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Supplement of

Observations of the vertical distributions of summertime atmospheric pollutants and the corresponding ozone production in Shanghai, China

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35 **Figure S1:** Location of the FengXian measurement site (red star) and neighbourhood.

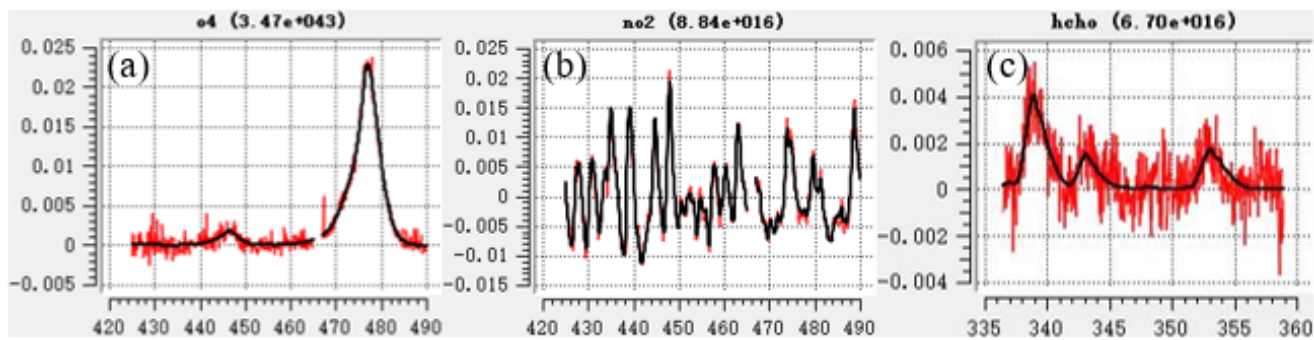


Figure S2: DOAS fit examples of (a) O₄ and (b) NO₂ at 08:24 LT on 17 May, as well as (c) HCHO at 08:24 LT on 18 May 2016. The fitted absorption structures (black curves) and the derived absorption structures from the measured spectra (red curves) are shown, respectively.

