



Ash in fire affected ecosystems

Paulo Pereira (1), Antonio Jordan (2), Artemi Cerda (3), and Deborah Martin (4)

(1) Mykolas Romeris University, Environmental Management Centre, Vilnius, Lithuania (paulo@mruni.eu), (2) MED Soil Research Group, University of Sevilla, C/Profesor García González, s/n, 41012 Sevilla, Spain, (3) Soil Erosion and Degradation Research Group (SEDER), Departament de Geografia, Universitat de Valencia, Blasco Ibàñez, 28, 46010 Valencia, Spain, (4) U.S. Geological Survey, 3215 Marine Street (E127), Boulder, CO 80303-1066, United States

Ash in fire affected ecosystems

Ash leaves an important footprint in the ecosystems and has a key role in the immediate period after the fire (Bodi et al., 2014; Pereira et al., 2015). It is an important source of nutrients for plant recover (Pereira et al., 2014a), protects soil from erosion and controls soil hydrological process as runoff, infiltration and water repellency (Cerda and Doerr, 2008; Bodi et al., 2012, Pereira et al., 2014b). Despite the recognition of ash impact and contribution to ecosystems recuperation, it is assumed that we still have little knowledge about the implications of ash in fire affected areas. Regarding this situation we wanted to improve our knowledge in this field and understand the state of the research about fire ash around world. The special issue about “The role of ash in fire affected ecosystems” currently in publication in CATENA born from the necessity of joint efforts, identify research gaps, and discuss future cooperation in this interdisciplinary field. This is the first special issue about fire ash in the international literature. In total it will be published 10 papers focused in different aspects of the impacts of ash in fire affected ecosystems from several parts of the world:

- Fire reconstruction using charcoal particles (Burjachs and Esposito, in press)
- Ash slurries impact on rheological properties of Runoff (Burns and Gabet, in press)
- Methods to analyse ash conductivity and sorptivity in the laboratory and in the field (Balfour et al., in press)
- Termogravimetric and hydrological properties of ash (Dlapa et al. in press)
- Effects of ash cover in water infiltration (Leon et al., in press)
- Impact of ash in volcanic soils (Dorta Almenar et al., in press; Escuday et al., in press)
- Ash PAH and Chemical extracts (Silva et al., in press)
- Microbiology (Barreiro et al., in press; Lombao et al., in press)

We believe that this special issue will contribute importantly to the better understanding of the role of ash in fire affected areas.

Acknowledgments

The ‘Litfire’ Project (MIP-048/2011; 181 Pereira) funded by the Lithuanian Research Council, Soil quality, erosion control and plant cover recovery under different post-firemanagement scenarios (POSTFIRE), funded by the Spanish Ministry of Economy and Competitiveness (CGL2013-47862-C2-1-R), Preventing and Remediating Degradation of Soils in Europe Through Land Care (RE CARE) funded by the European Commission (FP7-ENV-2013-TWO STAGE) and European Research Project LEDDRA (243857) and COST action ES1306 (Connecting European connectivity research).

References

Balfour, V.N., Determining wildfire ash saturated hydraulic conductivity and sorptivity with laboratory and field methods. *Catena*. doi:10.1016/j.catena.2014.01.009

Barreiro, A., Fontúrbel, M.T., Lombao, A., Martín, C., Vega, J.A., Fernández, C., Carballas, T., Díaz-Raviña, M., Using phospholipid fatty acid and community level physiological profiling techniques to characterize soil microbial communities following an experimental fire and different stabilization treatments. *Catena*. doi:10.1016/j.catena.2014.07.011

Bodí, M., Martín, D.A., Santin, C., Balfour, V., Doerr, S.H., Pereira, P., Cerda, A., Mataix-Solera, J. (2014) Wildland fire ash: production, composition and eco-hydro-geomorphic effects. *Earth-Science Reviews*, 130, 103–127.

Bodí, M.B., Doerr, S.H., Cerdà, A. and Mataix-Solera, J. (2012) Hydrological effects of a layer of vegetation ash on underlying wettable and water repellent soils. *Geoderma*, 191, 14-23.

Burjachs, F., Expósito, I., Charcoal and pollen analysis: examples of Holocene fire dynamics in Mediterranean Iberian Peninsula. *Catena*. doi:10.1016/j.catena.2014.10.006

Burns, K., Gabet, E., The effective viscosity of slurries laden with vegetative ash. *Catena*. doi:10.1016/j.catena.2014.06.008

Cerdà, A. Doerr, S.H. (2008). The effect of ash and needle cover on surface runoff and erosion in the immediate post-fire period. *Catena*, 74 , 256–263.

Dlapa, P., Bodí, M.B., Mataix-Solera, J., Cerdà, A., Doerr, S.H., Organic matter and wettability characteristics of wildfire ash from Mediterranean conifer forests. *Catena*. doi:10.1016/j.catena.2014.06.018

Dorta Almenar, I., Navarro Rivero, F.J., Arbelo, C.D., Rodríguez, A., Notario del Pino, J., The temporal distribution of water-soluble nutrients from high mountain soils following a wildfire within legume scrubland of Tenerife, Canary Islands, Spain. *Catena*.

Escuday, M., Arancibia-Miranda, N., Pizarro, C., Antilén, M., Effect of ash from forest fires on leaching in volcanic soils. *Catena*. doi:10.1016/j.catena.2014.08.006

León, J., Echeverría, M.T., Martí, C., Badía, D., Can ash control infiltration rate after burning? An example in burned calcareous and gypseous soils in the Ebro Basin (NE Spain). *Catena*. doi:10.1016/j.catena.2014.05.024

Lombao, A., Barreiro, A., Carballas, T., Fontúrbel, M.T., Martín, C., Vega, J.A., Fernández, C., Díaz-Raviña, M., 2014. Changes in soil properties after a wildfire in Fragas do Eume Natural Park (Galicia, NW Spain). *Catena*. doi:10.1016/j.catena.2014.08.007

Pereira, P., Jordan, A., Cerda, A., Martín, D. (2014) Editorial: The role of ash in fire-affected ecosystems, *Catena* (In press) doi:10.1016/j.catena.2014.11.016

Pereira, P., Úbeda, X., Martín, D., Mataix-Solera, J., Cerdà, A., Burguet, M. (2014a) Wildfire effects on extractable elements in ash from a *Pinus pinaster* forest in Portugal, *Hydrological Processes*, 28, 3681–3690.

Pereira, P., Ubeda, X., Mataix-Solera, J., Oliva, M., Novara, A. (2014) Short-term spatio-temporal spring grassland fire effects on soil colour, organic matter and water repellency in Lithuania, *Solid Earth*, 5, 209-225.

Silva, V., Pereira, J.S., Campos, I., Keizer, J.J., Gonçalves, F., Abrantes, N., Toxicity assessment of aqueous extracts of ash from forest fires. *Catena* doi:10.1016/j.catena.2014.06.021