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Characterization of the wintertime particulate (PM1) pollution at an urban background site of Nicosia, Cyprus

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A 1-month intensive campaign was performed during December 2014 at Nicosia, Cyprus, a city of 240,000 inhabitants, representative of E. Mediterranean medium sized cities. This is the first of a series of intensive campaigns, part of the MISTRALS-ENVI-Med “CyAr” project (Cyprus Aerosols and gas precursors) and MISTRALS-ChArMEx program (Chemistry-Aerosol Mediterranean Experiment, http://charmex.lsce.ipsl.fr/), and , with the objective to distinguish between local and transported sources responsible for wintertime particulate pollution.

The mass and composition of the major chemical constituents of submicron aerosols (PM1) was monitored at an urban background station located at the city’s suburbs with a suite of real-time analyzers (TEOM 1400, OPC Grimm 1.108, Q-ACSM, Aethalometer AE31). Quality control of Q-ACSM and Aethalometer datasets was performed through closure studies (using co-located TEOM / OPC Grimm). The consistency of the dataset was further validated using the integrated (off-line) and real-time measurements performed by the local air quality network at other locations in the same city.

Very high levels of Black Carbon and organics were systematically observed every night, typically maximizing at 22:00 local time, pointing to local combustion sources most probably related to domestic heating. Similar pattern has been observed in other cities in the Eastern Mediterranean (Pikridas et al., 2013) and partly has been attributed to the economic crisis (Vrekoussis et al., 2013). Source apportionment of organic aerosols (OA) was performed using the SourceFinder software (SoFi, http://www.psi.ch/acsm-stations/me-2) allowing the distinction between various primary/secondary OA sources that allowed us to better characterize the combustion sources responsible for the observed elevated nighttime PM1 levels.

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