

Interactive comment on “Does WEPP meet the specificity of soil erosion in steep mountain regions?” by N. Konz et al.

Anonymous Referee #1

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This manuscript is of good quality, and contains information of interest to readers of Hydrology and Earth System Sciences. It describes research evaluating performance of a process-based water erosion model applied to very steep alpine regions, dominated by winter processes (frost, thaw, snow accumulation, snow melt, etc.) as well as gravity-induced (land-slip) erosion, and comparisons to measured hydrologic and erosion data.

The paper describes use of the Water Erosion Prediction Project (WEPP) model, but does not indicate what version of WEPP was used? The authors need to be sure to indicate what model version was used, because WEPP has recently been updated with corrections and enhancements to the winter process components (in model version 2008.907, released in early October, 2008). The last public release of WEPP prior

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(version 2006.5) has known deficiencies in predictions of winter processes such as frost and thaw development, and snow melt. If the older version of WEPP (v2006.5) was used in this research, a suggestion would be to rerun the model simulations using the newest release (v2008.907) and determine if there was any effect on predicted results for this study.

Also, as the authors point out, WEPP was designed to simulate sheet and rill erosion from overland flow, not soil losses due to mass failure and gravity forcing. Addition of those types of erosion process simulation to the model would be needed to allow improvement of its prediction of total soil movement under the conditions described in this paper.

A number of specific comments for improvement of the manuscript are included here:

1. Page 2155, Line 5, Change "Alewell et al., 2007" to "Alewell et al., 2008".
2. Page 2157, Lines 10-11, the text indicates that slopes ranged from 35-39 degrees on all plots. However, in Table 1, plot pawo2 has a slope angle of 8 degrees shown? Is the table incorrect, or the text? Please correct as appropriate.
3. Page 2157, Line 25 - change "precipitation soil moisture and surface flow" to "precipitation, soil moisture, and surface flow".
4. Page 2160, Line 2 - Some better or additional citations for the WEPP model (instead of Flanagan and Livingston, 1995) would be "Flanagan and Nearing, 1995" - NSERL Report #10 - WEPP Technical Documentation, "Flanagan et al., 2001" - Flanagan, D.C., Ascough, J.C. II, Nearing, M.A. and Laflen, J.M. 2001. Chapter 7: The Water Erosion Prediction Project (WEPP) model. In Landscape Erosion and Evolution Modeling, 145-199. R.S. Harmon and W.W. Doe III, eds. New York, N.Y.: Kluwer Academic / Plenum Publishers , and "Flanagan et al., 2007" - Transactions of ASABE 50(5):1603-1612.
5. Page 2161, Lines 10-11 - the text states that the initial water saturation of the soil was set at 25% based upon measurements. However, that value seems extremely low, considering that the soils were presumably under a snow cover. Initial saturation is the percentage of the soil porosity that is filled with water, and ranges from 0-100%. Please check to make sure that the 25% value is ac-

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curate. 6. Page 2162, Line 9 - change "Tiscarenolopez" to "Tiscareno-Lopez". Change "analyze" to "analysis". 7. Page 2163, Line 13 - change "can not" to "cannot". Change "trough" to "through". 8. Page 2163, Line 14 - change "trough" to "through". 9. Page 2163, Line 15 - change "can not" to "cannot". 10. Page 2163, Line 17 - change "for weighing" to "by weighing". 11. Page 2163, Line 20 - change "amplify therefore" to "therefore amplify". 12. Page 2164, Line 22 - change "measurements conducted" to "measurements, where both observed and predicted". 13. Page 2164, Line 25 - delete "its". 14. Page 2164, Line 26 - change "tends" to "tend". 15. Page 2165, Lines 20-21 - change "analyzes" to "analysis". 16. Page 2165, Line 27 - change "pot lies" to "plot lies". 17. Page 2166, Line 10 - change "site were" to "site where". 18. Page 2168, Line 22 - change "was simulated" to "were simulated". 19. Page 2168, Line 24 - change "those hight" to "these high". 20. Page 2168, Line 24 - change "implemented to" to "implemented in". 21. Page 2170, Lines 1-2, reference for Flanagan and Livingston, 1995, is incomplete. Correct citation would be: "Flanagan, D.C. and Livingston, S.J. (editors). Water Erosion Prediction Project (WEPP) Version 95.7 User Summary. NSERL Report No. 11, National Soil Erosion Research Laboratory, USDA-Agricultural Research Service, West Lafayette, Indiana, 141 pp., 1995". 22. Page 2170, Lines 19-20, change title of article to "WEPP - A new generation of erosion prediction technology". 23. Page 2170, Line 31 - change "Deerascough" to "Deer-Ascough". 24. Page 2171, Lines 11-12 - reference is incomplete. Citation should be: "Robichaud, P.R. and Brown, R.E. Silt Fences: An Economical Technique for Measuring Hillslope Soil Erosion. RMRS-GTR-94, Rocky Mountain Research Station, USDA-Forest Service, 24 pp., 2002. 25. Page 2171, Lines 13-14 - reference is incomplete. Citation should be: "Savabi, M.R., Young R.A., Benoit G.R., Witte J.M. and Flanagan, D.C. Winter hydrology. Chapter 3 in (D.C. Flanagan and M.A. Nearing, eds.): USDA-Water Erosion Prediction Project (WEPP) Hillslope Profile and Watershed Model Documentation. NSERL Report No. 10, National Soil Erosion Research Laboratory, USDA-Agricultural Research Service, West Lafayette, Indiana. 1995.". 26. Page 2171, Line 25 - change "Wepp" to "WEPP". 27. Page 2173, Table 1 - change "1 5.3" to "15.3"; slope listed for pawo2 is 8 degrees

- is this correct, or should it be 38 degrees? 28. Page 2174, Table 2 caption - need to superscript "-1" in "kg ha⁻¹". 29. Page 2176, Table A1 - change units for residue mass from "kg m x -2" to "kg m⁻²". 30. Page 2176, Table A1 - the units listed for the last 5 cover parameters are "0-1", but that is actually the range of values. The units themselves are actually dimensionless fractions, so suggest changing "0-1" to "-". 31. Page 2177, Table A2 - units listed for "frostfree period" should be "days", not "integer". Units listed for "number of grasses along a 100 m transect" should be "#" and not "integer". Units listed for "plant drought tolerance factor" should be "-" or "m/m", not "0-1". 32. Page 2178, Table A3 - in the units for "CEC", the "-1" needs to be superscript. 33. Page 2180, in caption for Figure 2 - change "gets out of the trench" to "comes out of the trench". 34. Page 2183, change caption to: "Fig. 5. (a) Measured monthly precipitation, (b) measured (black) and WEPP-simulated (grey) surface flow, and (c) measured (black) and WEPP-simulated (grey) erosion rates, for meadow m3 from April to November 2007.". 35. Page 2184, Figure 6 - Initial soil moisture values input to WEPP appear to have been too low from this figure. Please see comment #5 above. 36. Page 2187, Figure 9 caption - change "manually" to "manual".

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