**Responses to the comments of the referees**

Interactive comment on “Responses of aeolian desertification to a range of climate scenarios in

China” by Xunming Wang et al.

Anonymous Referee #1

Received and published: 28 April 2016

This paper sets up an interesting discussion around the fact that desertification must be addressed at local level. The authors show how variables such as wind velocity, temperature or soil moisture, that use to be related to Aeolian desertification show high variability and even have been found to show negative correlation with desertification indices in different regions in China. Currently research of land degradation in this country is leading the ranking of desertification research (Escadafal et al., 2015) and I support its publication. (please check Escadafal, R., Barbero-Sierra, C., Exbrayat, W., Marques, M. J., Akhtar-Schuster, M., El Haddadi, A., and Ruiz, M. (2015) First Appraisal of the Current Structure of Research on Land and Soil Degradation as Evidenced by Bibliometric Analysis of Publications on Desertification. Land Degrad. Develop., 26:413–422. doi: 10.1002/ldr.2351)

Due to the fact that relevant data are provided only in the supplementary material the discussion is a bit difficult to follow. If possible I would recommend to include data on severity of desertification, landscape characteristics of different regions etc. in the body of the main text. In case that it is not possible, I suggest adding some comments to describe the main features of different regions. In this way the authors can find reasons or arguments to support the different correlations found in the analysis.

[Responses] Thank you for your positive comments. Following your and the other referee's suggestions we have thoroughly revised this ms. For instance, in the revised version we have supplemented some descriptions on severity of desertification, landscape characteristics of different regions in the body of the main text; and we also have supplemented some descriptions on the main features of different regions. Please see the revised version of the ms and the responses below.

As I mention in the detailed comments attached, I think that the authors should discard the fact that the lack of relationship between vegetation cover and wind erosion maybe be due to the fact that "NDVI soil" is considering non-erodible areas like crusted soil or rocky surfaces. Soil erodibility must be taken into account. Please check: Algayer, B., Wang, B., Bourennane, H., Zheng, F., Duval, O., Li, G., Le Bissonnais, Y. and Darboux, F. (2014), Aggregate stability of a crusted soil: differences between crust and sub-crust material, and consequences for interrill erodibility assessment. An example from the Loess Plateau of China. European Journal of Soil Science, 65: 325–335. doi: 10.1111/ejss.12134

[Responses] Thank you for comments and suggestions. In the revised version we have noted and supplemented related expressions. In addition, because the relationships between the characteristics of vegetation cover and the aeolian desertification was not the topic we discussed here, therefore, we have removed the related results and discussions from the revised version.

The authors argue that “the intensity of human activity is very low” (line 161) in the study area, and "human activity on desertification have been overestimated" (line 55). This is quite controversial, because in my opinion human activities are in the core of desertification processes. Without human activities we are only looking at natural processes in harsh environments. I think that human activities should not be underestimated. Please have a look at the following papers to find arguments to highlight its role in your region of study : Gao, Y., Dang, X., Yu, Y., Li, Y., Liu, Y., and Wang, J. (2016) Effects of Tillage Methods on Soil Carbon and Wind Erosion. Land Degrad. Develop., 27: 583–591. doi: 10.1002/ldr.2404. Miao, L., Moore, J. C., Zeng, F., Lei, J., Ding, J., He, B., and Cui, X. (2015) Footprint of Research in Desertification Management in China. Land Degrad. Develop., 26: 450–457. doi: 10.1002/ldr.2399.

[Responses] Thank you for your comments. In the revised version we have removed or revised related expressions.

Please find other minor comments on the pdf attached. Particularly check the scales of maps. Every table caption should be independent from the text. Please explain the meaning of any abbreviation such as NDVI, VFC, PDSI. Please check all the captions.

Please confirm that such the gap of data to establish correlations between NDVI and VFC is not causing inconsistencies in the Spearman correlation between variables Please also note the supplement to this comment:

http://www.solid-earth-discuss.net/se-2016-59/se-2016-59-RC1-supplement.pdf

[Responses] Thank you for your attached files. Following your comments and suggestions here and in the supplemented PDf version, we have thoroughly revised the ms. In addition, because the vegetation characteristics (indicated by NDVI and VFC) were not the topic we discussed in this ms, therefore, we have removed the related expressions in the revised version.

