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*Supplement of*

# Characterization of trace metals with the SP-AMS: detection and quantification

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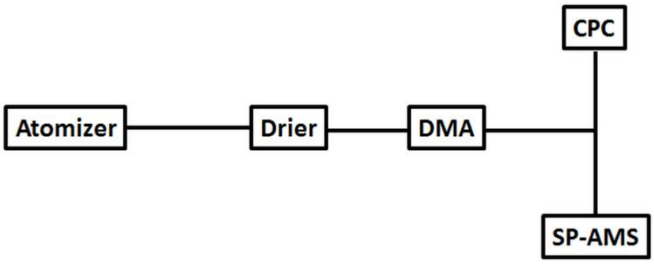


Figure S1 – Instrument setup to measure trace elements in the laboratory.

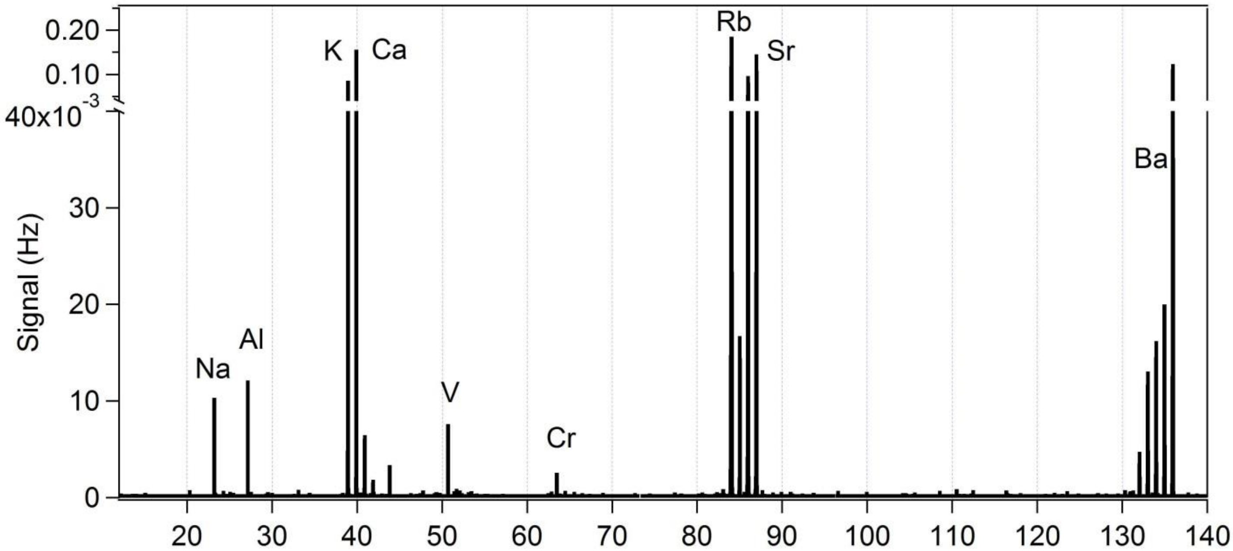


Figure S2 – Mass spectrum obtained with Tungsten and filament switched off and laser vaporizer on.

