

## ***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: The way Soil Loss Evaluation Index (SLEI) model explained in the paper, the model formulation fundamentally same as RUSLE model except P factor used in RUSLE (Dm and Hm seem more like surrogates for slope length (L) and slope steep-*

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*ness (S) factors used in RUSLE) and spatial scale at which the models are formulated (SLEI – sub-watershed v RUSLE – grid cell).*

Authors: Yes, soil loss evaluation index learned from RUSLE, and the model formulation of soil loss evaluation index is fundamentally same as RUSLE. Dm and Hm are more like surrogates for slope length.

*Reviewer: Another important point to be noted is SLEI model output seems more closely related to C factor (from RUSLE) rather than average annual soil loss as computed by RUSLE. If you compare Figure 7 of this manuscript with Figure 6 of Fu et al. (2005), the value trend looks almost same (low values around west, south and south-east part of the watershed and high values around the middle of the watershed) and even the values (except C values for water is assigned zero in Fu et al., 2005) look same. Does this indicate comparison of output from SLEI model with C map from RUSLE is a more appropriate than comparing SLEI model result with RUSLE? So, the authors need to explain in more detail how SLEI model differs from C value in RUSLE. Similarly, the authors also need to justify the advantage of using SLEI output rather than just using C value in RUSLE to make decisions regarding land use optimization since C factor also takes account for contribution of land use in average annual erosion rate.*

Authors: We are very thankful for this suggestion. The paper name will be changed from “A comparison of the soil loss evaluation index and the RUSLE Model: a case study in the Loess Plateau of China” into “A comparison of the soil loss evaluation index and the C factor from RUSLE: a case study in the Loess Plateau of China”. The paper content will focus on the difference between SLsw and C factor, and the advantage of using SLsw will be discussed.

*Reviewer: Page 2412, paragraph 3: The whole paragraph constitutes only one sentence. Please break up the paragraph into 2-3 simple sentences.*

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Authors: The paragraph will be broken up into some simple sentences.

*Reviewer: Page 2419, paragraph 2, The explanation of  $x_i$ ,  $x_{max}$  and  $x_{min}$  is confusing. My understanding is equation 4 is used to normalize both  $SL_{sw}$  and  $RUSLE$  values. The way equation 4 is explained at the moment, it seems the equation 4 is used to normalize  $SL_{sw}$  values only. Also, is it really necessary to normalize  $SL_{sw}$  values since they already range from zero to one? Please explain.*

Authors: There are some mistakes with the explanation of  $x_i$ ,  $x_{max}$  and  $x_{min}$ , and  $SL_{sw}$  values are not necessary to normalize indeed. In the revised manuscript, the  $SL_{sw}$  values will not be normalized, the equation 4 and  $RUSLE$  values will not appear.

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