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Hygroscopic properties of atmospheric particles emitted during wintertime biomass burning episodes in Athens

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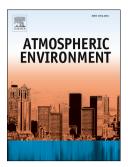
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15	Abstract
16	This study explores the Cloud Condensation Nuclei (CCN) activity of
17	atmospheric particles during intense biomass burning periods in an urban environment.

During a one-month campaign in the center of Athens, Greece, a CCN counter coupled with a Scanning Mobility Particle Sizer (SMPS) and a high resolution Aerosol Mass Spectrometer (HR-AMS) were used to measure the size-resolved CCN activity and composition of the atmospheric aerosols.

During the day, the organic fraction of the particles was more than 50%, reaching 22 23 almost 80% at night, when the fireplaces were used. Positive Matrix Factorization 24 (PMF) analysis revealed 4 factors with biomass burning being the dominant source after 25 18:00 until the early morning. The CCN-based overall hygroscopicity parameter κ 26 ranged from 0.15 to 0.25. During the night, when the biomass burning organic aerosol 27 (bbOA) dominated, the hygroscopicity parameter for the mixed organic/inorganic 28 particles was on average 0.16. The hygroscopicity of the biomass-burning organic 29 particles was 0.09, while the corresponding average value for all organic particulate 30 matter during the campaign was 0.12.

- 31 *Keywords*: Organic aerosol; fireplace emissions; urban air quality; CCN.
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33 **1. Introduction**

Atmospheric aerosols play an important role in the Earth's atmosphere, affecting the local and global climate (Vestin et al., 2007). Aerosol particles can affect the global radiation budget by scattering and absorbing solar radiation and thus have a direct effect on climate. In addition, depending on their physical and chemical properties, aerosols can serve as Cloud Condensation Nuclei (CCN) thereby indirectly affecting climate by Download English Version:

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