Supplement of Atmos. Chem. Phys. Discuss., 15, 17651–17709, 2015
http://www.atmos-chem-phys-discuss.net/15/17651/2015/
doi:10.5194/acpd-15-17651-2015-supplement

Atmospheric Chemistry and Physics Discussions

Supplement of

Sources, seasonality, and trends of Southeast US aerosol: an integrated analysis of surface, aircraft, and satellite observations with the GEOS-Chem chemical transport model

P. S. Kim et al.

Correspondence to: P. S. Kim (kim68@fas.harvard.edu)

Supplementary Material

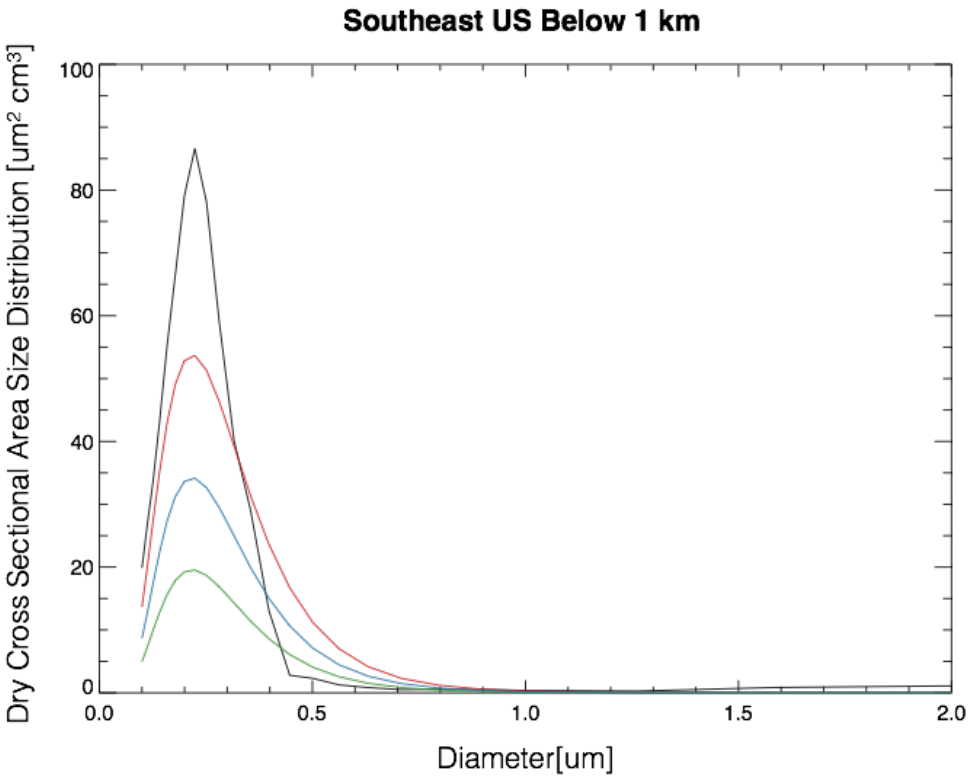

Figure S1: Dry aerosol cross-sectional area size distributions below 1 km over the Southeast US during SEAC^{4}RS (August-September 2013). The size distribution from the LAS aboard the DC-8 aircraft (black) is compared to GEOS-Chem (red) sampled at the times and locations of the available instrument data. Also shown are the simulated contributions from sulfate and organic carbon (OC).

