Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Supplementary Information

Wildfires and Water Chemistry: Effect of Metals Associated with Wood Ash

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Table S1. Detection limits for analyses using: **a)** inductively coupled plasma optical emission spectrometry (ICP-OES); and b) inductively coupled plasma mass spectrometry (ICP-MS);

a) ICP-OES

Element	IDL[a] (mg L^{-1})	MDL[b] (mg L^{-1})
Al	0.0280	0.280
Ca	0.0100	0.100
Cu	0.0054	0.054
Fe	0.0062	0.062
Mg	0.0030	0.030
Mn	0.0014	0.014
Ni	0.0150	0.150
Pb	0.0420	0.420
V	0.0064	0.064
Zn	0.0018	0.018

b) ICP-MS

Element	IDL[a] (µg L^{-1})	MDL[b] (µg L^{-1})
Cu	0.004	0.009
Ni	0.006	0.02
Pb	0.0003	0.0004
V	0.006	0.01
Zn	0.04	0.1

[a]IDL = Instrument Detection Limit
[b]MDL = Method Detection Limit

Table S2. Total anion content (mg kg^{-1}) of wood ash from pine, aspen, spruce fir, juniper, and oak wood measured for water extractions.

	Elemental Content (mg kg^{-1})						
	F^-	Cl^-	NO_2^-	Br^-	NO_3^-	PO_4^{3-}	SO_4^{2-}
Pine	<DL	945±8.04	44.2±0.366	28.8±1.38	625±7.10	118±40.2	23478±211
Aspen	5.93±1.24	91.4±2.16	26.6±0.912	13.5±9.52	229±6.53	52.2±3.12	9861±275
Spruce	6.56±3.70	378±2.83	27.9±0.439	28.6±0.776	165±4.24	28.4±1.81	13331±79.4
Fir	<DL	123±6.07	29.7±0.630	22.7±0.271	1331±80.7	31.4±1.57	15338±815
Juniper	4.49±0.581	1529±19.8	32.6±5.32	37.8±7.40	525±4.08	489±39.1	15215±213
Oak	<DL	230±2.64	32.3±0.606	<DL	1291±8.04	280±4.56	18249±196

Table S3. Quantitative analyses performed by whole pattern fitting using Jade® software. Silicon standard SRM 640B was used as an internal intensity standard.

Phase	Formula	Card #	Aspen	Ponderosa	Spruce
Silicon std	Si	04-001-7247	20.9	18.7	24.6
Quartz	SiO_2	98-00-8023	0.1 (0.0)	1.8 (0.1)	5.8 (0.2)
Cristobalite	SiO_2	04-005-4875	--	0.1(0)	0.3 (0.0)
Calcite	$CaCO_3$	98-000-0141	55.4 (0.8)	12.4 (0.1)	21.5(0.4)
Dolomite	$(Ca,Mg)CO_3$	04-011-9829	0.6 (0.1)	0.3 (0.1)	<0.1
Fairchildite	$K_2Ca(CO_3)_2$	04-009-1816	2.6 (0.3)	0.9 (0.1)	1.0 (0.3)
Zabuyelite	$Li_2(CO_3)$	04-013-9887	--	1.2 (0.2)	1.0 (0.2)
Apatite	$Ca_5(SiO_4)$	04-012-1573	4.0 (0.1)	1.5(0.1)	--
Witherite	$BaCO_3$	04-015-3215	--	0.1 (0.0)	0.2 (0.0)
Kutnohorite	$Ca_{1.11}Mn_{0.89}(CO_3)_2$	01-084-1291	1.8 (0.1)	0.7 (0.1)	0.1 (0.0)
Albite	$NaSi_3O_8$	04-007-5008	--	--	4.6 (0.2
Microcline	$K_{0.85}Na_{0.15}AlSi_3O_8$	04-013-6049	--	0.4 (0.1)	--
Magnetite	Fe_3O_4	04-009-8425	0.3 (0.0)	--	--
Amorphouis	(SiO_2)		14.2 (0.8	61.9 (0.4)	41.0 (0.6)

Table S4. Dissolved organic carbon (mg L^{-1}) measured for laboratory batch experiments.