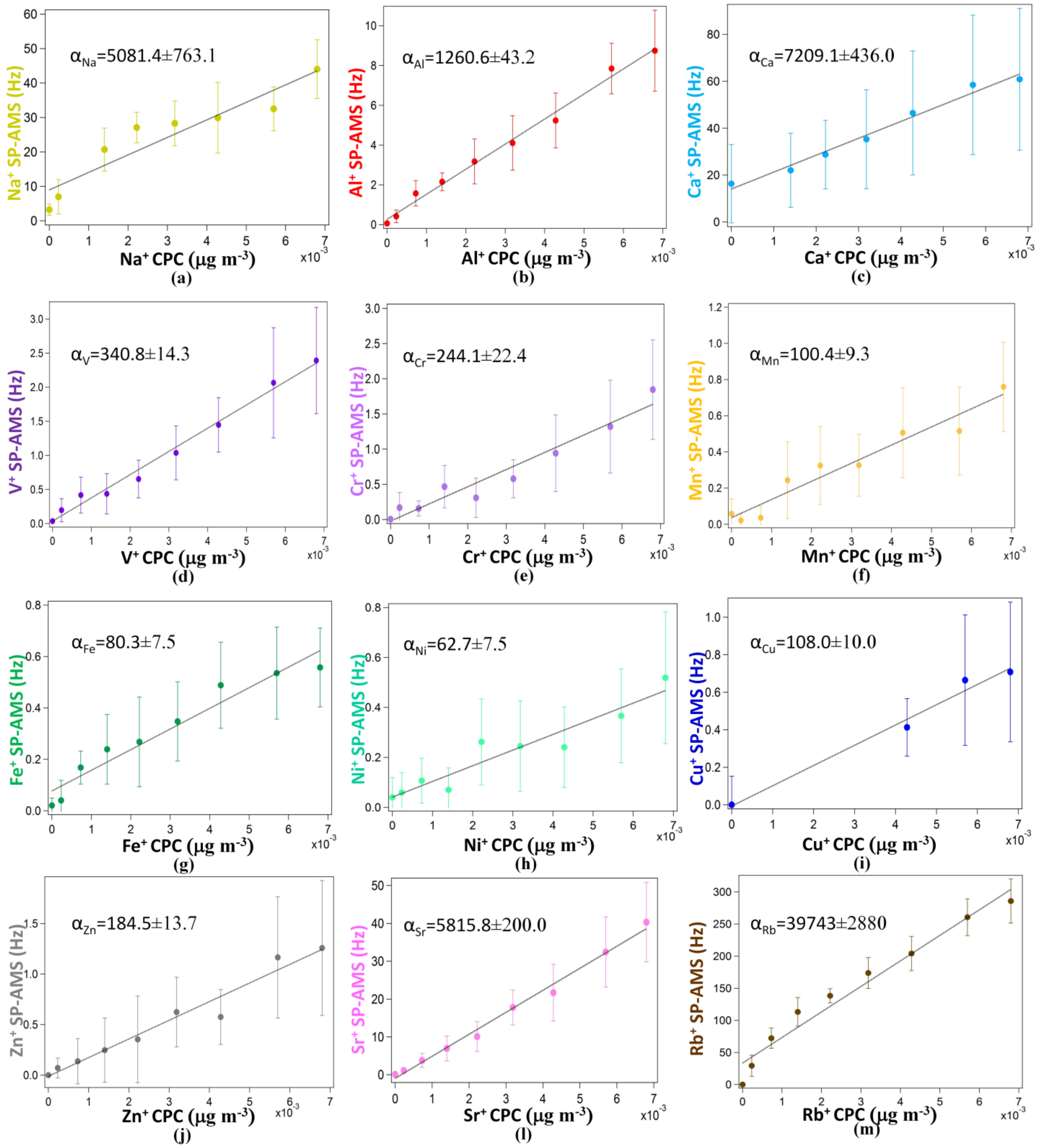


Figure S3- Signal measured by the SP-AMS (Hz) versus the mass concentration obtained by the CPC ($\mu g\ m^{-3}$) for each trace element and respective slope values ($\alpha$).

