



Physical characteristics, chemical composition and water contamination potential from Canadian wildfire ash

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Wildland fires leave a powdery residue on the ground: wildfire ash, which consists of mineral materials and charred organic components. Its quantities and characteristics depend mainly on the total amount and type of fuel burnt and the fire characteristics. Up to several tens of tons of ash per hectare have been quantified in different post-fire environments.

As a new material present after a wildland fire, ash can have profound effects on ecosystems. It affects biogeochemical cycles, including the carbon cycle, stimulates microbial activity and helps the recovery of vegetation. Ash incorporated into the soil increases soil pH and nutrient pools temporarily and changes soil physical properties such as albedo, soil texture and hydraulic properties. Ash also modifies soil and landscape-scale hydrological behaviour. Its high porosity makes it very effective at absorbing rainfall, but it can also contribute to catastrophic debris flows when ash is mobilised by large storm events.

Its 'fragile' nature makes ash very susceptible to wind and water erosion, facilitating its transfer to the hydrological system. Runoff containing ash from burnt areas carries soluble nutrients and pollutants, which can have detrimental impacts on aquatic ecosystems and the supply of potable water.

In this presentation we will report for the first time on the physical characteristics, chemical composition and associated water pollution risk from ash produced in four typical Canadian boreal forest fires: two high-intensity fires in jack pine stands, and one high-intensity and one smouldering fire in black spruce stands.