

Carbon sequestration potential and physicochemical properties differ between wildfire charcoals and slow-pyrolysis biochars

Cristina Santín^{1*}, Stefan H. Doerr¹, Agustin Merino², Thomas D. Bucheli³, Rob Bryant¹, Philippa Ascough⁴, Xiaodong Gao⁵, Caroline A. Masiello⁵

¹College of Science, Swansea University, Singleton Park, Swansea SA2 8PP, UK

²Department of Soil Science and Agricultural Chemistry, University of Santiago de Compostela, 27002 Lugo, Spain

³Agroscope, Environmental Analytics, Reckenholzstrasse 191, 8046 Zürich, Switzerland

⁴NERC-RCF, Scottish Universities Environmental Research Centre, Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, G75 0QF, Scotland, UK

⁵Department of Earth, Environment, and Planetary Sciences, Rice University, 6100 Main St MS 126, Houston, Texas 77005, US

Figure S1. Diagram showing the different feedstocks (forest floor and down wood), formation processes (wildfire and slow pyrolysis) and PyC materials used in this study (wildfire charcoals and slow-pyrolysis biochars).

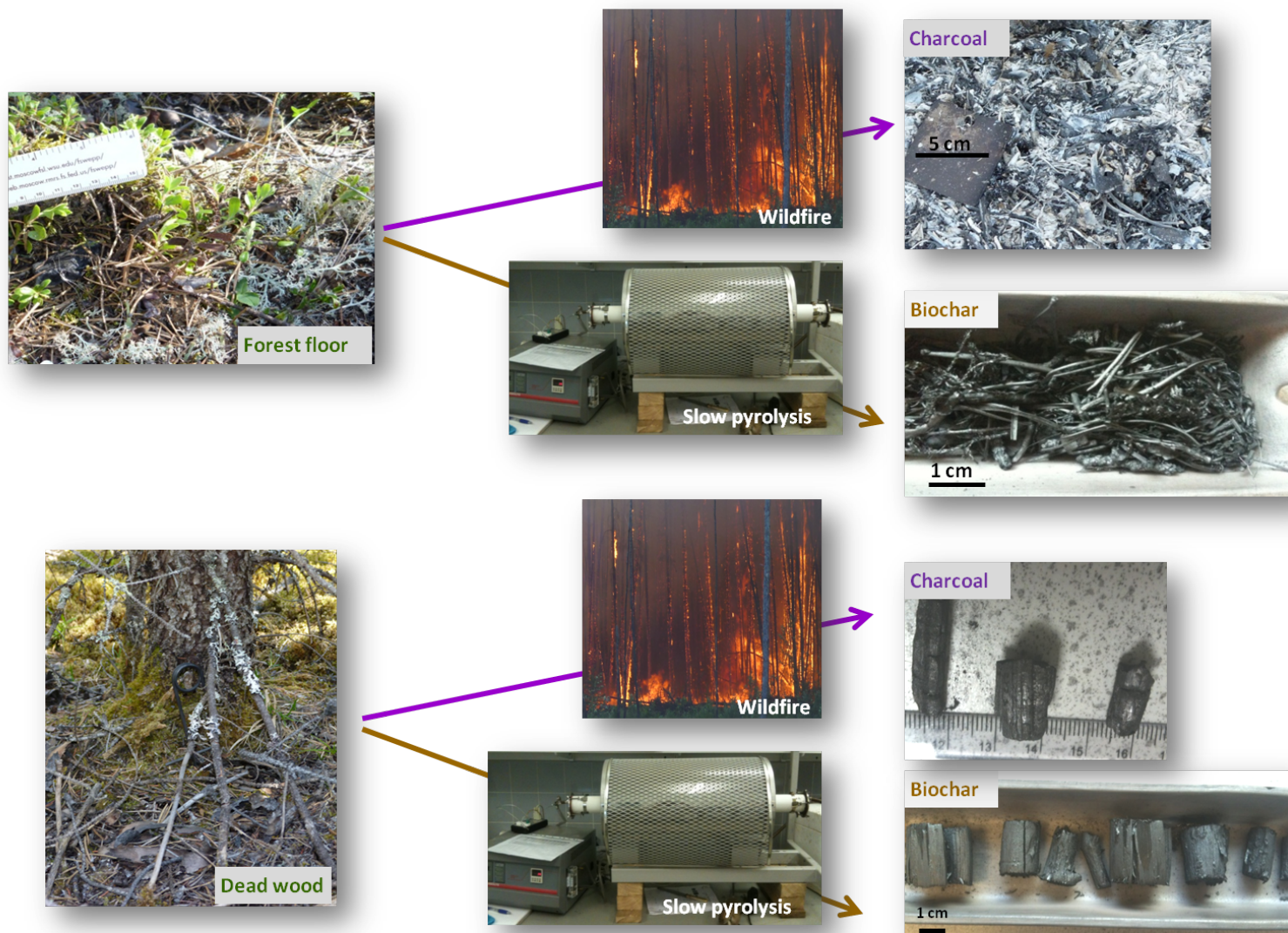


Table S1. Relative concentrations (in %) of the 16 polycyclic aromatic hydrocarbons (PAHs), listed as priority pollutants by the US Environmental Protection Agency (EPA), present in the forest floor (FF) and dead wood (DW) wildfire charcoals and slow-pyrolysis biochars.

	FF charcoal #2	FF charcoal #13	FF charcoal #20	FF biochar #1	FF biochar #2	FF biochar #3	DW charcoal	DW biochar #1	DW biochar #2	DW biochar #3
Naphthalene (%)	59.5	78.4	74.1	70.5	75.8	90.8	59.1	37.8	44.4	71.8
Acenaphthylene (%)	2.6	2.8	2.8	0.2	0.2	0.0	1.6	0.8	0.0	0.0
Acenaphthene (%)	2.5	0.9	1.9	1.3	0.3	0.3	1.2	1.0	11.9	6.0
Fluorene (%)	17.9	1.7	4.8	4.1	2.8	0.9	1.1	5.0	1.0	1.6
Phenanthrene (%)	11.0	10.3	10.6	15.0	9.7	3.9	21.2	16.1	22.0	6.4
Anthracene (%)	0.0	1.0	0.0	1.8	1.7	2.0	1.9	1.8	3.2	11.1
Fluoranthene (%)	1.4	1.5	1.8	1.8	1.2	0.6	2.1	3.9	2.3	1.0
Pyrene (%)	1.5	1.4	1.8	2.0	2.2	0.7	2.9	8.2	2.6	1.0
Benzo[a]anthracene (%)	1.2	0.4	0.5	0.5	1.1	0.2	2.0	2.0	2.9	0.4
Chrysene (%)	1.0	0.8	0.8	0.9	1.2	0.2	2.6	5.9	3.6	0.7
Benzo[b]fluoranthene (%)	0.3	0.2	0.3	0.2	0.4	0.1	0.7	1.9	0.9	0.0
Benzo[k]fluoranthene (%)	0.2	0.1	0.2	0.3	0.2	0.1	0.7	6.6	0.5	0.0
Benzo[a]pyrene (%)	0.6	0.3	0.3	0.6	1.3	0.0	1.6	3.5	2.0	0.0
Indeno[1,2,3-cd]pyrene (%)	0.1	0.1	0.2	0.3	0.6	0.0	0.6	1.9	0.8	0.0
Dibenzo[a,h]anthracene (%)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.0	0.2	0.0
Benzo[ghi]perylene (%)	0.2	0.2	0.2	0.5	1.1	0.2	0.8	2.7	1.6	0.0

#: sample number.