



The wildgeographer avatar shows how to measure soil erosion rates by means of a rainfall simulator

Artemi Cerdà (1), Óscar González Pelayo (1), Paulo Pereira (2), Agata Novara (3), Thomas Iserloh (4), and Massimo Prosdocimi (5)

(1) Soil Erosion and Degradation Research Group, Department of Geography, University of Valencia, Valencia, Spain. artemio.cerda@uv.es, Oscar.Gonzalez-Pelayo@uv.es, www.soilerosion.eu, (2) Department of Environmental Policy, Mykolas Romeris University, Ateities g. 20, LT-08303 Vilnius, Lithuania, paulo@mruni.eu, (3) Dipartimento dei Sistemi Agro-ambientali, University of Palermo, viale delle scienze Italy. agatanovara@unipa.it, (4) rier University, Physical Geography Campus II – Behringstr 54286 Trier Germany, iserloh@uni-trier.de, (5) University of Padova, Dep. of Land, Environment, Agriculture and Forestry. massimo.prosdocimi@gmail.com

This contribution to the immersed worlds wish to develop the avatar that will teach the students and other scientists how to develop measurements of soil erosion, surface runoff and wetting fronts by means of simulated rainfall experiments.

Rainfall simulation is a well established and knows methodology to measure the soil erosion rates and soil hydrology under controlled conditions (Cerdà 1998a; Cerdà, 1998b; Cerdà and Jurgensen, 2011; Dunkerley, 2012; Iserloh et al., 2012; Iserloh et al., 2013; Ziadat and Taimah, 2013; Butzen et al., 2014). However, is a method that requires a long training and expertise to avoid mismanagement and mistaken. To use and avatar can help in the teaching of the technique and the dissemination of the findings.

This contribution will show to other avatars how to develop an experiment with simulated rainfall and will help to take the right decision in the design of the experiments. Following the main parts of the experiments and measurements the Wildgeographer avatar must develop:

1. Determine the objectives and decide which rainfall intensity and distribution, and which plot size to be used. Choose between a laboratory or a field rainfall simulation.
2. Design of the rainfall simulator to achieve the objectives: type of rainfall simulator (sprayer or drop former) and calibrate.
3. The experiments are carried out.
4. The results are show.

Acknowledgements

To the “Ministerio de Economía and Competitividad” of Spanish Government for finance the POSTFIRE project (CGL2013- 47862-C2-1-R). The research projects GL2008-02879/BTE, LEDDRA 243857 and PREVENTING AND REMEDIATING DEGRADATION OF SOILS IN EUROPE THROUGH LAND CARE (RECARÉ)FP7-ENV-2013- supported this research.

References

- Butzen, V., Seeger, M., Wirtz, S., Huemann, M., Mueller, C., Casper, M., Ries, J. B. 2014. Quantification of Hortonian overland flow generation and soil erosion in a Central European low mountain range using rainfall experiments. *Catena*, 113, 202-212.
- Cerdà, A. 1998a. Effect of climate on surface flow along a climatological gradient in Israel. A field rainfall simulation approach. *Journal of Arid Environments*, 38, 145-159.
- Cerdà, A. 1998b. The influence of aspect and vegetation on seasonal changes in erosion under rainfall simulation on a clay soil in Spain. *Canadian Journal of Soil Science*, 78, 321-330.
- Cerdà, A., Jurgensen, M. F. 2011. Ant mounds as a source of sediment on citrus orchard plantations in eastern Spain. A three-scale rainfall simulation approach. *Catena*, 85(3), 231-236.
- Dunkerley, D. 2012. Effects of rainfall intensity fluctuations on infiltration and runoff: rainfall simulation on dryland soils, Fowlers Gap, Australia. *Hydrological Processes*, 26(15), 2211-2224.
- Iserloh, T., Ries, J.B., Arnaez, J., Boix Fayos, C., Butzen, V., Cerdà, A., Echeverría, M.T., Fernández-Gálvez, J., Fister, W., Geißler, C., Gómez, J.A., Gómez-Macpherson, H., Kuhn, N.J., Lázaro, R., León, F.J., Martínez-Mena, M., Martínez-Murillo, J.F., Marzen, M., Mingorance, M.D., Ortigosa, L., Peters, P., Regüés, D., Ruiz-Sinoga, J.D., Scholten, T., Seeger, M., Solé-Benet, A., Wengel, R., Wirtz, S. 2013. European small portable rainfall simulators: a comparison of rainfall characteristics. *Catena*, 110, 100-112. Doi: 10.1016/j.catena.2013.05.013

Iserloh, T., Ries, J.B., Cerdà, A., Echeverría, M.T., Fister, W., Geißler, C., Kuhn, N.J., León, F.J., Peters, P., Schindewolf, M., Schmidt, J., Scholten, T., Seeger, M. (2012): Comparative measurements with seven rainfall simulators on uniform bare fallow land. *Zeitschrift für Geomorphologie*, 57, 193-201. DOI: 10.1127/0372-8854/2012/S-00118.

Ziadat, F. M., Taimah, A. Y. 2013. Effect of rainfall intensity, slope and land use and antecedent soil moisture on soil erosion in an arid environment. *Land Degradation & Development*, 24: 582- 590. DOI 10.1002/ldr.2239