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Post-fire metal exports in a recently burnt eucalypt plantation in North-Central Portugal

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Ash and sediments transported by post-fire runoff are a source of hazardous substances, like metals, posing a risk of contamination to the downstream aquatic ecosystems. In the present study, metal mobilization was evaluated using 16 m^2 bounded runoff-erosion plots at a eucalypt plantation in Albergaria-a-Velha (Aveiro district, North-Central Portugal) that burnt with moderate severity in September 2019. In total, 9 plots were installed: 3 were treated with eucalypt chopped-bark mulch, another 3 were treated with an innovative barrier-based technique developed within the scope of the LIFE REFOREST project (LIFE17 ENV/ES/000248) consisting of geotubes containing a mycotechnosol and, 3 others were left untreated. Eroded sediments and overland flow were collected during the first post-fire hydrological year. Sediment and overland flow samples were analysed for vanadium (V), chromium (Cr), manganese (Mn), iron (Fe), cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), cadmium (Cd) and lead (Pb), which are of concern for both environmental and human health. Given the most recent climate change scenarios, which foresee an increase in fire severity and frequency for the Mediterranean region, this work provides key information for resource managers to define adaptative strategies to effectively safeguard surface water resources.