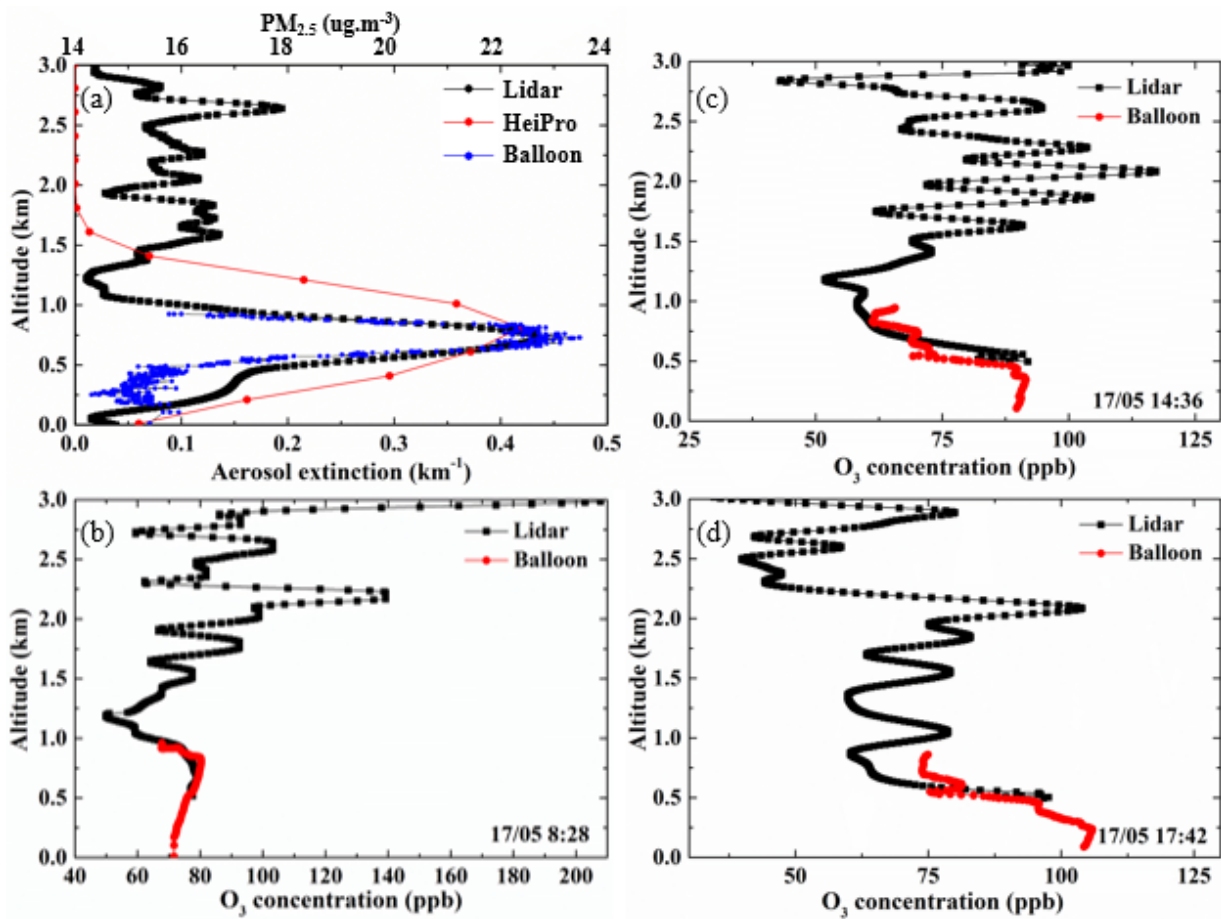
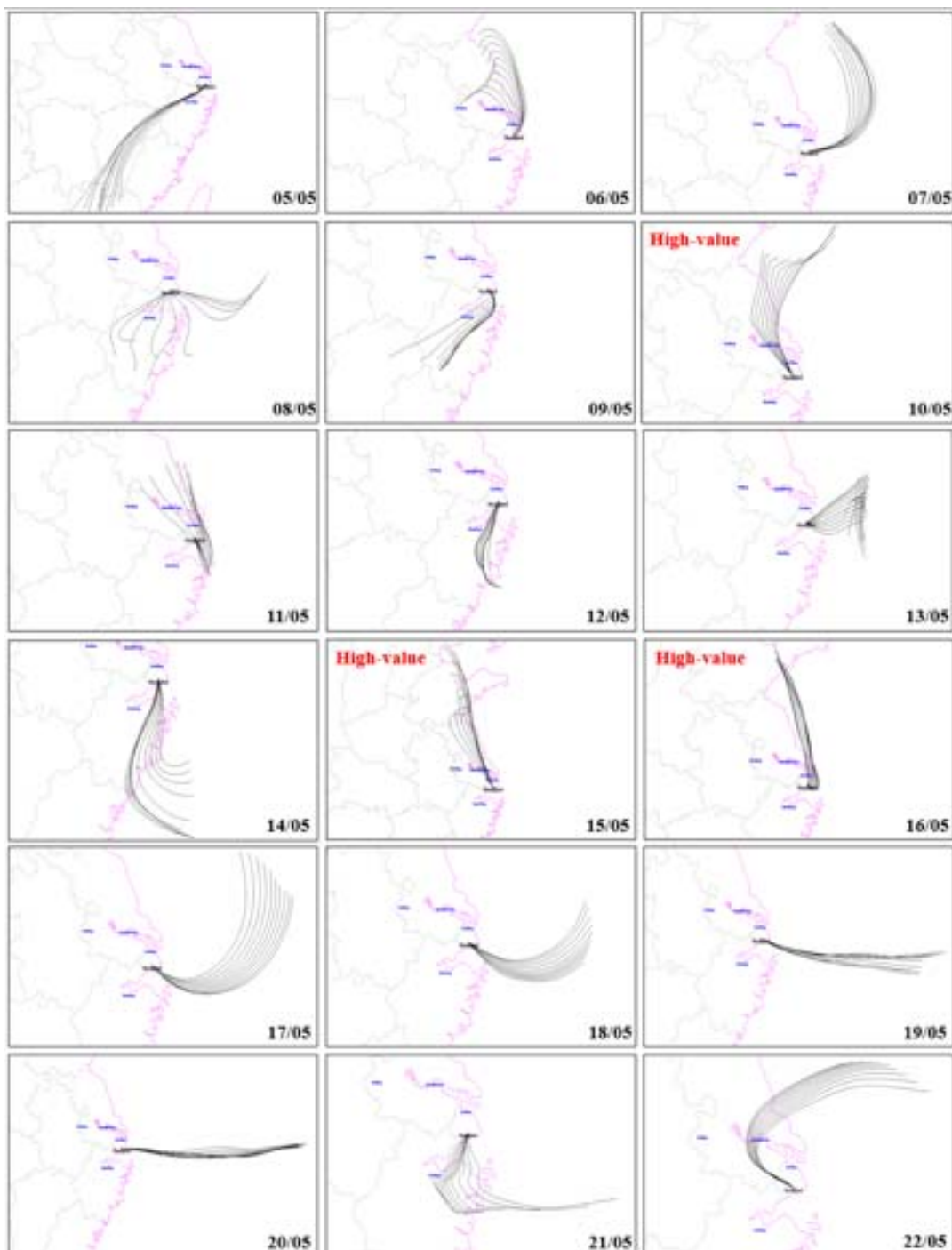


Figure S3: Inter-comparison of vertical distributions retrieved from MAX-DOAS measurement, lidar and balloon-borne observation on 17 May, 2016. (a) denotes balloon-based PM_{2.5} vertical profile measured during 08:10-08:40, lidar measured aerosol extinction profile at 08:25 and HeiPro retrieved aerosol extinction profile during 08:15-08:30. (b) to (d) shows balloon-based and lidar measured O₃ profiles at three different periods, respectively.



