

# Analysis of CAPMoN dry bags

Jian Feng, William B. Sukloff, and Robert J. Vet

Air Quality Research Division  
Science and Technology Branch  
Environment and Climate Change Canada

Why we measure dry bags?

To identify if there are systematic serious issues that affect the sampling system.

Objective:

To determine the effect of measuring dry bags on a once-every-two-weeks basis vs. on a once-a-month or once-a-quarter basis.

If we reduce the analysis frequency from the current once-two-weeks to once-a-month or once-a-quarter, will the purpose of dry bag analysis be compromised?

## Methods:

Statistical analysis of all samples, vs. samples once a month (the first dry bag each month for each station), and samples once a quarter (the first dry bag each quarter).

Statistical analysis of CAPMoN dry bags

<http://iweb.cmc.ec.gc.ca/~arqjfg/arqm/drybag/>

# Summaries of statistical analysis

- a. The sampling once a month or once a quarter has a negligible impact on major part of the measurements (1<sup>st</sup> quartile, 2<sup>nd</sup> quartile, 3<sup>rd</sup> quartile)
- b. The sampling has biggest impact on the maximum values, as sampling once a month or once a quarter can miss these maximum values. Sampling once-a-quarter misses the maximum value significantly. Sampling also impacts the minimum of PH value, especially on a once-a-quarter basis. Mean values of SO<sub>4</sub>, NO<sub>3</sub>, Ca, K, Na, Cl are also affected by sampling, but not significantly if it is once a month.
- c. Sampling once a month can capture 95% of all measurements (P95, 95% percentile) well.
- d. The T-tested showed that sampling once a month has no significant impact on the mean values of samples.

e. The Wilcoxon rank-sum test showed that sampling once a month has no significant impact (with 95% confidence level) on medians of samples, but there are 5 significant differences (with 95% confidence level, among 90 total differences) if sampling once a quarter.

## Question

What is the reasonable frequency to have a dry bag analysis?

The current once-two-weeks? Once-a-month? Once-a-quarter?