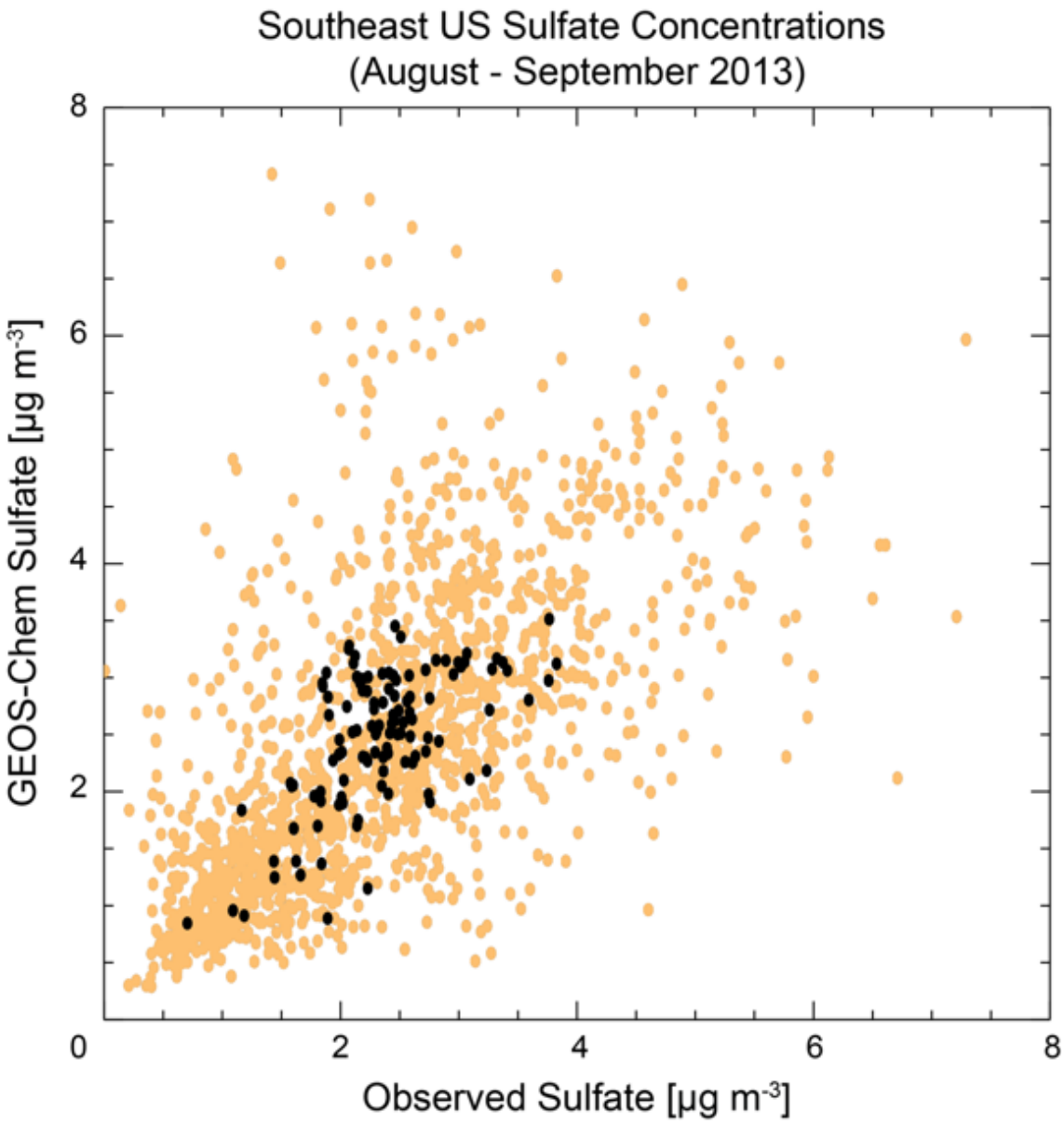

Figure S2: Scatterplot of daily mean observed and simulated surface sulfate concentrations in the Southeast US during SEAC^{4}RS (August-September 2013). The observations are from the CSN, IMPROVE, and SEARCH networks. The comparisons of the mission mean concentration for each individual station is shown in black.

