Geophysical Research Abstracts
Vol. 20, EGU2018-15524, 2018
EGU General Assembly 2018

Plant trait effects on charcoal and ash production and characteristics

Cathelijne Stoof (1) and Claire Belcher (2)

(1) Wageningen University, Soil Geography and Landscape Group, Wageningen, Netherlands (cathelijne.stoof@wur.nl), (2) WildFIRE Lab, Hatherly Laboratories, University of Exeter, Exeter, Devon, EX4 4PS, UK

There is considerable variation in the characteristics of ash and thus its impacts on (soil) hydrology, carbon sequestration and biogeochemistry. However, the factors controlling ash characteristics have only been studied by heating crushed plant material in ovens, whereas in reality, plants shape the fire environment. By doing so, plants cannot only be expected to also affect aboveground fire intensity but also the proportion and characteristics of the ash that is produced. To assess the mechanisms controlling ash characteristics in a realistic setting, we burned fuel beds in controlled laboratory experiments using an iCone calorimeter at the University of Exeter wildFIRE Lab. Standing fine fuels (< 6 mm diameter) were sampled from two watersheds in Portugal, where vegetation consisted of fire prone shrubland with vegetation being dominated by heaths and heathers (Ericaceae) such as Erica umbellata, Erica cinerea and Calluna vulgaris, and several legumes (Leguminosae) such as gorse (Ulex sp.), 'carqueja' (Pterospartum tridentatum) and broom (Genista triacanthus). Before the experiments, the plant material was manually separated for live and dead components. Because fine dead fuels considerably increase fire intensity, we wanted to test the resulting effects on ash characteristics. Samples were ignited using a controlled radiant heat flux and heat release was monitored during the bench-scale burns. Production of charcoal and ash was analyzed using image analysis, and ash characteristics assessed through particle size analysis and Inductively Coupled Plasma Mass-Spectrometry. Insight into the relationships between heat release, charcoal and ash production, ash characteristics and plant traits can increase understanding of sources of spatial variability in burned systems, which is relevant for understanding of post-fire hydrology and biogeochemistry.