Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Assessing the performance of standard methods to predict the standard uncertainty of air quality data having incomplete time coverage †

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Electronic Supplementary Information

Figures ESI 1 – ESI 8.

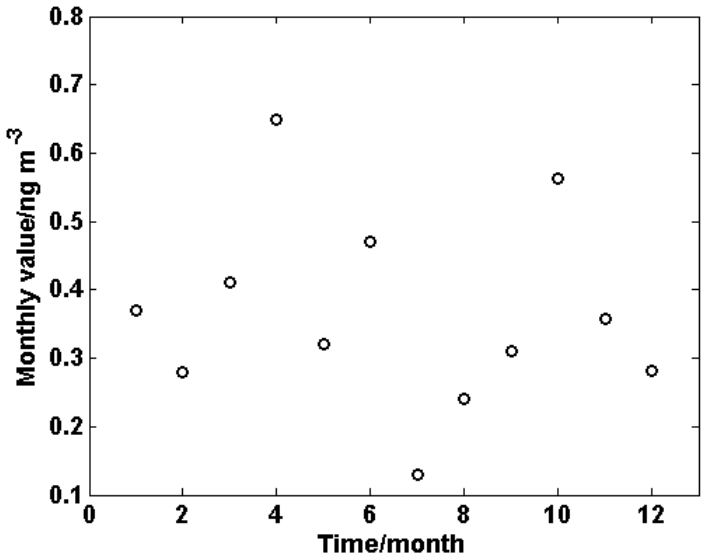

Figure ESI 1. Measured monthly concentration values of benzo[a]pyrene from the PAH network at Newport in 2010.

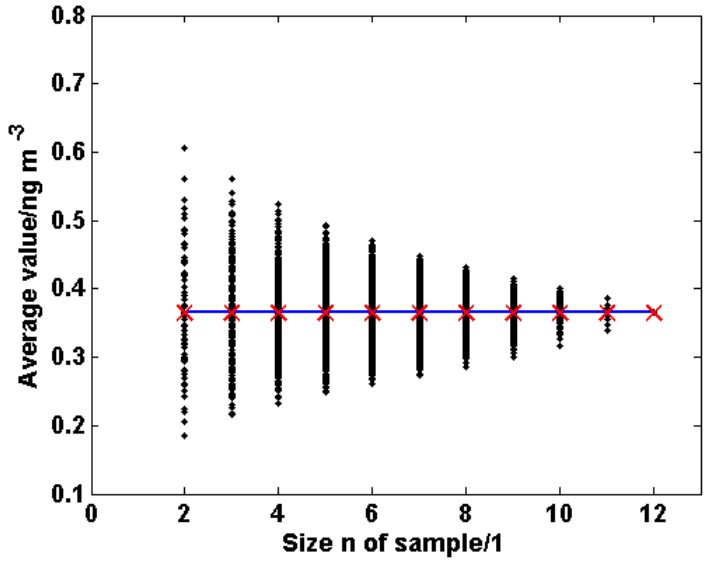

Figure ESI 2. For Newport in 2010, the (true) average benzo[a]pyrene concentration value μ (solid blue line), and for each sample size n, the average values $\hat{y}$ for all possible samples of size n (black dots) and the mean $m(\hat{y})$ of those average values (red crosses).

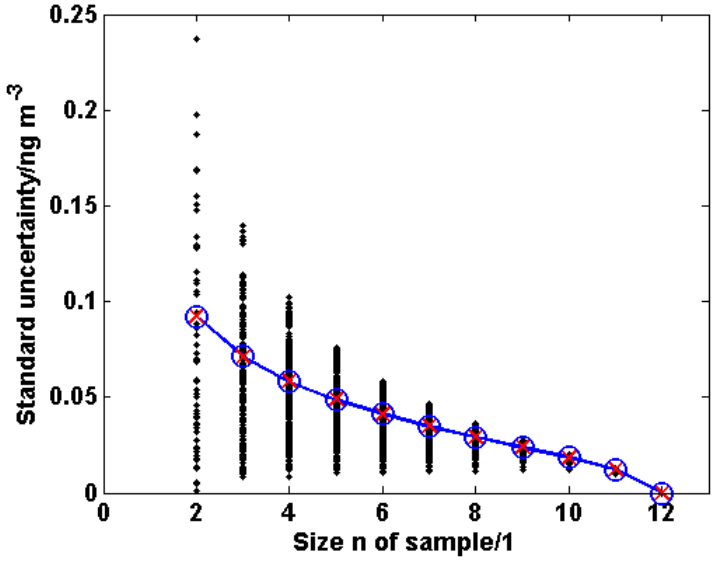

Figure ESI 3. For Newport in 2010, and for each sample size n, the standard deviation $s(\hat{y})$ of the set of possible average benzo[a]pyrene values (solid blue line), the standard uncertainty $u(\hat{y})$ calculated using equation (6) (blue circles), and the standard uncertainties $u_a(\hat{y})$ for all possible samples calculated using equation (7) (black dots). The square root of the mean of the variances $u_a^2(\hat{y})$ calculated for all possible samples is also shown (red crosses).