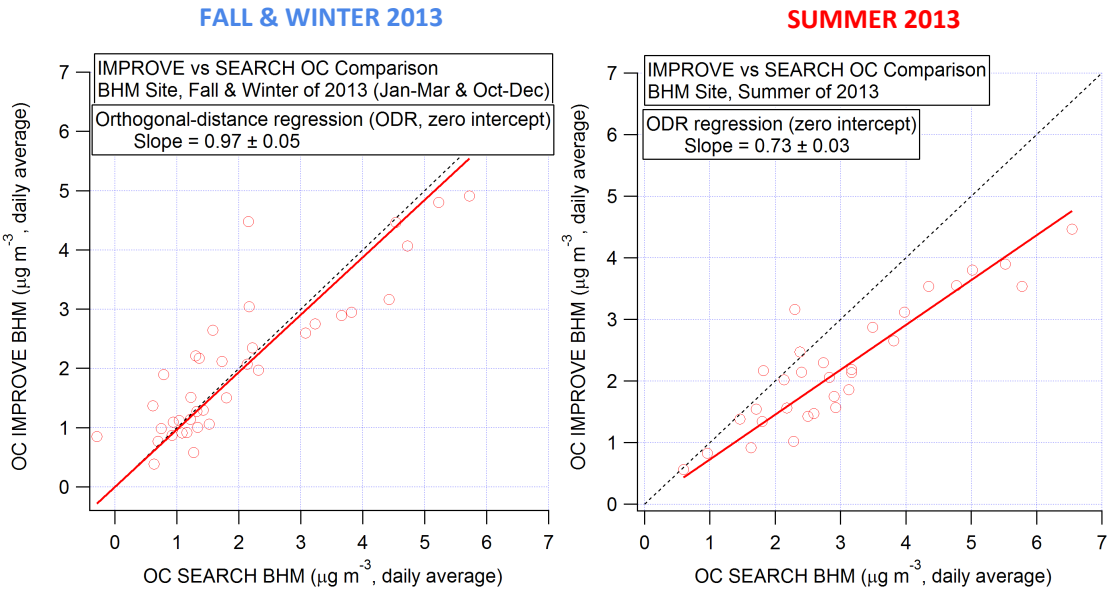

Figure S3: Scatterplot of collocated IMPROVE and SEARCH OC measurements at Birmingham, Alabama for fall & winter (left) vs. summer (right). The SEARCH measurement uses a gas-phase denuder and performs automated in-situ analysis within 1 hour of sample collection. IMPROVE samples stay in the field for a week and are then shipped commercially without cooling. The differences may be due to evaporation of OC from IMPROVE summer samples after sampling and shipping, consistent with the prior study of Dillner et al. (2009).

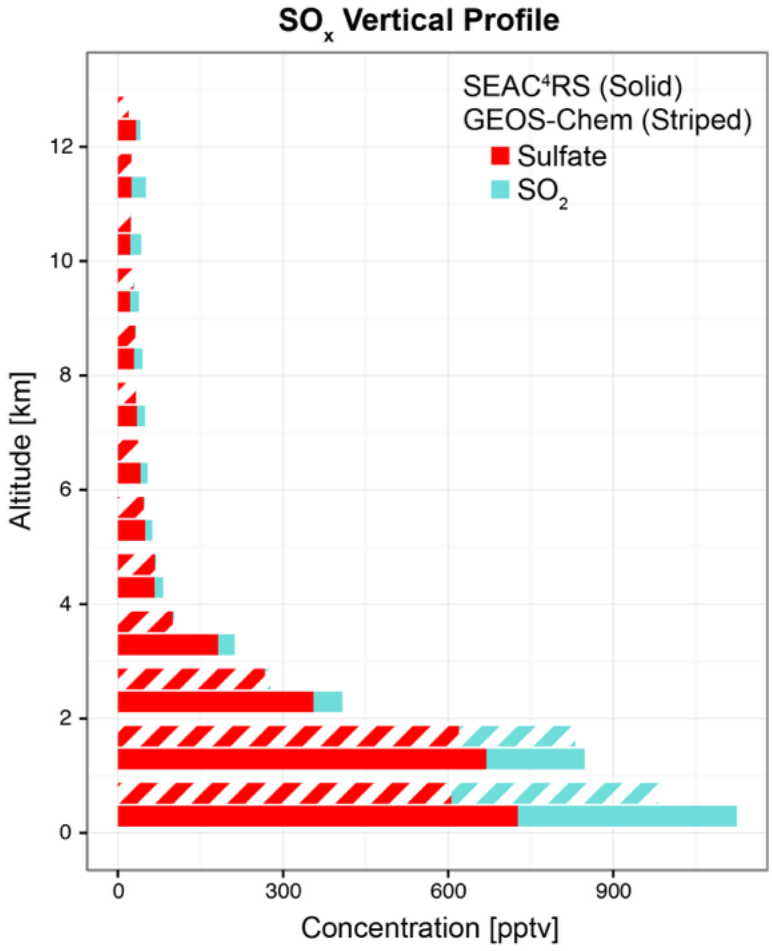

Figure S4: Median vertical profiles of SO_x (≡ SO_2 + sulfate) concentrations over the Southeast US during SEAC^{4}RS (August-September 2013). Aircraft observations (SO_2 from the Georgia Tech CIMS, sulfate from CU Boulder AMS) are compared to model values in 1-km bins.

