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Temporal evolution of water repellency and preferential flow in the post-fire

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Forest fires usually intensify erosive process due to the reduction of vegetation cover and degradation of aggregation in the topsoil. Another common effect of wildifres is the development of soil water repellency, which in turn favors the formation of runoff, inhibiting or delaying infiltration. Under these conditions, infiltration occurs only when ponded water or runoff flow finds macropores and cracks in the soil surface, producing preferential flow pathways. When water infiltrates through these paths, a significant portion of the soil remains dry, limiting the supply of nutrients to the roots, favoring the rapid leaching of nutrients and agrochemicals, and other impacts on flora and hydrological processes at hillslope- or basin-scale. The existence of irregular wetting fronts has been observed frequently in burned or unburned water repellent soils. Although some authors have suggested that preferential flow paths may be more or less permanent in the case of unburned soils, the temporal evolution of preferential flow has been rarely studied in burned soils during the post-fire, after water repellency decreases or disappears. This research focuses on the temporal evolution of water repellency and preferential flows in an area affected by fire.