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

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As part of MISTRALS-ChArMEx (Chemistry-Aerosol Mediterranean Experiment, http://charmex.lsce.ipsl.fr/), and MISTRALS-ENVI-Med "CyAr" (Cyprus Aerosols and gas precursors) programs, a 1-month intensive field campaign has been performed in December 2014 at an urban background site of Nicosia (Cyprus) - a typical European city of the Eastern Mediterranean - with the objective to document the major (local versus imported) sources responsible for wintertime particulate (PM1) pollution.

Several near real-time analyzers were deployed for that purpose (TEOM 1400, OPC Grimm 1.108, Q-ACSM, Aethalometer AE31) allowing to investigate in near-real time the major chemical components of submicron aerosols (Black Carbon, Organics, Sulphate, Nitrate, Ammonium). Quality control of Q-ACSM and Aethalometer datasets was performed through closure studies (using co-located TEOM / OPC Grimm). Comparisons were also performed with other on-line / off-line measurements performed by the local Air quality network (DLI) at other locations in Nicosia with the objective to check the consistency and representativeness of our observations.

Very high levels of Black Carbon and OA were systematically observed every night (with maximum concentrations around 22:00 local time) pointing to local combustion sources most probably related to domestic heating. 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 and helped us to better characterize the combustion sources being responsible for the observed elevated nighttime PM1 levels.