

## ***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 #1**

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The irrational land use practice is the cause of severe soil erosion especially on the Loess Plateau of China. Chinese scientists work hard to obtain a straight way like the index in this paper to help land use planning and control soil erosion. A kind of model (SLsw) designed by the authors was compared to RUSLE to illustrate the validity of SLsw to find the place need urgent optimization.

It is much easier to find out the differences such as purpose, scale and calculation procedures of two models. But output comparison and the interpretation are not sufficient leading to a great suspicion of reliability of the model in the paper. The science foundation of the model structure failed to present clearly and also the verification as a

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model is missing, so it is difficult to justify its correctness and accuracy. Furthermore the Fig. 8 in the paper gives wrong information about the soil erosion rate in the study area. The paper needs a major revision to give more clear explanation.

1.Does the paper address relevant scientific questions within the scope of HESS? yes 2.Does the paper present novel concepts, ideas, tools, or data? yes 3.Are substantial conclusions reached? No 4.Are the scientific methods and assumptions valid and clearly outlined? No 5.Are the results sufficient to support the interpretations and conclusions? No 6.Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? No 7.Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8.Does the title clearly reflect the contents of the paper? Yes 9.Does the abstract provide a concise and complete summary? Yes 10.Is the overall presentation well structured and clear? yes 11.Is the language fluent and precise? yes 12.Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? No 13.Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? No 14.Are the number and quality of references appropriate? Yes 15.Is the amount and quality of supplementary material appropriate? No

some specific comments are as following:

1.In the construction of SLsw model, the authors adopt four factors and their equations from RUSLE model, see the part of 2.2.4. Because the cover and management practices factors (C) is referred to the land use pattern and most concerned in the paper, it is necessary to state clearly what the relationship of C factor used here and the land use pattern the paper mentioned are, and to make it easier to understanding the results and conclusion in this paper (see note 5 below).

2.Equation (4) was used to standardize the results from two models. But what is the scope of Xmax and Xmin? Of the sub watershed or whole watershed? How to trans-

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form the result of RUSLE into the standard level? Please describe it briefly and clearly in the paper.

3. The authors constructed the model like part of 3.1.5 of the paper shows the application result of SLsw. As a semi-empirical model, its purpose is to guide land use planning. Although the model is constructed in the basis of erosion processes and USLE, it is necessary to test its correctness and accuracy and strengthen the reliability.

4. The criteria to divide the sensitive or non-sensitive area need clearly explanation and verification in the part of 3.3. From the paper it is only the comparative conception limited for the study area, not for the indicative region and for the whole Loess Plateau. If the SLsw indexes in the study area have a low coefficient of variation, but a high average, that means all the study area are probably so called sensitive area, but only part of them could be identified based on the paper. Such an evaluation is suspected its value and ability to guide the land use planning on the Loess Plateau.

5. The mean annual soil erosion modulus of 29884 Mg.km<sup>-2</sup>.yr<sup>-1</sup> in Fig 8 is near the ultimate value (30000 t.km<sup>-2</sup>.yr<sup>-1</sup>) which ever occurred based on the records of gauge station in the river with much severe soil erosion than the study area in the paper on the Loess Plateau. Such soil modulus happened in the middle and the southeast parts of the Yanhe River based on the statement in the paper. The first location is generally consistent with the identification from the SLsw model. But the latter one shows the huge difference. The southeast part of the Yanhe River with high soil loss rate up to near 30000 t/km<sup>2</sup>/year from RUSLE in Fig 8 and Fig 9, is not only the non-sensitive area, also the lowest value identified by SLsw model in Fig7 and 10.

The agreement of first location between two models means that irrational land use resulted in the severe soil erosion, but the disagreement of the second is stated that the sever soil erosion is caused by the fators such as rainfall, topography and soil, not by irrational land use by human people. Is that true? Which one is more reliable?

It is necessary for authors to give more clear and sound explanation, not only the simple

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guess in the paper. The detailed data in the paper would support the analysis.

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