50 **Figure S4:** 24-h air mass back trajectories at 500 m computed from 8:00 to 17:00 LST (Local Standard Time) in Shanghai campaign site (30.8° N, 121.5° E).

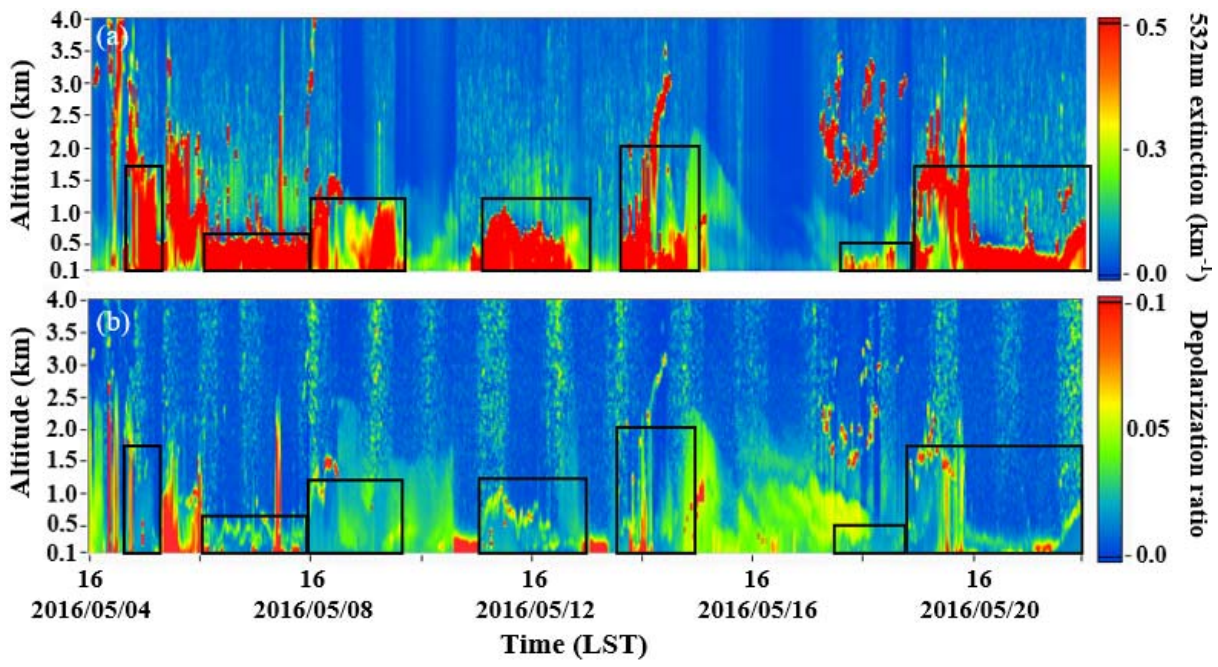


Figure S5: Time series of (a) aerosol extinction coefficient and (b) depolarization ratios.

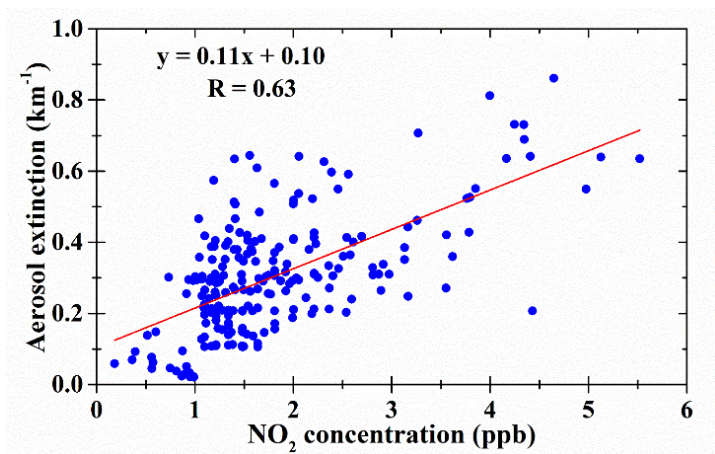


Figure S6. Scatter plots of aerosol extinction coefficient measured by Mie-Scattering depolarization lidar versus MAX-DOAS measurement of NO₂ from 100 to 1000 m above ground level.