



Severity, mass loss and emissions from wildland smouldering fires

G. Rein (1)

(1) BRE Centre for Fire Safety Engineering, University of Edinburgh [G.Rein@ed.ac.uk]

Smouldering fires are an important factor in wildfires. These biomass fires propagate slowly through the surface and subsurface organic layers of the forest ground. They are responsible for 50% or more of the total biomass consumed during wildfires and contribute with a significant amount to global carbon emissions. These fires alter the eco-system and have physical, chemical and biological effects on the soil. The changes to the soil are mainly caused by two factors: the high temperatures reached and the large loss of soil mass. These effects are not well documented in the literature. This paper studies and quantifies the mass loss, thermal effects and the emission of peat fires using small-scale experiments. Observed mass losses are up to 90% resulting in the destruction of the soil layers and great loss of carbon to the atmosphere. The measured thermal severity in terms of the temperature/time regimes lead to soil sterilization. Smouldering peat was measured to release an average mass flow rate equivalent to approximately 3,000 times the natural flux from peatlands.