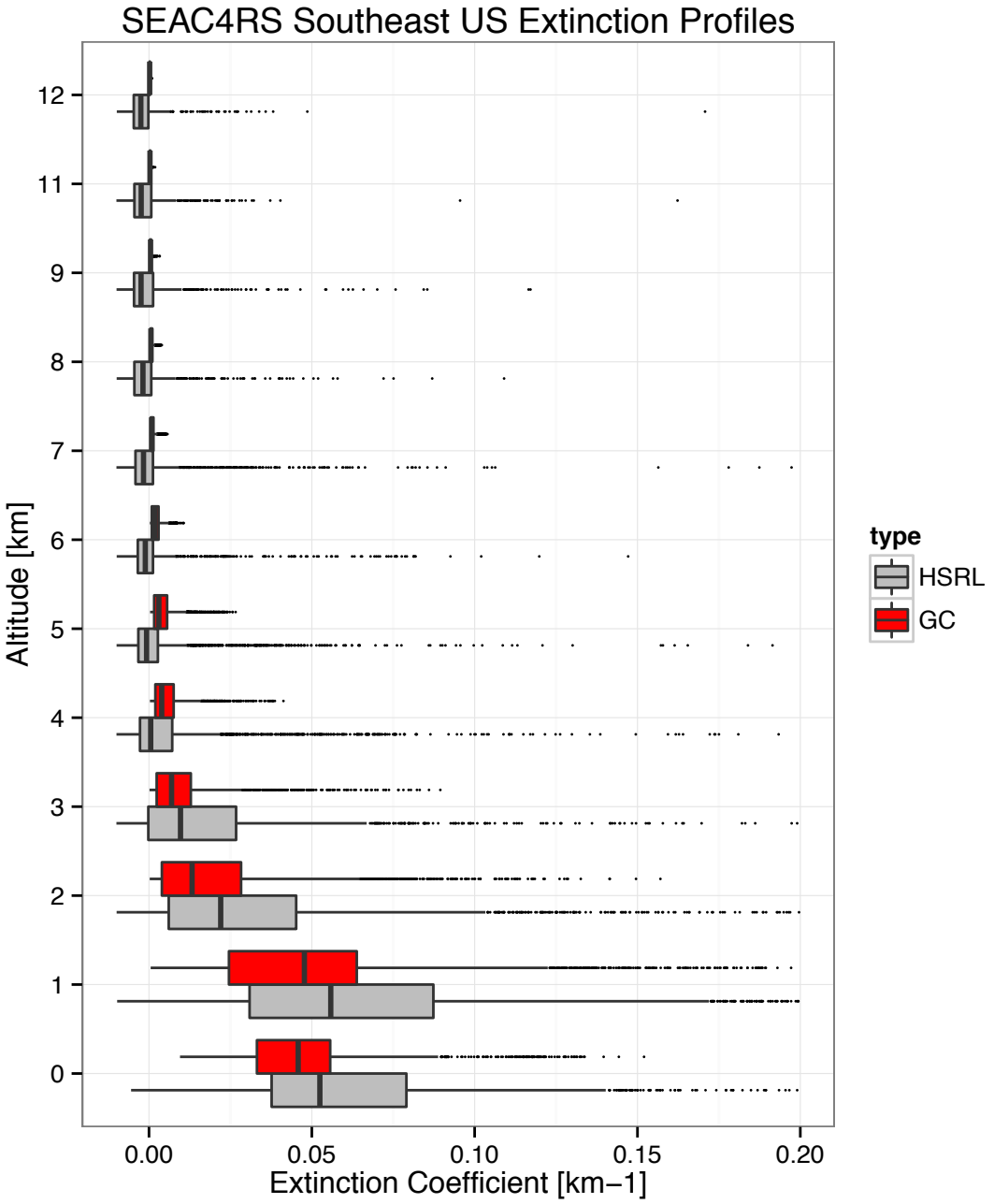

Figure S5: Vertical profile of HSRL and GEOS-Chem aerosol extinction coefficients over the Southeast US during SEAC^{4}RS. GEOS-Chem is sampled at the times and locations of the available HSRL observations. Boxplots are shown for each 1 km bin.

