**Table S.1.** Emission factors normalized to the amount of burnt wood and chimney temperature per experiment.

| Experiment | POA ($\mu g/m^3$) | POA (g/kg wood) | SOA (g/kg wood) | BC[a] ($\mu g/m^3$) | BC (g/kg wood) | $NO_x$ (ppb) | $T$[b] (°C) |
|---|---|---|---|---|---|---|---|
| **Old log wood burner** | | | | | | | |
| 1 flaming + smoldering | 3.8 | 0.054 | 0.034 | 17.5 | 0.25 | 43 | n/a |
| 2 flaming | 4.4 | 0.066 | 0.18 | 29 | 0.43 | 49 | n/a |
| 3 flaming | 28 | 0.45 | 1.8 | 130 | 2.1 | 85 | 355 |
| 4 starting | 27 | 0.46 | 2.7 | 90 | 1.5 | 54 | 115 |
| 5 starting | 6.5 | 0.27 | 1.3 | 36 | 1.5 | 30 | 206 |
| 6 smoldering | 17 | 1.4 | n/a | n/a | n/a | 8 | 207 |
| 7 flaming | 7.6 | 0.22 | 0.61 | n/a | n/a | 29 | 185 |
| **Pellet burner** | | | | | | | |
| 8 stable burning | 4.2 | 0.027 | - | 2.1 | 0.014 | 110 | 209 |
| 9 starting | 3.6 | 0.23 | 0.41 | 1.8 | 0.11 | 9 | 26 |
| 10 starting | 3.5 | 0.27 | 0.73 | 1.0 | 0.077 | 7 | 5 |
| **Modern log wood burner** | | | | | | | |
| 11 flaming | 1.4 | 0.019 | 0.048 | 13.6 | 0.18 | 67 | 238 |
| 12 flaming | 4.9 | 0.040 | 0.18 | 35 | 0.29 | 97 | 228 |
| 13 flaming | 6.1 | 0.058 | 0.095 | 40 | 0.38 | 75 | 261 |
| 14 gas-phase only[c] | - | - | 0.98 | - | - | 58 | 143 |
| 15 starting | 31 | 0.86 | 2.7 | 19.1 | 0.53 | 18 | 38 |
| 16 starting | 3.9 | 0.59 | 1.4 | 3.5 | 0.53 | 4 | 40 |
| 17 starting | 20 | 0.56 | 0.72 | 23 | 0.64 | 10 | 45 |
| 18 gas-phase only[c] | - | - | 0.14 | - | - | 27 | 155 |
| 19 gas-phase only[c] | - | - | 0.21 | - | - | 44 | 48 |
| 20 flaming | 2.0 | 0.027 | 0.028 | 27 | 0.36 | 46 | 234 |

[a] Concentration at lights on.

[b] Temperature at the beginning of the injection.

[c] Gas-phase only experiments were performed on a mixture of starting and flaming phase emissions.