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The airborne mass spectrometer AIMS – Part 2: Measurements of trace gases with stratospheric or tropospheric origin in the UTLS

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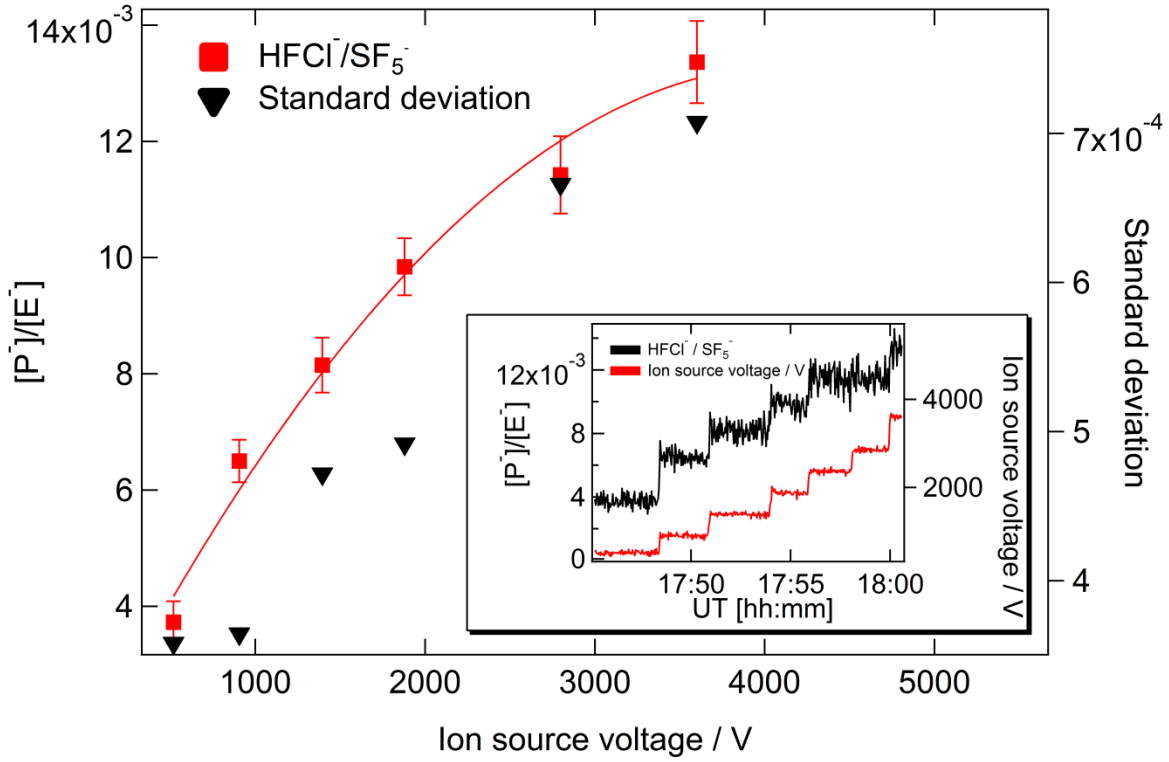

Figure S1 The ratio of product to reagent ions $[P^-]/[E^-]$ (here $HFCl^-/SF_5^-$) during background measurements is shown for different ion source voltages. The inset shows the timeline of the signal, while the larger plot shows the direct correlation of the average values of [P-]/[E-] and the standard deviation of the background signal for different ion source voltages. With increasing voltage both background level and standard deviation of the background increase. Generally voltages between 400 and 1400V are used for the AIMS ion source.

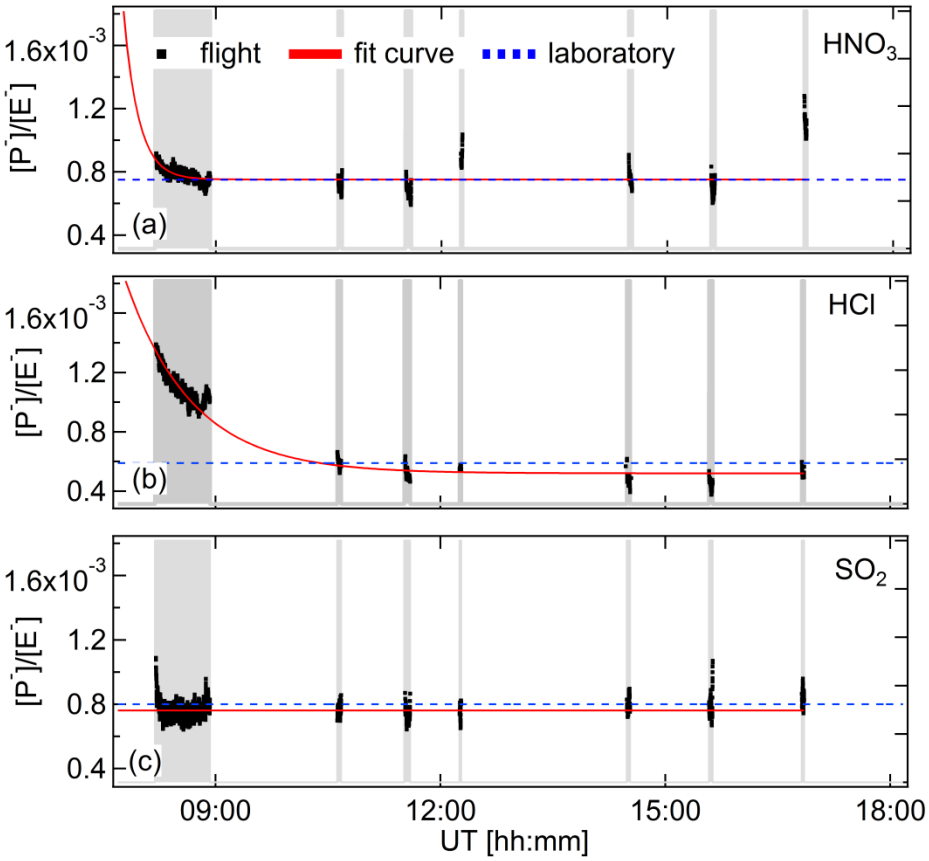

Figure S2 Ion ratios during background measurements for HNO_3, HCl and SO_2 during the flight on 11 September 2012 .Grey shaded are time sequences where synthetic air was introduced and a stable ion ratio was observed. The red curves represent the fit curves applied to correct for the instrumental background during atmospheric measurements. Generally during the first hour, the background follows an exponential fit. For the rest of the flight, the background can be described by a constant value. For SO_2, a constant value of 0.008 was used for the entire flight. For comparison, the ion ratio averages measured during laboratory measurements are given (blue dashed line). Generally, flight and ground based measurements agree well.