



Temporal variation in topsoil water repellency in recently burnt eucalypt and pine stands in north-central of Portugal

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Soil water repellency is widely considered to be one of the main factors responsible for enhanced runoff generation and associated soil losses in recently burnt areas. Nonetheless, there continue to be few studies that have intensively monitored the post-fire temporal patterns of soil water repellency under field conditions.

The present study is part of the EROSFIRE-II project, which aims at predicting runoff and erosion rates in recently burnt Portuguese forest stands. To this end, runoff and erosion was measured at 1-2 weekly intervals at the micro-plot, slope and small catchment scale in a forest area that burnt during the summer of 2008. To help explain the observed runoff response, topsoil water repellency was monitored at mostly monthly intervals from November 2008 onwards. Repellency at 0-5 cm soil depth was measured using the 'Molarity of an Ethanol Droplet' (MED) test. Soil moisture content was measured simultaneously at the same depth. This was done to explore if its expected relationship with repellency would allow more insight in the observed changes in water repellency, namely through the use of automated moisture recordings being done in the study area.

The study area is located in the Góis municipality in central Portugal. At the time of the wildfire, the area's 70 ha were dominated by Maritime Pine and eucalypt plantations. In November 2008, one burnt pine stand and one burnt eucalypt stand were selected as well as two comparable, adjacent unburnt stands. The two unburnt stands were only studied during one year, whereas the two burnt stands continue to be monitored. Additional data on topsoil water repellency and moisture content were collected at a burnt Maritime Pine stand that had been logged and was selected for a study on the effectiveness of hydro-mulching for erosion control between April 2009 and August 2010. Also, since March 2010 two further burnt stands are being monitored, i.e. one Maritime Pine and one eucalypt plantation.

The presentation will address amongst others if the principal findings regarding the first year following fire - presented at an earlier EGU – also apply to the second post-fire year. They indicated that the wildfire's main effect was to reduce the temporal variation in topsoil water repellency at the burnt sites compared to the adjacent unburnt sites.