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Hydrology and Earth System Sciences Discussions

Interactive comment on "Application of fuzzy representation of geographic boundary to the soil loss model" *by* G.-S. Lee and K.-H. Lee

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Dear refree

The authors wish to thank the two anonymous reviewers for their elaborate and useful comments and the sequence of our response to the points made by both reviewers is as follows;

1)We modified the abstract to provide concise and complete summary.

2)We added over 10 references to give proper credit for old works (especially, RUSLE with fuzzy concept). Accordingly, we added the RUSLE/fuzzy-related work by old scientists in the introduction. E.g. "Torri et al., 1997; Mirta et al, 1998; Ahaned et al., 2000a,b; Changing and Junzheng, 2000; Kumar et al., 2000; Lark, 2000; Oberthur et al., 2000; Baja et al., 2002; Tran et al., 2002; Rashed et al., 2005 among others".

3)We restructured and reorganized most of paper. Especially, we reorganized/added

the description of the RUSLE model, putting the soil loss equation (A=Ě) as the first equation followed by parameter explanation. We added more explanation about how the RUSLE model is applied when the K is fizzified, the reasoning for using 500m as the fuzzy boundary, and the RUSLE factors etc..

4)In Korea, soil samples were taken at 1km spacing to calibrate the 2-D digital soil texture map. The boundary area near which soil characteristics varies was arbitrarily bisected to discern different soil texture for each category and these uncertainties have an influence on soil erosion estimation in the RUSLE. It is, hence, assumed that the Euclidian distance of 500m is covered by the fuzzy representation from the boundary on the basis of ground sampling spacing (1km).

5)The shape of FMF strongly depends on the parameters and and these parameters affect the fuzzified distribution of the K-factor and soil erosion eventually. As a standard form, equal b and d was selected for the FMF in this study.

6)We fully agree with reviewers that the concept of fuzzifyng the K factor in the geographic boundary zone should be demonstrated and tested against field data. Hence, we performed additional research to demonstrate the new technique and the results of the RUSLE model using the conventional shrap-boundary and the fuzzy boundary were tested against field data. The total soil erosion simulated by the RUSLE for the fuzzy boundary is 1474781 , while 1429339 for the conventional boundary. The sediment yield is given by SDR (3.9%) as 57516 and 55744 for the fuzzy and conventional boundary, respectively. Consequently the RUSLE sediment yield for the fuzzy representation of geographic boundary results in lower error (2.9%) comparing to field measurement (59246)

7)Basically, we tried to reconstruct almost entire paper as pointed by both reviewers.

I want you download updated version as following homepage (http://hamong.net/blog/baechu). In homepage, the title is “HESSD-0108 (Application of fuzzy representation of geographic boundary to the soil loss model) update

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version". Thanks.

Interactive comment on Hydrology and Earth System Sciences Discussions, 3, 115, 2006.