Geophysical Research Abstracts
Vol. 19, EGU2017-17957-1, 2017
EGU General Assembly 2017

Soil heating during wildfires and prescribed burns: a global evaluation based on existing and new data

Stefan Doerr (1), Cristina Santin (1), James Reardon (2), Jorge Mataix-Solera (3), Cathelijne Stoof (4), Rob Bryant (1), Jessica Miesel (5), and David Badia (6)

(1) Swansea University, Swansea, UK, (2) US Forest Service, Missoula, USA, (3) Elche University, Elche, Spain, (4) Wageningen University, the Netherlands, (5) Michigan State University, Michigan, USA, (6) University of Zaragoza, Spain

Heat transfer from the combustion of ground fuels and soil organic matter during vegetation fires can cause substantial changes to the physical, chemical and biological characteristics of soils. Numerous studies have investigated the effects of wildfires and prescribed burns on soil properties based either on field samples or using laboratory experiments. Critical thresholds for changes in soil properties, however, have been determined largely based on laboratory heating experimentation. These experimental approaches have been criticized for being inadequate for reflecting the actual heating patterns soil experienced in vegetation fires, which remain poorly understood.

To address this research gap, this study reviews existing and evaluates new field data on key soil heating parameters determined during wildfires and prescribed burns from a wide range of environments.
The results highlight the high spatial and temporal variability in soil heating patters not only between, but also within fires. Most wildfires and prescribed burns are associated with heat pulses that are much shorter than those typically applied in laboratory studies, which can lead to erroneous conclusions when results from laboratory studies are used to predict fire impacts on soils in the field.