Atmospheric
Chemistry
and Physics
Discussions

Interactive comment on "The Interactions Between Precipitation, Vegetation and Dust Emission Over Semi-Arid Mongolia" *by* Yuki Sofue et al.

Anonymous Referee #4

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This paper addresses the important issued of interaction between precipitation and vegetation in Mongolia. It uses the findings to suggest its impact on dust emissions and desertification. As presented data is predominantly NDVI and precipitation records at 4 sites the link between the two factors is examined. This suggests impact on ground cover; the connection to dust emission is assumed rather than documented. What is the dust data from Namhem? How can this be associated with vegetation and precipitation? The process is not clear. Mongolia is vast with varied landscape. At a 1o to 2.5 o scale is lost. More thorough investigation is needed such as groundtruthing, same-time location specific dust monitoring, or dust traps to make claims.

The paper can stress the NDVI-precipitation link which is useful. It highlights the landscape difference from east to west. Dust events have specific timeframes – this may

be different from the more general precipitation or vegetation. The connections are implied and logical, but the data is too general to say it is proved. It is not clear what dust data is used.

Similarly, the discussion on desertification is unspecific. The Gobi is dry with sparse vegetation that makes it a desert, not desertified. The question of processes that lead to degradation cannot be addressed with these research methods. It is mentioned that desertification is affected by human action in China. This is true with farming and development being major factors. This is not the case in Mongolia. It is more direct to focus on the correlational findings than to try to tie this to dust and desertification. More interpretation of correlations and differences would be useful. are they artefacts of the data, when/how data is collected? Why is there less coupling in the west? Is this because there is little precipitation and high variability? Plants are mentioned – are they important as cover, or for livestock – are plants palatable and is it implied that grazing is responsible for degradation? The research does not address these points directly so they should be presented as explanations only.

The paper will be strengthened by concentrating on the work that was done. Possible implications – dust, desertification, difference between Mongolia and China, possible climate change (please document) etc can go in a discussion. Factors that may affect vegetation, dust and desertification should also be mentioned. Is the implication that mining, herders, roads or agricultural is affecting land cover? Otherwise the data is in a vacuum – what is the significance, what do the findings mean in the real world. This does not have to be extensive, but without the context the purpose of the research is not clear. The title oversells the research so should more directly address the work done.

More specificity of terms, dates and timings would be useful as this can strengthen and clarify relationships. These details came across as general so were unconvincing. Why was only Shainshand used? Can the findings tell us more – some general results were what we would expect before undertaking the research.

The topic and engagement are good. A clearer sense of purpose would be useful. The authors can be encouraged to broaden the study or focus on a smaller area to provide more depth in the future. Also, consider some fieldwork to make the research less abstract. This would enable discussion of landscape, plants and degradation.