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Changes in hydrological properties of mulched soils after a wild [U+FB01]re in Mediterranean forest ecosystems

Bruno Gianmarco Carrà (1), Yang Yu (2), Manuel Esteban Lucas-Borja (3), and Demetrio Antonio Zema (1)

(1) Department "Agraria", University "Mediterranea" of Reggio Calabria, Località Feo di Vito, I-89122 Reggio Calabria, Italy., (2) China Institute of Water Resources and Hydropower Research, Department of Sediment Research., Peking, China (theodoreyy@gmail.com), (3) Departamento de Ciencia y Tecnología Agroforestal y Genética, Universidad de Castilla La Mancha, Campus Universitario s/n, E-02071, Albacete, Spain

Wildfires are one of the most important threats for forest health, since they change the hydrological response of soil by increasing runoff and soil erosion and, hence, for land degradation. By reducing or eliminating the vegetation and litter cover, wildfires make the soil more susceptible to raindrop impact and drag forces of overland flow, promoting sediment detachment and transport. In addition, other heating-induced changes in soil properties, such as the aggregate stability as well as water infiltration and repellency (SWR), can also contribute to increase surface runoff and soil erosion in burned forest areas. Enhanced erosion can lead to the ash, finer sediment and contaminant transport towards water bodies (sea, lakes and reservoirs) with negative impacts on aquatic ecosystems and human water uses.
Among the post-[U+FB01]re stabilization and rehabilitation treatments used to mitigate the short-term effects of wildfires on soil degradation, straw mulching has been widely tested in Mediterranean areas in the recent years, but further investigations are needed to improve the comprehension of the related hydrological effects. To address this issue, the unsaturated hydraulic conductivity, water content and temperature of mulched (by straw application) and non-mulched (considered as control) soil plots were monitored throughout eight months on a sandy loam soil after wild[U+FB01]re.
Compared to untreated soils, straw maintained higher temperature and water content in mulched plots, but reduced their unsaturated hydraulic conductivity, particularly in the drier season. These results suggest that straw release on soil may lead to a decrease of water in[U+FB01]ltration capacity of soils subjected to wild[U+FB01]re, with particular evidence in summer in the case of heavy storm occurrence.
On the whole, this study supports land managers towards the identi[U+FB01]cation of the most suitable soil conservation practices to mitigate undesirable post-[U+FB01]re responses in Mediterranean forest ecosystems.