	Solvent	1 Hour	24 Hour	72 Hour
Aspen	18 MΩ H_2O	0.655 ± 0.130	< MDL	0.640 ± 0.070
	10 mM $NaHCO_3$	0.603 ± 0.009	0.475 ± 0.116	0.566 ± 0.044
Pine	18 MΩ H_2O	<MDL	0.580 ± 0.158	0.387 ± 0.127
	10 mM $NaHCO_3$	0.564 ± 0.120	<MDL	0.357 ± 0.058
Spruce	18 MΩ H_2O	0.419 ± 0.075	0.368 ± 0.051	0.518 ± 0.085
	10 mM $NaHCO_3$	0.480 ± 0.044	<MDL	<MDL

All values are given in mg Carbon L^{-1}. Samples below the method detection limit of 0.308 mg L^{-1} are listed as <MDL. All samples are below the method quantification limit of 1.026 mg L^{-1}.

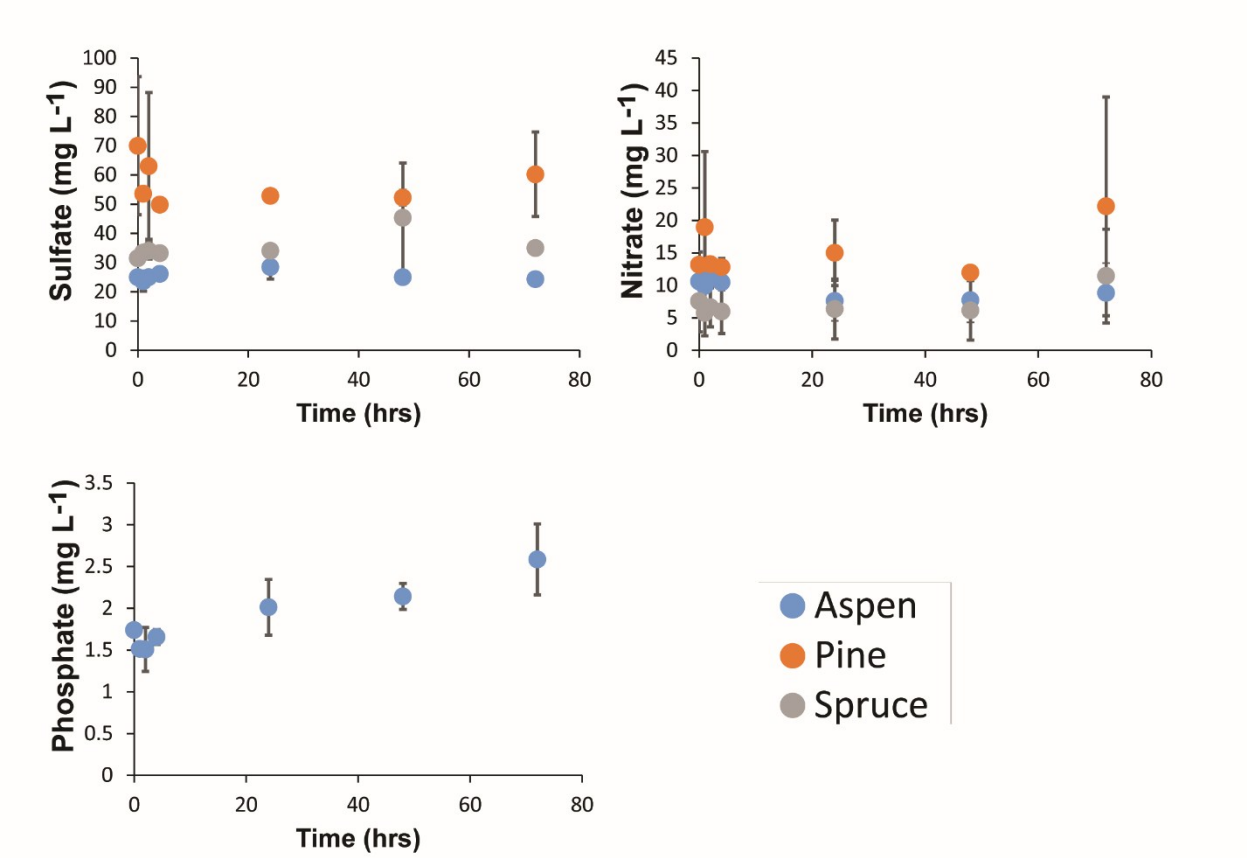

Figure S1. Aqueous concentrations of anions (in mg L^{-1}) over time measured for laboratory experiments reacting ash with 18 MΩ water (n=3).

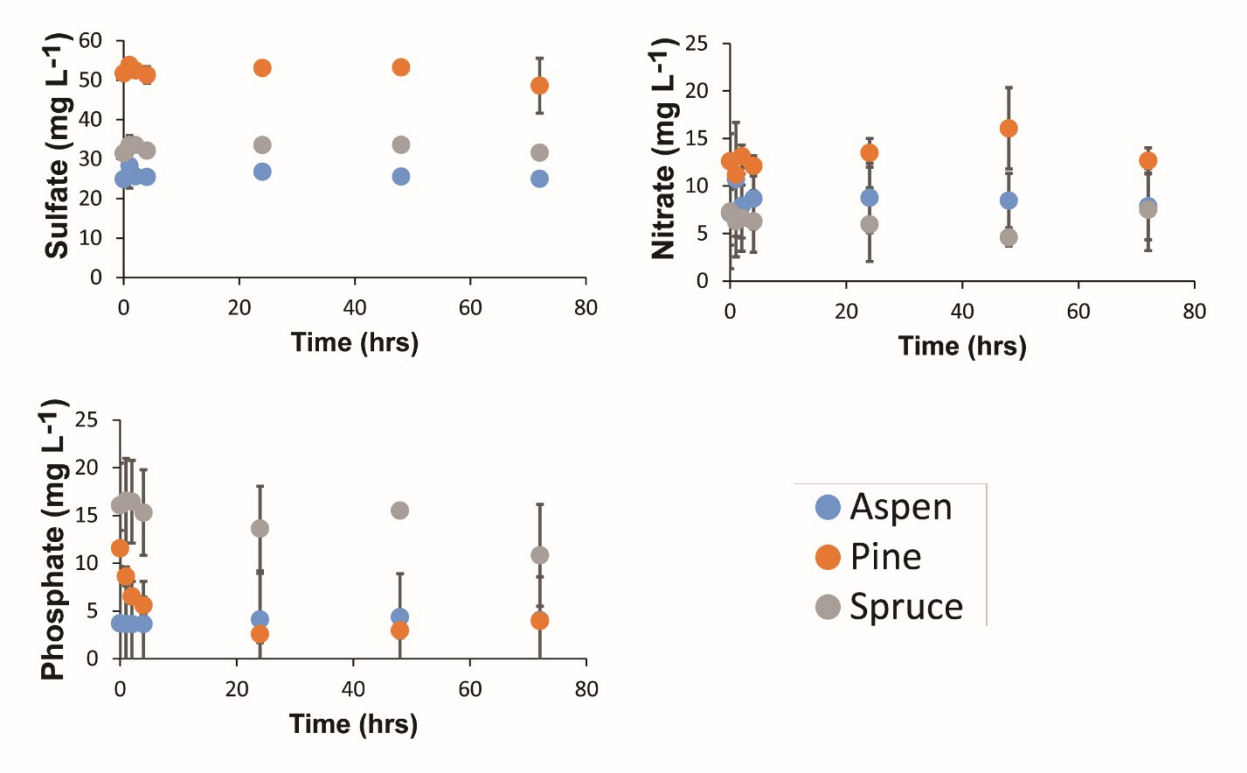

Figure S2. Aqueous concentrations of anions (in mg L^{-1}) over time measured for laboratory experiments reacting ash with 10 mM HCO_3^- (n=3).