Ion Exchange Resin (IER) method tested

for quantifying bulk (throughfall) deposition

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Background

Quantification of atmospheric deposition on forests is mostly derived by regular (weekly to biweekly) measurements of precipitation outside (bulk deposition) and below (throughfall) forests. These methods are, however, labor intensive, costly and inaccurate for reactive elements like N [1, 2].

The IER method provides a way to collect deposition accumulated over several months, reducing cost and labor [3] while being reliable for reactive elements [2]. The IER method allows for measurements in areas with little rainfall and low elemental concentrations [2]. The accuracy of IER has, however, hardly ever been tested for elements other than nitrogen [2, 3].

Results

The IER method captures 90-100% of added macro- & microelements under lab conditions.

Implications

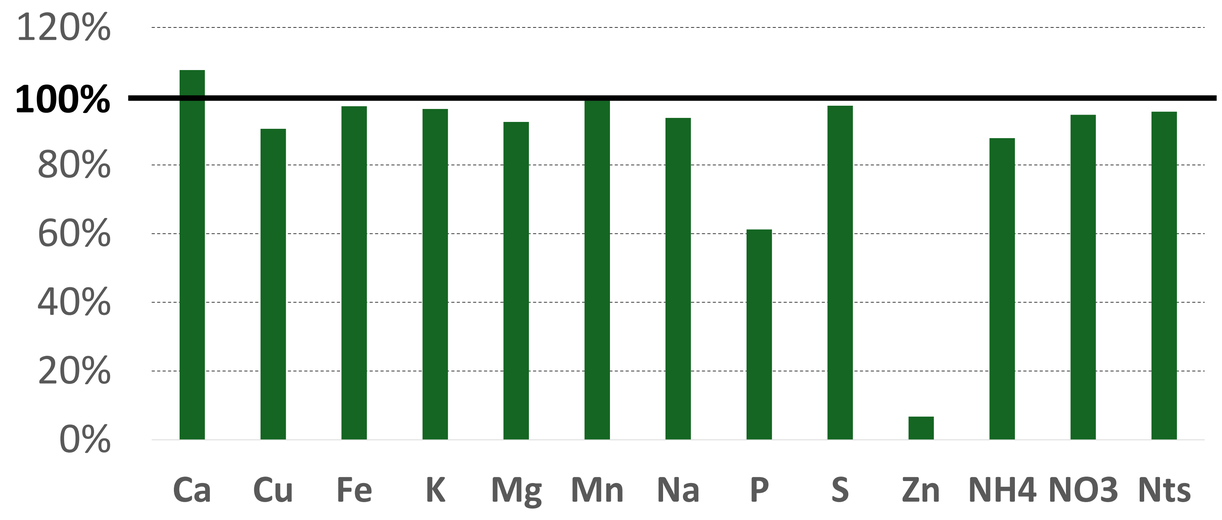
The IER method is an efficient, reliable tool to estimate deposition of multiple elements except for P and Zn.

Our approach

We tested the IER method to quantify deposition of macro and micro-elements. Amberlite IRN-150 (capacity > 0.6 mol/l) was stepwise tested under laboratory conditions:

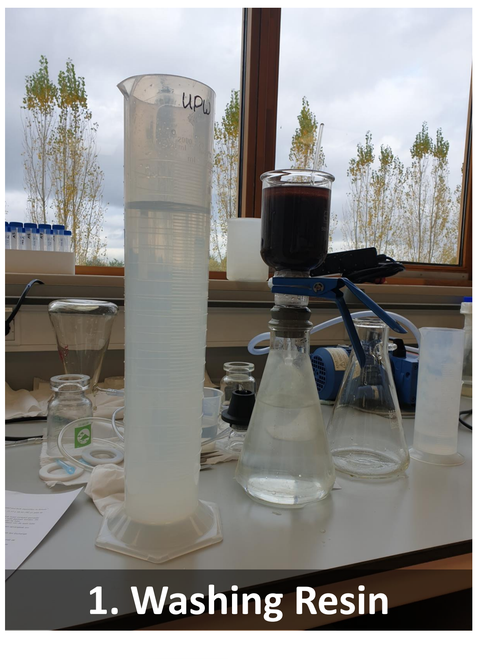
1. Preparation of blank columns
2. Loading blank columns simulate bulk deposition.
3. Extraction with 2M KCl for N-NH4, N-(NO3+N02) & Nts and 2M HCl for Ca, Cu, Fe, K, Mg, Mn, Na, P, S and Zn;
4. Chemical analysis of KCl extracted with SFA and HCl extract with ICP-AES.