Anonymous Referee #2

Received and published: 17 May 2016

The work of Wang et al. (manuscript SE-2016-59) shows a large scale study about aeolian desertification throughout China and its degree of intensity (4 classes). Regarding to a scientific novelty point of view, this study may be very useful because it can provide relevant information to stakeholders about this important problem, particularly in the boundaries of Sandy and Gobi deserts. However, in my opinion, the authors should do still a great effort to improve the quality of the manuscript in order to be accepted for publication in Solid Earth journal. Therefore, I am going to suggest to the Editor a Major Revision. Please see below general and specific comments.

[Responses] Thank you for fruitful comments. Following your comments we have thoroughly revised the ms. Please see the responses below and the revised version of the ms.

GENERAL COMMENTS

- Although English is not my mother tongue, I think that a linguistic review by a native speaker is still needed.

[Responses] Thank you for your comments. The ms has been edited by colleagues with English as the native tongue.

- Chapter 1 should be renamed to “Introduction” and not “Instruction”.

[Responses] Revised. Thank you.

- “Rainfall” and “speed” should be used instead of “precipitation” or “velocity” throughout the text.

[Responses] Revised. Thank you.

- The main goal and research questions of the article are not mentioned in any part.

[Responses] In the revised version we have noted that the main goal and research questions of this ms is 'integrated variations in trends in temperature, wind speed, and rainfall, and determined their relationships with aeolian desertification in China, and provided information for future policy decisions on how best to combat desertification'.

- The chapter of Materials and methods is very bad organized. I.e. there are too many subchapters and methods used in this research are not well explained.

[Responses] Revised. Thank you.

- A subchapter of “Study area” is necessary.

[Responses] Thank you for your suggestions. Because here we take China as the study area, and therefore, we have not supplemented a subchapter of “Study area”.

- More references worldwide are needed in the Discussion section.

[Responses] We have supplemented some references worldwide in the revised version. Thank you.

SPECIFIC COMMENTS

- Line 20: “arable land and grassland are degraded”. Please use “land degradation due mainly to a decrease of vegetation cover.

[Responses] Thank you for your suggestions. Following our colleague's suggestions we would rather use “arable land and grassland are degraded” here.

- Line 23: “Over the past five decades”. Please use “In the last 50 years”. Please check it throughout the text.

[Responses] Revised. Thank you.

- Line 30: “Sandy and Gobi deserts”. Please use capital letters.

[Responses] Revised. Thank you.

- Lines 37-42: This sentence is repetitive. Please delete it.

[Responses] Thank you. We have revised these expressions.

- Lines 46-49: Are you sure? If the predictions of global warming are good to avoid aeolian desertification why Chinese government has implemented numerous programs in the last decades. It does not make sense! Please give more details.

[Responses] We have supplemented and revised these expressions. Thank you.

- Lines 56-57: I do not know exactly what is happening in China but it is a little strange that variations in the predominant climatic factors and their impact on desertification have not been studied. Please revise it.

[Responses] We have revised these expressions. Thank you.

- Line 78: “reported by Wang (2014)”. Please check it.

[Responses] We have check this expression. Thank you.

- Line 85: “a spatial resolution of 1/12âA˛rˇ x 1/12âA˛rˇ”. Please check it throughout the text.

[Responses] We have checked these expressions. Thank you.

- Line 105: This subchapter should be renamed “Statistical analysis”. Furthermore, it should be much better explained.

[Responses] We have revised the Materials and methods sections. Because the Spearman correlations are one of the common statistical tools, therefore, we have not explained it more in the revised version. Thank you.

We honestly appreciate the Editors and the anonymous referees for efforts for taking so much time reviewing our manuscript. We hope that these changes will be satisfactory, and we will be pleased to work with you to resolve any remaining issues.

Yours sincerely,

Xunming Wang, Ting Hua, Wenyong Ma