Supplement of

Air pollution measurement errors: is your data fit for purpose?

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Table S1. Research grade instrumentation used for this study.

| Analyte | Manchester | York |
|---------|------------|------|
| NO₂     | *Teledyne T500U (CAPS) | **Teledyne T200U (Chemiluminescence) | **Teledyne T200U (Chemiluminescence) |
| O₃      | *Thermo 49i (UV photometry) | **Thermo 49i (UV photometry) | **2B (UV photometry) |
| PM₂.₅   | ------------ | ------------ | 1020 (Beta attenuation) |

*Instruments permanently deployed at the site.

**Instruments temporarily deployed as part of the QUANT study.

Figure S1. Time series (left panels), regression plots (middle-left panels), Bland-Altman plots (middle-right panels) and REU (right panels, DQO for NO₂ = 25%) for baseline drift (a-panels), temperature interference drift (b-panels), and instrument sensitivity drift (c-panels) simulated errors.
Figure S2. Two bias corrected LCS systems (LCS3 & LCS4, same brand) measuring PM2.5 (Time res 1 h). While LCS3 is shown for the same location (Manchester) but unfolded in two different seasons (a-panels: Apr to May 2020; b-panels: Oct to Nov 2020), LCS4 is at a different location (c-panels: York, Apr to May 2020). Time series (left panels), regression plots (middle-left panels), Bland-Altman plots (middle-right panels) and REU (right panels; DQO<sub>PM2.5</sub> = 50%) are used to characterise the device's error structure. All but the time-series plots have been coloured by data density (darker colours denote lower density and lighter colours denote higher density).

Figure S3. Time series (left panels), regression plots (middle-left panels), Bland-Altman plots (middle-right panels) and REU (right panels, DQO for O<sub>3</sub> = 30%) for two ozone research grade instruments (1hr time res): a Thermo 49i (a-panels, July & August 2021) and a 2B (b-panels, June and July 2021). All but the time-series plots have been coloured by data density (darker colours denote lower density and lighter colours denote higher density).