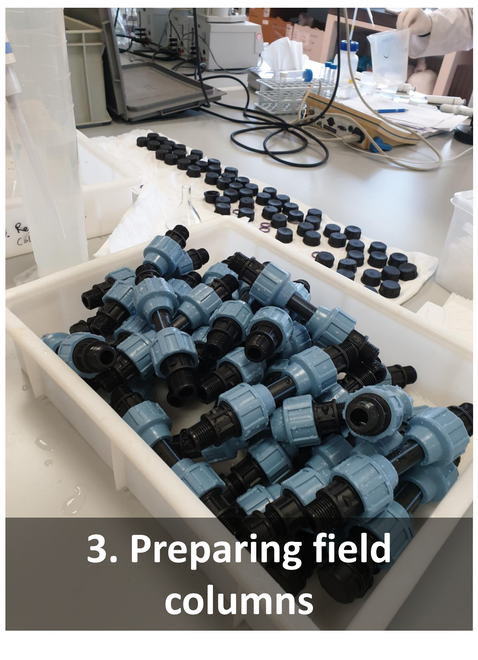
Recovery rates



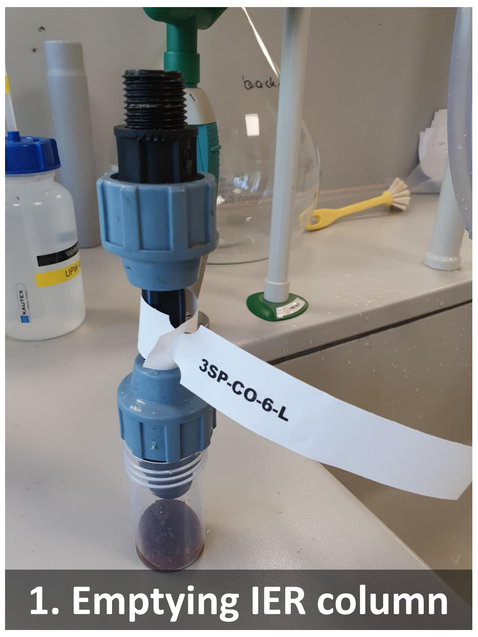
Procedure

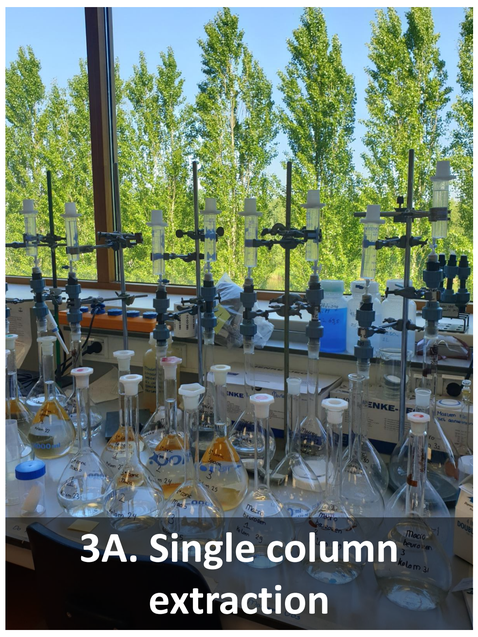
Preparation

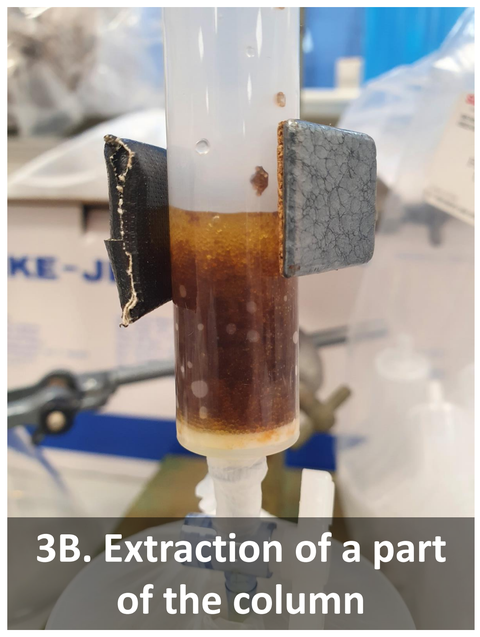


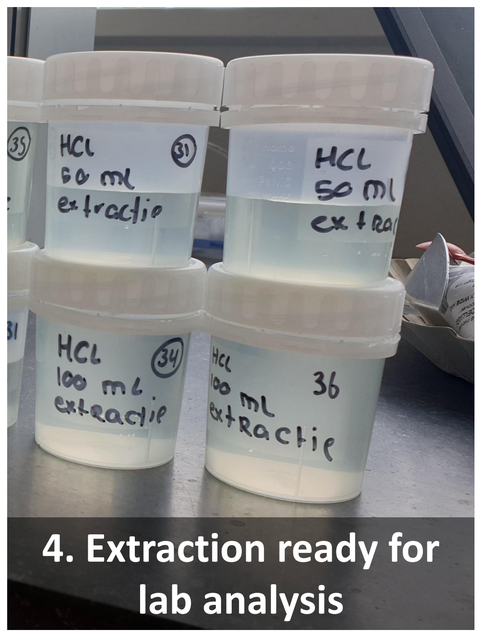


Extraction









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