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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 #3

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I am not really convinced whether two models that compute two different entities can be compared in this fashion. This is the reason why the discussion section of the paper sounds somewhat weak. Similarly, the computed values are not compared with the observations (my suggestion is, at least, to compare the annual average soil loss values to observed values in the region if these values have been reported in literature) which can raise the concerns regarding the reliability of these model predictions. Hence, the paper needs extensive revision. After major revision, this could be considered as a scientific communication.

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

Minor comments: (a) Page 2412, paragraph 3: The whole paragraph constitutes only one sentence. Please break up the paragraph into 2-3 simple sentences. (b) Page 2419, paragraph 2: The explanation of xi, xmax and xmin is confusing. My understanding is equation 4 is used to normalize both SLsw and RUSLE values. The way equation 4 is explained at the moment, it seems the equation 4 is used to normalize SLsw values only. Also, is it really necessary to normalize SLsw values since they already range from zero to one? Please explain.

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