Fire in the Earth System Abstracts
Vol. 1 FES-Fire and soil organic matter-121
Valencia, Spain, 3-7 November, 2021
© Author(s) 2021. CC Attribution 3.0 License

Soil water infiltration in the Pinet forest fire. The ephemeral impact of ash.

[1]Cerdà, A., [2]Úbeda, X., [3]Terol, E., [4]Franch-Pardo, Ivan, [5]Giménez-Morera, A. and [6]Rodrigo-Comino, J.

[1]*Soil Erosion and Degradation Research Group. Department of Geography, Valencia University, Blasco Ibàñez, 28, 46010 Valencia, Spain;*
[2]*GRAM (Mediterranean Environmental Research Group), Dept of Physical Geography and Regional Geographic Analysis, University of Barcelona, Montalegre, 6. 08001 Barcelona, Spain*
[3]*Department of Cartographic Engineering, Geodesy, and Photogrammetry, Universitat Politècnica de València, Camino de Vera, s/n, 46022 Valencia, Spain*
[4]*GIS Laboratory, Escuela Nacional de Estudios Superiores Morelia, Universidad Nacional Autónoma de México, Antigua carretera Pátzcuaro 8701, 58190 Morelia, Michoacán, México*
[5]*Departamento de Economía y Ciencias Sociales, Universitat Politècnica de València, Cami de Vera S/N, S46022, Valencia, Spain*
[6]*Departamento de Análisis Geográfico Regional y Geografía Física, Facultad de Filosofía y Letras, Campus Universitario de Cartuja, University of Granada, 18071 Granada, Spain,*

Abstract

Wildfires are recurrent in Mediterranean-Type Ecosystems. Post-fire infiltration behaviour is a key factor that determines the fate of the ecosystem. Infiltration determines the soil recovery after fire, and the water available for plant development. The Pinet forest fire study site was selected to determine the impact of the surface ash layer on soil infiltration immediately after fire by means of mini-disk infiltrometer tests. Sampling and measurements were carried out in September 2018 after the forest fire in August 2018. Twenty plots were selected in a slope transect (12 % slope angle) every 10 meters. In each plot, measurement was carried out on the ash bed, and then, in the vicinity, the ash was removed until the mineral soil was exposed and the measurement was also carried out. Then 20 paired plots were established along the slope 40 mini-disk infiltrometer measurements were carried out. The results show higher infiltration rates on the ash-covered soils. Moreover, the infiltration envelopes show an increase in the infiltration rates in the plots without ash.

Keywords: Soil, Water, Infiltration, mini-disk infiltrometer, Mediterranean

References

Balfour, V. N., Doerr, S. H., & Robichaud, P. R. (2014). The temporal evolution of wildfire ash and

implications for post-fire infiltration. International Journal of Wildland Fire, 23(5), 733-745.Moody, John A., and Brian A. Ebel. Infiltration and runoff generation processes in fire-affected soils. Hydrological Processes 28.9 (2014): 3432-3453.
Cerdà, A., Borja, M. E. L., Úbeda, X., Martínez-Murillo, J. F., Keesstra, S. (2017). Pinus halepensis M. versus Quercus ilex subsp. Rotundifolia L. runoff and soil erosion at pedon scale under natural rainfall in Eastern Spain three decades after a forest fire. Forest ecology and management, 400, 447-456.
Moody, J. A., & Ebel, B. A. (2014). Infiltration and runoff generation processes in fire-affected soils. Hydrological Processes, 28(9), 3432-3453.
López-Vicente, M., Kramer, H., & Keesstra, S. (2020). Effectiveness of soil erosion barriers to reduce sediment connectivity at small basin scale in a fire-affected forest. Journal of Environmental Management, 278, 111510.
Úbeda, X.; Alcañiz, M.; Borges, G.; Outeiro, L.; Francos, M. (2019). Soil quality of abandoned agricultural terraces managed with prescribed fires and livestock in the municipality of Capafonts, Catalonia, Spain (2000-2017). Agronomy, 9(6), p. 340 .
Robichaud, P. R. (2000). Fire effects on infiltration rates after prescribed fire in Northern Rocky Mountain forests, USA. Journal of Hydrology, 231, 220-229.

Acknowledgments: Artemi Cerdà thanks the Co-operative Research programme from the OECD (Biological Resource Management for Sustainable Agricultural Systems) for its support with the 2016 CRP fellowship (OCDE TAD/CRP JA00088807), POSTFIRE Project (CGL2013-47862-C2-1 and 2-R) and POSTFIRE_CARE Project (CGL2016-75178-C2-2-R) sponsored by the Spanish Ministry of Economy and Competitiveness and AEI/FEDER, UE

DRAFT