Supplement of

A low-activity ion source for measurement of atmospheric gases by chemical ionization mass spectrometry

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Figure S1. (a) An example of flows controlled by AVO at 40 torr flow tube pressure. (b) PAN calibration signal as a function of temperature. The rate coefficient for the thermal decomposition of PAN (at 453 K and 100 torr) is $\approx 790 \text{ s}^{-1}$ (Atkinson et al., 2006; IUPAC, 2018), so that PAN calibration standard should be fully thermally dissociated within the residence time of $\approx 40 \text{ ms}$. This is confirmed by measurement of the calibration signal whilst varying the inlet temperature. (c) Time series of PAN calibration signal while sampling ambient air in Atlanta, showing a minimal interference by ambient species such as NO and NO$_2$. (d) Example of relative sensitivity of PAN as a function of NO concentration.
Figure S2. Schematic diagram of the Iodide-Adduct CIMS. The nitrogen flows with calibration gas enter the flow tube through the AVO (automatic variable orifice).

Figure S3. Flight map of the ATom-3 science flight #5 from Fiji to New Zealand. Orange box highlights the location of the southern hemisphere plume presented in Figure 5b.
Figure S4. Time dependence of the sensitivity of the LAS. The sensitivity of a fresh (green square) and one half-life aged (cyan triangle) LAS for PAN.