



Rainfall modified soil water repellence and its variability after low intensity fire in southeast Australian eucalypt woodland

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Soil water repellence was measured before, and after, a low intensity fire in eucalypt woodland on sandstone terrain at North Ryde, Sydney in southeastern Australia. Water drop penetration times were recorded *in situ* to depths of 12cm before the experimental fire, immediately after fire, four weeks later when rainfall had modified the soil surface but the soil was dry, and five weeks after the fire when the soil was moist. Spatial variation in water repellence was high in all cases except immediately after the fire, when soil was almost uniformly repellent to 3cm depth, and less uniformly repellent at 4-6cm depth. Heavy rain moved litter, ash and mineral soil, modifying the soil surface into litter dams, microterraces and other areas with differing amounts of litter, bare soil and gravel. Post-rain water drop penetration measurements were taken on and beneath these different surface conditions, in order to investigate the possible contribution of water repellence to the formation and maintenance of litter dams and microterraces characteristic of this terrain after fire. Water repellence did not appear to be correlated with the presence or absence of surface litter. Results suggest the long term and spatially variable water repellence found in Australian soils and soils associated with eucalypts is maintained by different factors from those causing extreme and uniform water repellence after fire. A possible scenario involves the breakdown of water repellent compounds and the development of hydrophobic biotic structures including fungal hyphae and proteoid roots. Assessment of potential soil erosion in Australian catchments after fire needs to take the temporal and spatial variation of water repellence into account as well as fire severity.