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Hydrology and Earth System Sciences Discussions

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.

Anonymous Referee #2

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Below are the first-round review comments. Further comments will be provided in a shore future. 1. "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 and the index, to save space, be concise, and reduce confusions.

2. 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.

3. 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.

4. 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?

5. Authors should provide the statistic basis picking the threshed values of 0.325 for dividing no-sensitive and sensitive areas.

6. 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 cross all sub-watersheds may be more scientifically meaningful than visually comparing four figures.

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

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?

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

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 2409, 2012.