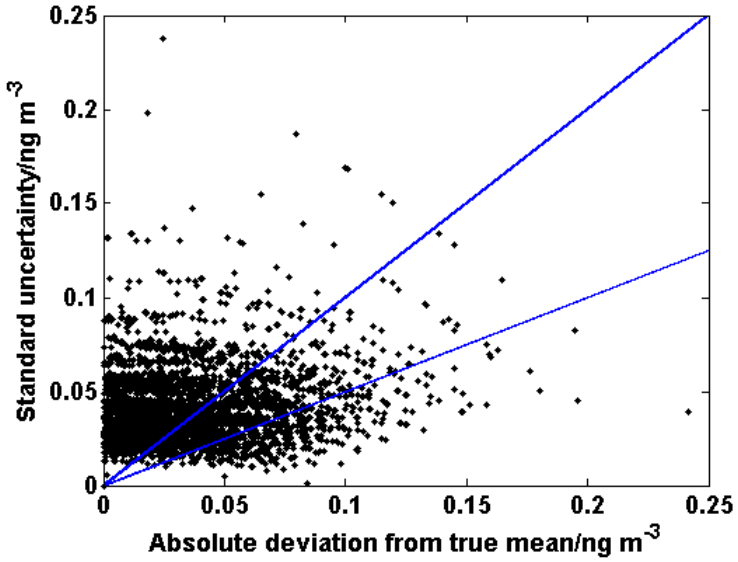

Figure ESI 4. For Newport in 2010, values of $|\hat{y} - \mu|$ plotted against corresponding values of $u_a(\hat{y})$ (black dots). Values satisfying $|\hat{y} - \mu| = u_a(\hat{y})$ and $|\hat{y} - \mu| = 2u_a(\hat{y})$ are also shown as, respectively, the upper and lower (blue) lines: 62 % of points satisfy $|\hat{y} - \mu| \leq u_a(\hat{y})$ and 88 % of points satisfy $|\hat{y} - \mu| \leq 2u_a(\hat{y})$.

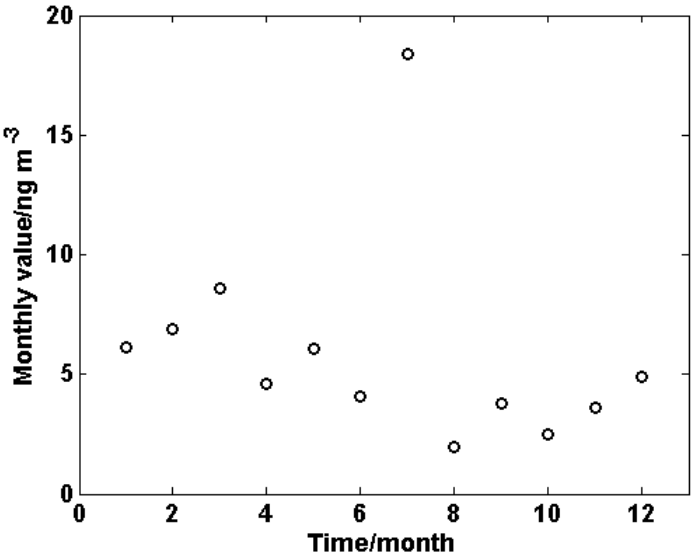

Figure ESI 5. Measured monthly concentration values of lead from the metals network at Belfast in 2008.