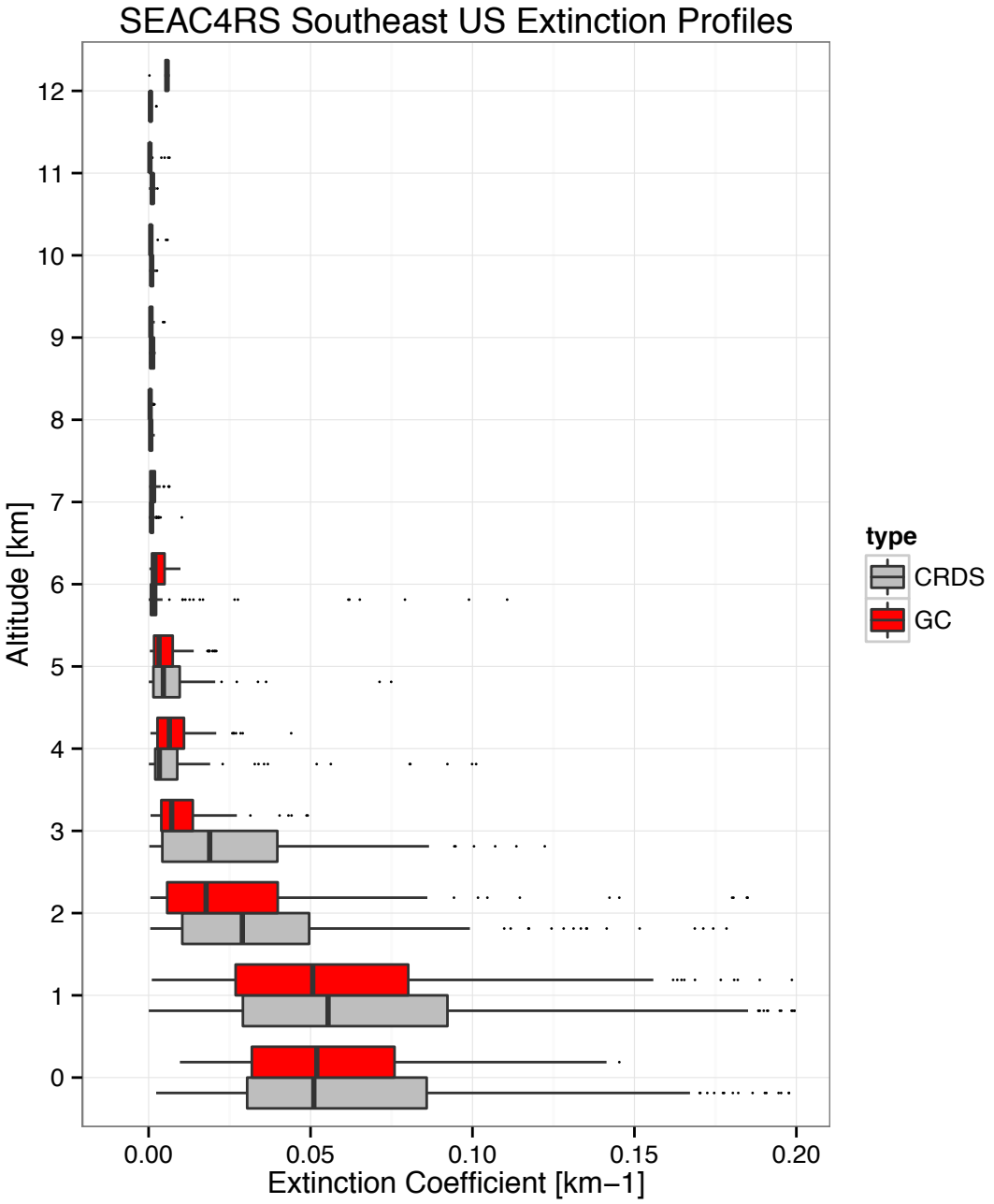

Figure S6: Vertical profile of CRDS and GEOS-Chem aerosol extinction coefficients over the Southeast US during SEAC^{4}RS. GEOS-Chem is sampled at the times and locations of the available CRDS observations. Boxplots are shown for each 1 km bin.