



Detecting and assessing Saharan dust contribution to PM₁₀ loads: A pilot study within the EU-Life+10 project DIAPASON

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The EC LIFE+2010 DIAPASON Project (Desert dust Impact on Air quality through model-Predictions and Advanced Sensors Observations, www.diapason-life.eu) intends to contribute new methodologies to assess the role of aerosol advections of Saharan dust to the local PM loads recorded in Europe. To this goal, automated Polarization Lidar-Ceilometers (PLCs) were prototyped within DIAPASON to certify the presence of Saharan dust plumes and support evaluating their mass loadings in the lowermost atmosphere. The whole process also involves operational dust forecasts, as well as satellite and in-situ observations. Demonstration of the Project is implemented in the pilot region of Rome (Central Italy) where three networked DIAPASON PLCs started, in October 2013 a year-round, 24h/day monitoring of the altitude-resolved aerosol backscatter and depolarization profiles. Two intensive observational periods (IOPs) involving chemical analysis and detailed physical characterization of aerosol samples have also been carried out in this year-long campaign, namely in Fall 2013 and Spring 2014. These allowed for an extensive interpretation of the PLC observations, highlighting important synergies between the PLC and the in situ data. The presentation will address capabilities of the employed PLCs, observations agreement with model forecasts of dust advections, retrievals of aerosol properties and methodologies developed to detect Saharan advections and to evaluate the relevant mass contribution to PM₁₀. This latter task is intended to provide suggestions on possible improvements to the current EC Guidelines (2011) on this matter. In fact, specific Guidelines are delivered by the European Commission to provide the Member States a common method to assess the Saharan dust contribution to the currently legislated PM-related Air Quality metrics. The DIAPASON experience shows that improvements can be proposed to make the current EC Methodology more robust and flexible. The methodology DIAPASON recommends has been designed and validated taking advantage of the PLC observations and highlights the benefits of the operational use of such systems in routine Air Quality applications. Concurrently, PLC activities are contributing to the COST Action "TOPROF", an European effort aiming at the setup and operational use of Lidar-Ceilometers networks for meteorological and safety purposes.