2, 6, 7, 8, 9, 10, 12, 13.