# Sampling and non-sampling errors in throughfall deposition

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At Boschi Carrega, a permanent plot of the ICP-Forests 2nd level network, located in a 50-year old stored coppice lying on an ancient alluvium and dominated by deciduous oaks (Quercus petraea and Quercus cerris), separate analysis of the 16 samplers were performed, and used to calculate sampling errors.
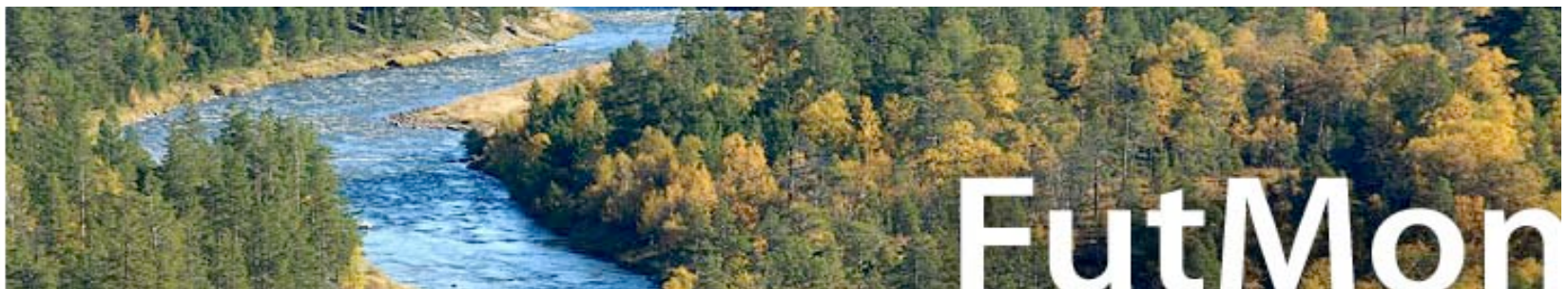

Protection
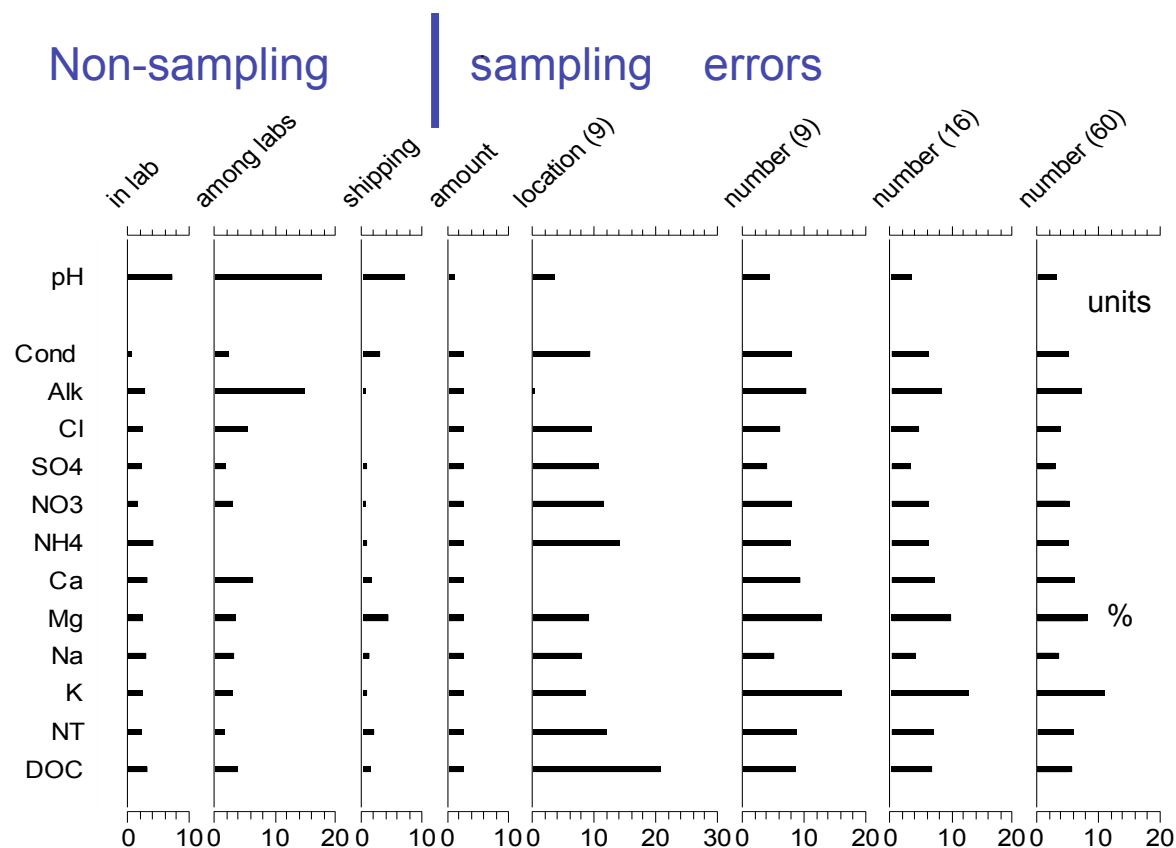Stemflow collectors
Throughfall collectors
Snow collectors
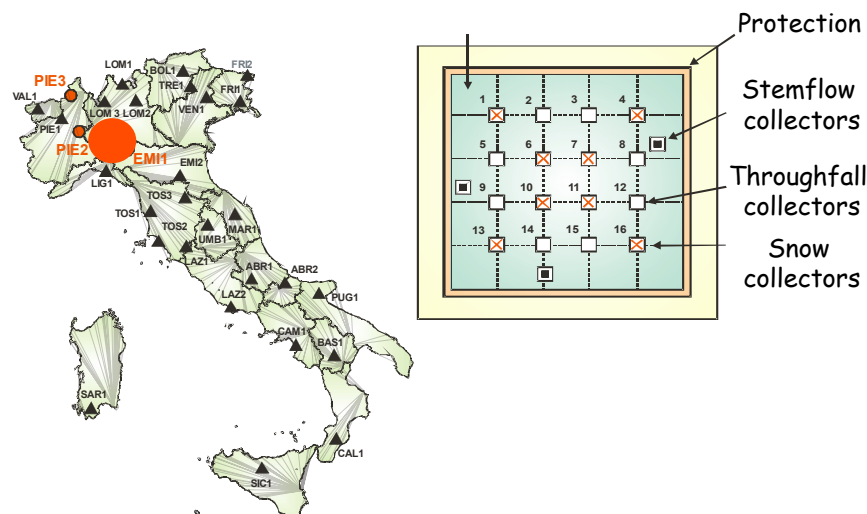
Conference "Long-term ecosystem research:
Understanding the present to shape the future",
Zurich, 7 - 11 September 2009

