Mass concentration comparison between C-ToF-AMS and collocated instrumentation

Aerosol loadings from the C-ToF-AMS were compared against volume integration using a Scanning Mobility Particle Sizer (SMPS) and Black Carbon (BC) from a Single Particle Soot Photometer (SP2), yielding good agreement (slope: 0.87, R2: 0.83, Fig. S1). The density used for each species was 1.78, 1.72, 1.72, 1.52, and 1.77 g cm^{-3} for sulphate, nitrate, ammonium, chloride, and BC, respectively (Holden and Lide, 1991; Park et al., 2004). The density of organics was estimated based on the oxygen-to-carbon (O : C) and hydrogen-to-carbon (H : C) ratios (Canagaratna et al., 2015; Kuwata et al., 2012), yielding a campaign average of 1.67 g cm^{-3}.

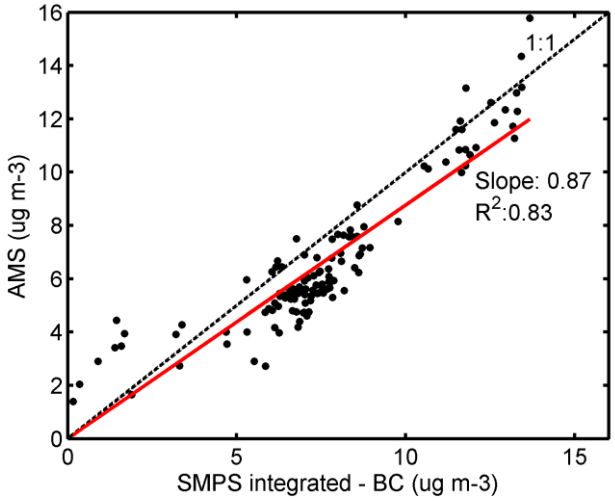

Fig. S1. Sum of AMS species versus integrated SMPS mass minus BC.

Back-trajectories analysis of the case-study of 06 July 2016

Figure S2 shows the back-trajectory analysis of the three flight transects. The back-trajectory was calculated using the ECMWF analysis dataset of the wind field.

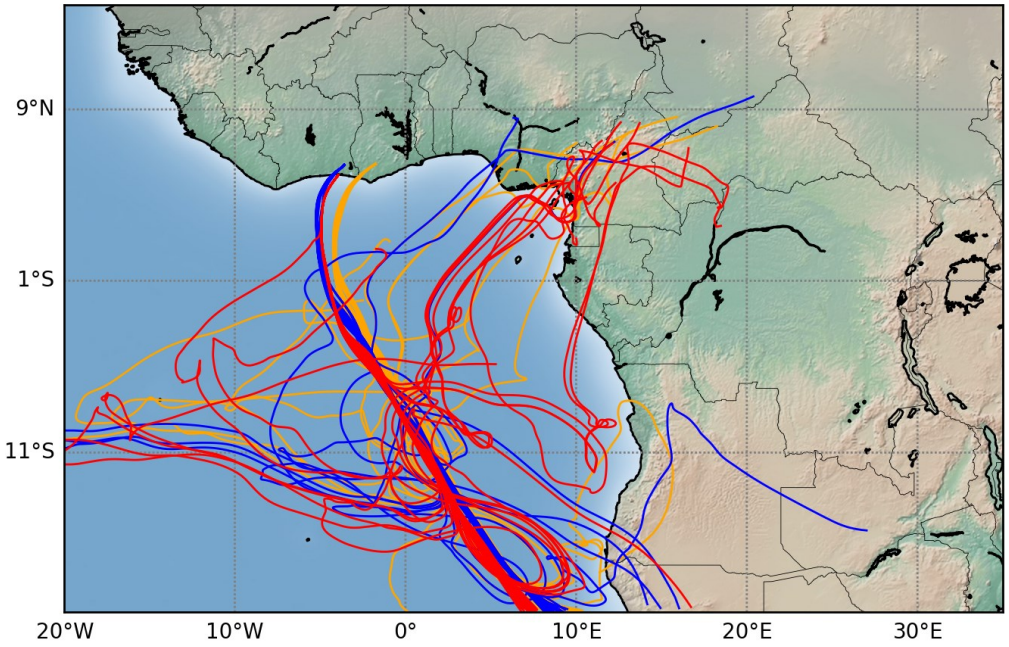

Fig. S2. Back-trajectory analysis of the sampling points of the case study of 06 July 2016. The blue, red and yellow lines represent Upwind Abidjan, within the plume and continental air mass, respectively.

Systematic plume identification using ATR42 data

Figure S3 shows the location of measurement points classified as in-plume according to the systematic analysis described in Section 3.3. Distance between emitting city and sampling point has been calculated by identifying the emitting city according to sampling location.

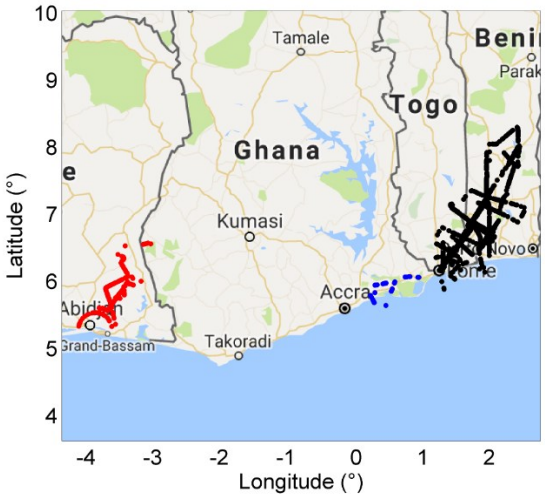

Fig. S3. Location of sampling points identified as in-plume according to systematic analysis. Red, blue and black points refer to Abidjan, Accra and Lomé, respectively.