

## ***Interactive comment on “A comparison of the soil loss evaluation index and the RUSLE Model: a case study in the Loess Plateau of China” by W. W. Zhao et al.***

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We acknowledge the work done by reviewers very much. We have gone through all the comments and will amend the original manuscript base on the suggestions and comments. In the following lines we provide answers to the reviews comments.

*Reviewer: “soil loss evaluation index” were used for about 23 times throughout the paper. In some part of the paper, SL or SLsw were also used to represent the method (such as in Table 1 and Section 3.2). Suggest using two acronyms, each for the method*

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*and the index, to save space, be concise, and reduce confusions.*

Authors: Yes, it is necessary to use two acronyms in the revised manuscript. It will be modified.

*Reviewer: Soil erosion is a natural process. Even without our human interruption, it will occur. As part of ecosystem conservation, we need to minimize the impact of adverse human interruption (such as improper land use). Authors emphasized the land use was the key reason causing the soil erosion throughout the paper. However, very limited land use information (page 2415, lines 11-14) was provided. How land use information was incorporated into the sub-watershed delineations and how land uses are associated with the predicted sensitive areas were not addressed at all. So fully attributing the soils erosion to improper land use may be subjective. The conclusions should be based on the associations.*

Authors: Yes, it is necessary to give the more information on land use pattern in the revised manuscript. The land use pattern will be described based on the slope degree, distance to rive, and other factors.

*Reviewer: Two model results were compared. However, both models were not verified against the actual soil erosion data in the sub watershed scale. Therefore, the conclusions based on both model are only predictions of potential soil erosions by locations (for RUSLE) or in rates (for the soil index method), with some degree of predicting uncertainties. Without model verification, one or both model results could be unreliable. Authors should explicitly address such a point. Verifying the models’ accuracies should be part of the future effort.*

Authors: SLsw and C factor from RUSLE has close relationship. Combined the suggestions of reviewers, the revised manuscript will focus on the comparison between SLsw and the C factor from RUSLE, and relative data will be given to explain the def-

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erence. Verifying the models' accuracies will be part of the future effort.

*Reviewer: The statement in page 2425 lines 8 to 10 is misleading or incorrect. The accuracies of the models should be based on the verification of the model predictions against the actual data. Although the input data resolution and grid sizes could affect the model predictions to some extent, without the model verification, how could you know what input data resolution and/or cell size are sufficient?*

Authors: Yes, the statement is based on the knowledge, not the model verification. It will be modified in the revised manuscript.

*Reviewer: Authors should provide the statistic basis picking the thresholded values of 0.325 for dividing no-sensitive and sensitive areas.*

Authors: It may not be suitable to divide non-sensitive and sensitive areas based on the values of 0.325. Combined the suggestions of reviewers, the revised manuscript will not divide the watershed into no-sensitive and sensitive areas.

*Reviewer: Authors concluded the two model outputs are significantly different on page 2424, lines 25-26. "Significantly different" is commonly based on statistical analysis, not based on a visual observation. Since both models were conducted on the sub-watershed scale. A quantitative comparison of model predictions across all sub-watersheds may be more scientifically meaningful than visually comparing four figures.*

Authors: Yes, the quantitative comparison is important to compare the two models. In the revised manuscript, the quantitative comparison will be done for SLsw and C factor.

*Reviewer: Regards to equations: (1) What does m represent in equation (1)? (2) In*

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*equation (2), how was Dmax defined? At the basic unit or watershed scale? The same questions for the Hmax in equation (3). (3) At what scale Xmin and Xmax were applied in C519 equation (4)? In other words, did you use a set of minimum and maximum for each sub-watershed? (4) What's LS and P factors, line 3 of page 2422?*

Authors: In equation (1), m is the abbreviation of distribution map. In equation (2), Dmax should be the maximum soil loss horizontal distance for the study area (at the watershed scale). In equation (3), Hmax should be the maximum soil loss vertical distance for the study area (at the watershed scale). Equation(4) will not appear in the revised manuscript.

In line 3 of page 2422, L is the slope length factor, S is the slope steepness factor, C is the cover-management practice factor.

*Reviewer: Regards figures (1) Suggest indicating what method was based for Figures 7 through 11. (2) Suggest adding one land use map.*

Authors: Yes, the land use map and the methods on how to get the figures 7 will be given in the revised manuscript.

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