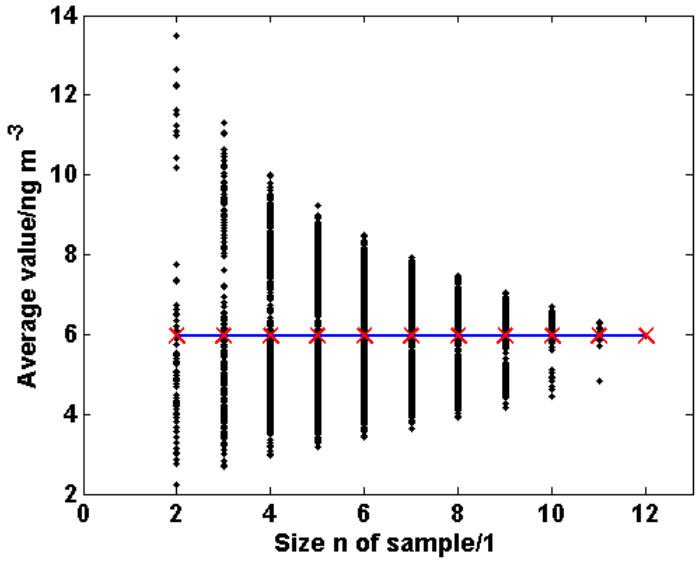

Figure ESI 6. For Belfast in 2008, the (true) average lead concentration value μ (solid blue line), and for each sample size n, the average values $\hat{y}$ for all possible samples of size n (black dots) and the mean $m(\hat{y})$ of those average values (red crosses).

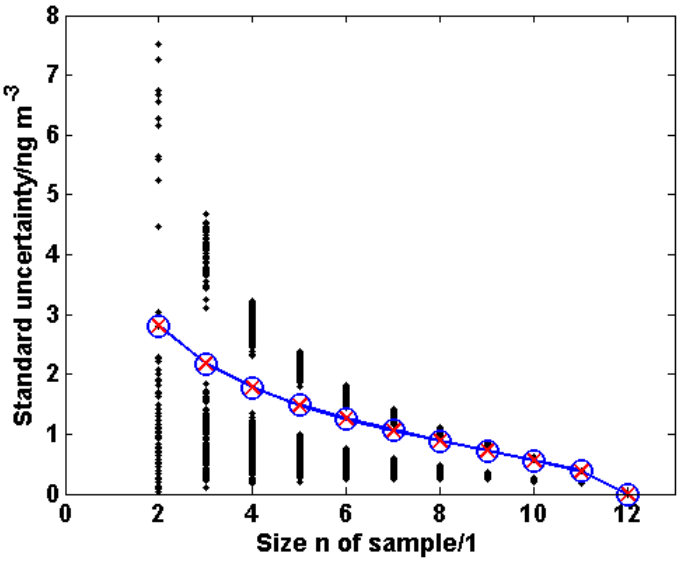

Figure ESI 7. For Belfast in 2008, and for each sample size n, the standard deviation $s(\hat{y})$ of the set of possible average lead values (solid blue line), the standard uncertainty $u(\hat{y})$ calculated using equation (6) (blue circles), and the standard uncertainties $u_a(\hat{y})$ for all possible samples calculated using equation (7) (black dots). The square root of the mean of the variances $u_a^2(\hat{y})$ calculated for all possible samples is also shown (red crosses).

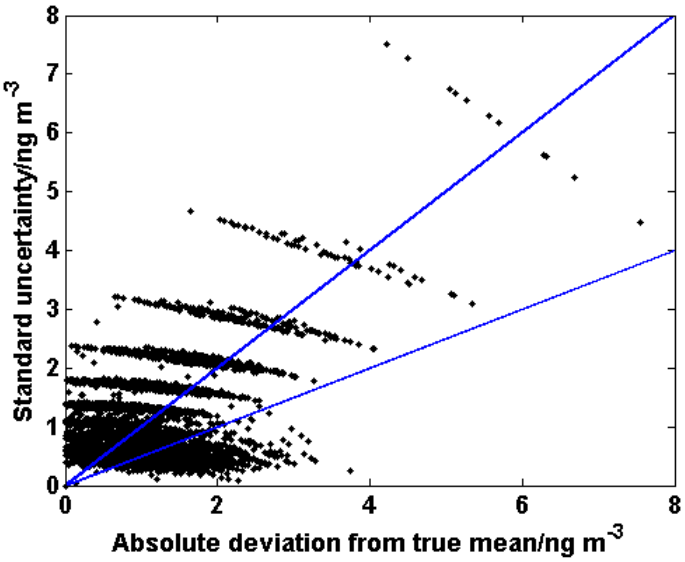

Figure ESI 8. For Belfast in 2008, values of $|\hat{y} - \mu|$ plotted against corresponding values of $u_a(\hat{y})$ (black dots). Values satisfying $|\hat{y} - \mu| = u_a(\hat{y})$ and $|\hat{y} - \mu| = 2u_a(\hat{y})$ are also shown as, respectively, the upper and lower (blue) lines: 52 % of points satisfy $|\hat{y} - \mu| \leq u_a(\hat{y})$ and 76 % of points satisfy $|\hat{y} - \mu| \leq 2u_a(\hat{y})$.