

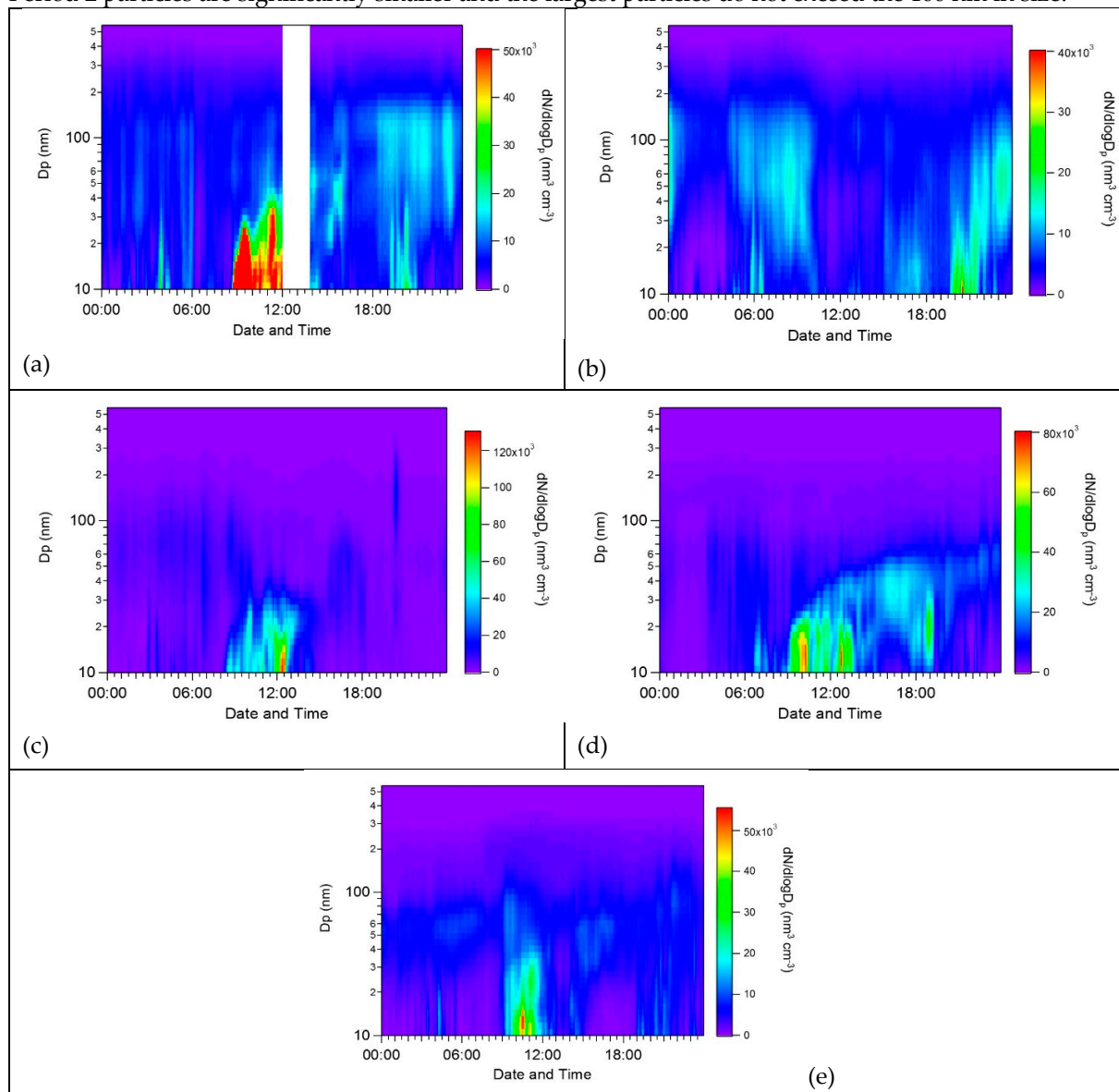
Supplement of

## CCN activity, variability and influence on droplet formation during the HygrA-CD campaign in Athens

Bougiatioti et al.

