



## The ash in forest fire affected soils control the soil losses. Part 2. Current and future research challenges

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Ash distribution on soil surface and impacts on soil properties received a great attention in recently (Pereira et al., 2010; Pereira et al., 2013). Ash is a highly mobile material that can be easily transported wind, especially in severe wildland fires, where organic matter is reduced to dust, due the high temperatures of combustion. In the immediate period after the fire, ash cover rules soil erosion as previous researchers observed (Cerdà, 1998a; 1998b) and have strong influence on soil hydrological properties, such as water retention (Stoof et al. 2011) and wettability (Bodi et al., 2011). Ash is also a valuable source of nutrients important for plant recuperation (Pereira et al., 2011; Pereira et al., 2012), but can act also as a source contamination, since are also rich in heavy metals (Pereira and Ubeda, 2010). Ash has different physical and chemical properties according the temperature of combustion, burned specie and time of exposition (Pereira et al., 2010). Thus this different properties will have different implications on soil properties including erosion that can increase due soil sealing (Onda et al. 2008) or decrease as consequence of raindrop impact reduction (Cerdà and Doerr, 2008). The current knowledge shows that ash has different impacts on soil properties and this depends not only from the type of ash produced, but of the soil properties (Woods and Balfour, 2010).

After fire wind and water strong redistribute ash on soil surface, increasing the vulnerability of soil erosion in some areas, and reducing in others. Understand this mobility is fundamental have a better comprehension about the spatial and temporal effects of ash in soil erosion. Have a better knowledge about this mobility is a priority to future research. Other important aspects to have to be assessed in the future are how ash particulates percolate on soil and how ash chemical composition is important to induce soil aggregation and dispersion. How soil micro topography have implications on ash spatial distribution and if soil micro topography changes with time? What the factors that controls it? What is the impact of ash in vegetation recuperation and the implications of this recover in ash spatial distribution? We need studies with better spatial and temporal resolution, especially in the immediate period after the fire, when the major spatial and temporal changes on ash distribution and impacts occur. Based on high level research conducted by Artemi Cerdà and others, our future research will be focused in these and other aspects in order to have a better knowledge about the impacts of ash on post-fire spatio-temporal erosion.

### Acknowledgements,

Lithuanian Research Council. Project LITFIRE, Fire effects on Lithuanian soils and ecosystems (MIP-48/2011) and the research projects GL2008-02879/BTE and LEDDRA 243857.

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