

All work was performed in a Class 100 clean room under laminar flow hoods. Sample filters were retrieved from storage at -80°C, removed from cryovials using plastic acid-washed forceps, and transferred into trace metal clean 15 mL PFA vials with 4 mL of 5% HNO₃ (Optima) containing a 1 ppb Indium (In) internal standard. Filters were digested for ~3.5h at 140°C using a HotBlock® heating block (Environmental Express, USA) before the filters were removed and discarded, leaving behind the liquid extract. After evaporating the remaining solution to just dryness, the residue was resuspended in 2 mL of 5% HNO₃ (Optima) by light vortexing. Process blank filters were digested and processed as sample filters were. Digests were analyzed in duplicate by ICP-MS using a Thermo ICAP-Q plasma mass spectrometer calibrated to a multi-element standard curve (Spex Certiprep) over a range of 1 – 20 ppb. Natural Cd and Zn isotope abundances of the standards were assumed to calculate concentrations of ¹¹⁰Cd, ¹¹¹Cd, ¹¹⁴Cd, ⁶⁷Zn, ⁶⁶Zn, and ⁶⁸Zn. Digests were analyzed in KED mode after an 85s sample uptake window and element mass windows were scanned 3 times during measurements. The 1 ppb In internal standard was used to correct for variation in sample delivery and plasma suppression between samples. Process blanks were subtracted from measured sample concentrations. Phosphorus concentrations were simultaneously measured by ICP-MS and were calibrated to a standard curve ranging from 100 – 3,200 ppb using a 1 ppm certified P stock (Alfa Aesar Specpure). Equation #2 was used for the calculations described above:

$$M_{\text{particulate}} = \left[\frac{M_{\text{sample}}}{In_{\text{sample}}} - \frac{M_{\text{blank}}}{In_{\text{blank}}} \right] * \frac{In_{\text{digestion}}}{M_{\text{slope}}} * \frac{V_{\text{digested}}}{V_{\text{filtered}}} \quad (2)$$

where V_{filtered} is the total spiked sample volume estimated to have passed through the filter (275 mL), V_{digested} is the final volume the sample was resuspended in (2.0 mL), M_{sample} is the metal of interest measured in the sample in units of counts per second (cps), M_{blank} is the metal of interest measured in the process blanks (cps), M_{slope} is the slope of the metal of interest obtained by the standard curve (cps ppb⁻¹), In_{sample} is the In measured in the sample (cps), In_{blank} is the In measured in the process blanks (cps), $In_{\text{digestion}}$ is the cps of In measured in the 5% HNO₃+1 ppb In digestion solution, and the calculated concentration of the metal of interest ($M_{\text{particulate}}$) is in ppb (µg L⁻¹). This equation is that same as that used by Noble et. al. 2013 for the determination of particulate metal concentrations using ICP-MS (Noble et al. 2013).