### 1. Daily aerosol number size distributions

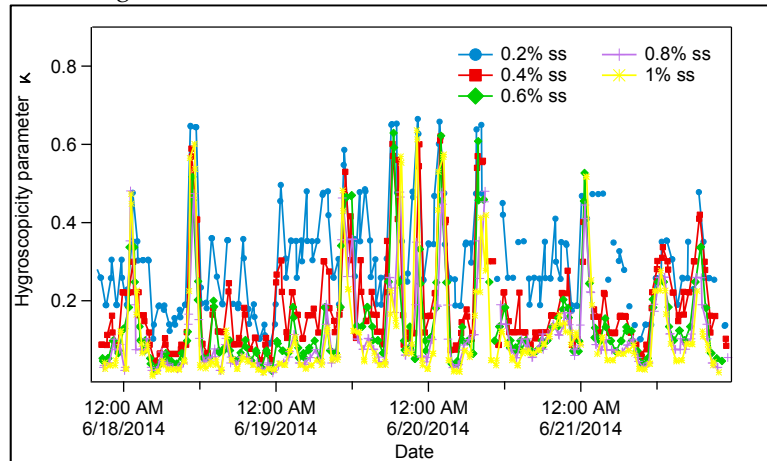
The derived aerosol number size distributions clearly depict the significant local sources influence especially during Period 1 (17-18/6), together with the presence of more aged aerosol, depicted by the separate mode in the size range of around 100 nm, which could be subject to cloud processing. During Period 2 particles are significantly smaller and the largest particles do not exceed the 100 nm in size.



**Figure S1.** Particle number size distributions for the whole measurement period: (a) 17 June 2014; (b) 18 June 2014; (c) 19 June 2014; (d) 20 June 2014; (e) 21 June 2014.

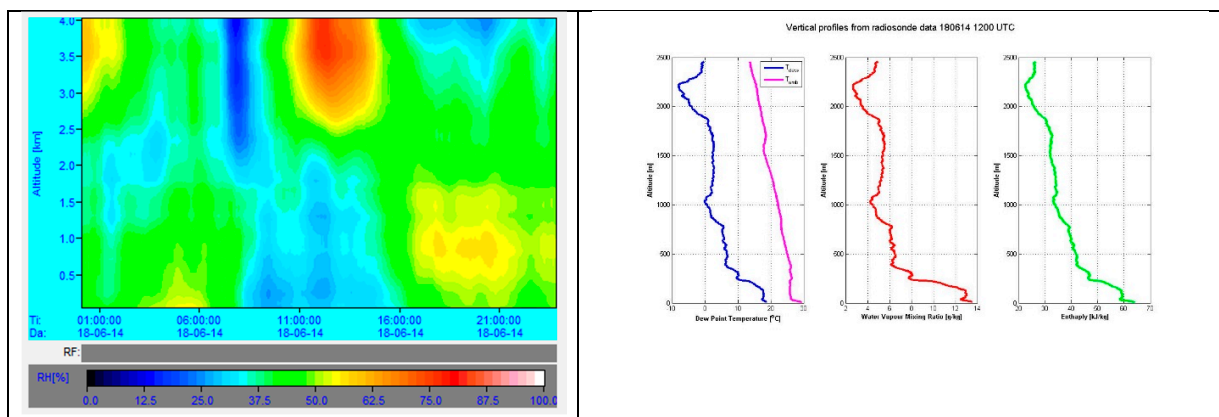
## 2. Particles hygroscopicity

The time series of the particles' hygroscopicity is depicted in Figure S2. The derived median values obtained for the five supersaturations were 0.36, 0.19, 0.13, 0.1 and 0.09, respectively. Values are also close to the proposed global average for continental aerosol of 0.3.



## 3. Relative Humidity profiles

During the first period (Period 1) with very low wind speeds, limited ventilation and high aerosol number, air masses contained high amounts of dust. On June 18<sup>th</sup> the three consecutive layers of dust particles seen by the lidar (1064 nm) causes a limited heating of the surface and thus, the development of the PBL is limited to low heights. As seen by the RH profile (left panel) values are very low, having a local noon minimum. The radiosonde (right panel) shows that above 400 m, the amount of water vapor is decreased considerably, as near ground the ratio of water vapor/dry air is 13 gr/kg while above 400 m it drops to 6 gr/kg.



On the other hand, during period 2 when “cleaner” conditions are observed, with lower aerosol numbers, higher wind speeds and more efficient dispersion, the PBL height reaches 2 km around local noon. The RH profile on June 20<sup>th</sup> exhibits very high values, contributing to the formation of clouds seen during that day, while high amounts of water vapor are detected by the microwave radiometer (MWR) (no radiosonde available that day).