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CON ECO FOR
Controllo Ecosistemi Forestali
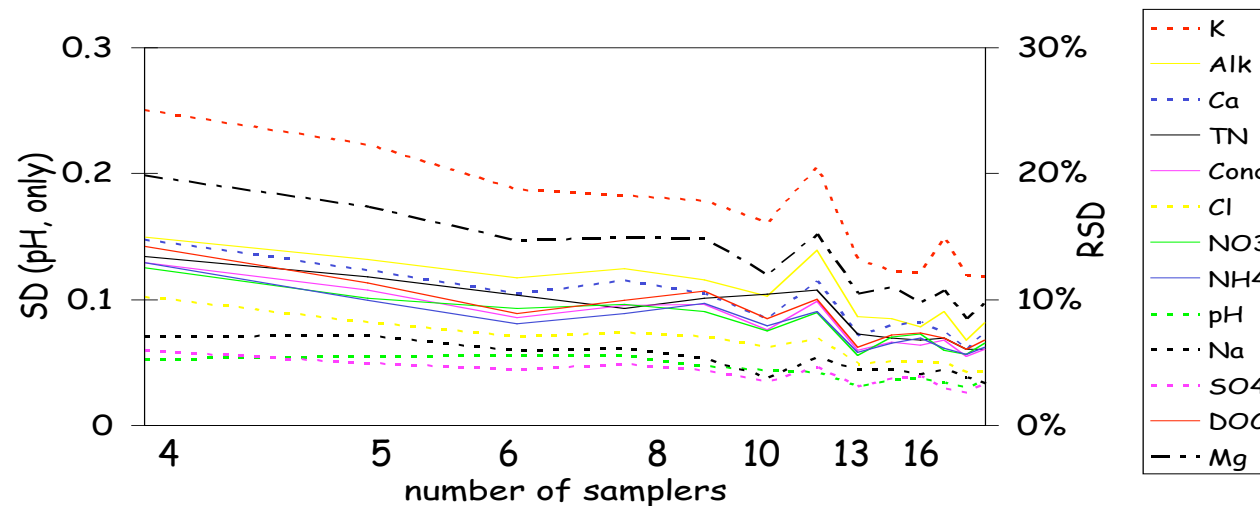
Sampling errors related to the number of collectors were estimated by numerically resampling the set of 16 samplers actually measured, by repeated random selection of n (n = 4 …. 16) samplers, and calculating the relative standard deviation (RSD) of the annual deposition so obtained. The estimated RSD of the annual deposition is higher for ions deriving from canopy leaching (K, Mg) and lower for conservative ions like Na and Cl and for sulphate. It slowly decreases with the inverse of the number of samplers (r ranging from 0.83 to 0.93).

Non-sampling | **sampling errors**

Columns: in lab | among labs | shipping | amount | location (9) | number (9) | number (16) | number (60)

Rows: pH, Cond, Alk, Cl, SO4, NO3, NH4, Ca, Mg, Na, K, NT, DOC

units

%

Axis scales: 0 100 | 0 10 20 | 0 100 | 0 100 | 0 10 20 30 | 0 10 20 | 0 10 20 | 0 10 20

Others source of error (e.g. in situ alteration of the samples), are still under evaluation.

For pH and alkalinity, among labs variability is larger than sampling error, showing the opportunity of further improving analytical comparability through Working Ring Tests.

To reduce non-sampling errors, a (reasonable) increase in sampler number does not seem to give relevant improvements. However the effect of using random located collectors instead of regularly located collectors is evident.

We underline that our results are related to the particular sampling plot used for this study, and cannot be extended to the whole network without further investigation.