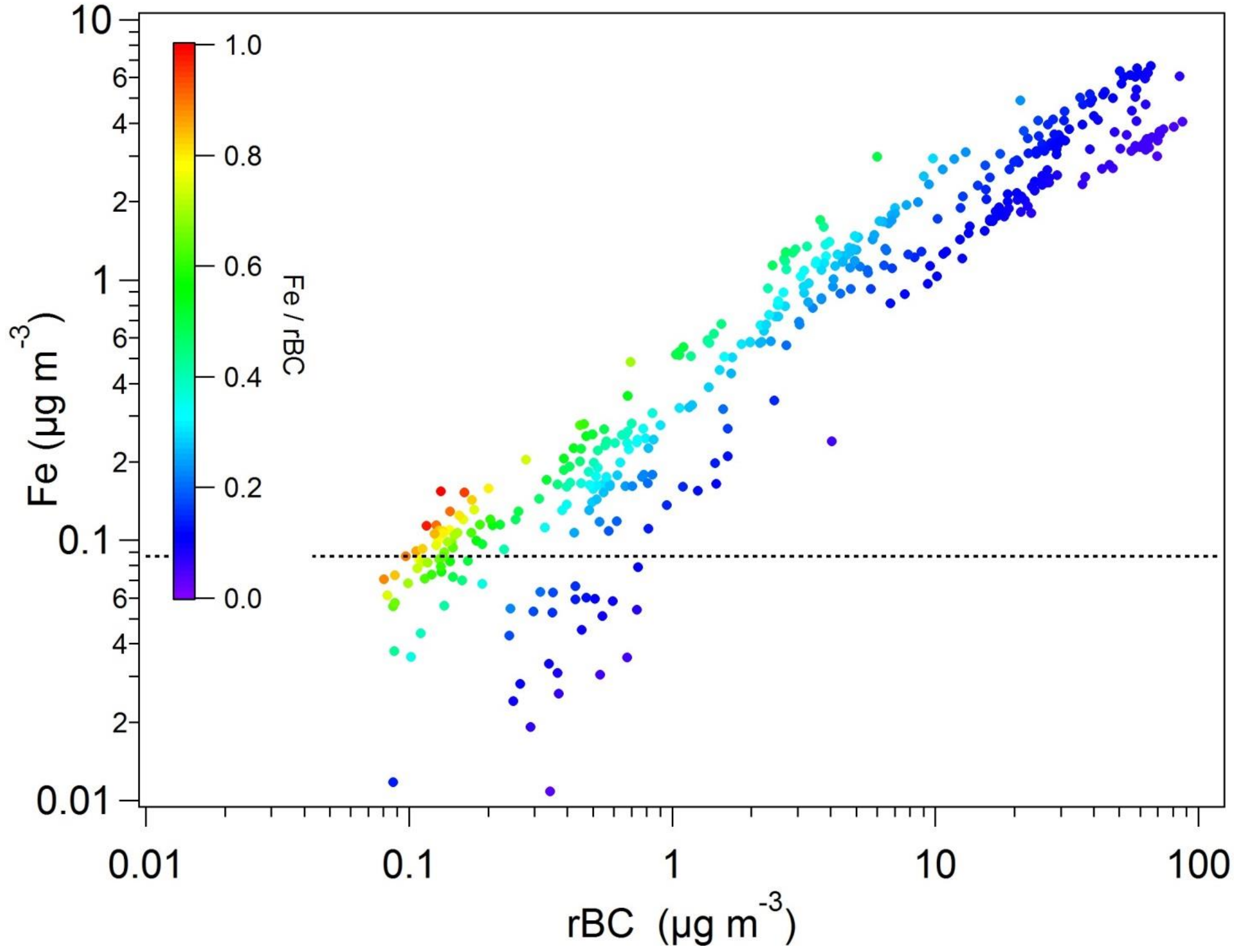


Figure S4 – Fe mass concentration as a function or rBC concentration measured at the heating station with the SP-AMS. The dashed black line represent the Fe limit of detection for this instrument.

Table S1- Relative atomic mass, isotopic composition, standard concentration, nitric acid concentration and identified isotopes of the trace elements investigated in this study.

| Element | Relative atomic mass [a] | Isotopic composition (%) [a] | Standard concentration (mg $L^{-1}$) [b] | $HNO_3$ concentration (%, w/w) [b] | Identified isotopes with the SP-AMS |
|---|---|---|---|---|---|
| **Na** | 22.9897 | 100.00 | 1000 | 2 | $^{23}Na^+$ |
| **Al** | 26.9815 | 100.00 | 1000 | 2 | $^{27}Al^+$ |
| **Ca** | 39.9625 | 96.94 | 1000 | 2 | $^{40}Ca^+$, $^{42}Ca^+$, $^{44}Ca^+$ |
| **V** | 50.9439 | 99.75 | 1000 | 3 | $^{51}V^+$ |
| **Cr** | 51.9405 | 83.78 | 1000 | 2 | $^{52}Cr^+$, $^{53}Cr^+$, $^{54}Cr^+$ |
| **Mn** | 54.9380 | 100.00 | 998 | 2 | $^{55}Mn^+$ |
| **Fe** | 55.9349 | 91.75 | 1000 | 2 | $^{54}Fe^+$, $^{55}Fe^+$, $^{56}Fe^+$, $^{57}Fe^+$, |
| **Ni** | 57.9353 | 68.07 | 1000 | 2 | $^{58}Ni^+$, $^{60}Ni^+$, $^{61}Ni^+$, $^{62}Ni^+$,$^{64}Ni^+$ |
| **Cu** | 62.9295 | 69.15 | 1000 | 2 | $^{63}Cu^+$, $^{64}Cu^+$, |
| **Zn** | 63.9291 | 48.26 | 1000 | 2 | $^{64}Zn^+$, $^{66}Zn^+$, $^{67}Zn^+$, $^{68}Zn^+$, $^{70}Zn^+$ |
| **Rb** | 84.9117 | 72.17 | 1000 | 2 | $^{85}Rb^+$, $^{87}Rb^+$ |
| **Sr** | 87.9056 | 82.58 | 1000 | 2 | $^{84}Sr^+$, $^{86}Sr^+$, $^{87}Sr^+$, $^{88}Sr^+$, |
| **Ba** | 137.9052 | 71.69 | 1000 | 2 | $^{130}Ba^+$, $^{132}Ba^+$, $^{134}Ba^+$, $^{135}Ba^+$, $^{136}Ba^+$, $^{137}Ba^+$, $^{138}Ba^+$ |

[a] Watson et al., 2004.

[b] Sigma-Aldrich standards in nitric acid.