

# Identification of African dust influence to PM<sub>10</sub> concentrations at the Athens air quality monitoring network during 2010

V. Aleksandropoulou and M. Lazaridis

Department of Environmental Engineering, Technical University of Crete, Chania,  
Polytechnioupolis, 73100, Greece

## INTRODUCTION

In order to protect human health the European Union has set limit values (Air Quality Standards - AQS) for PM<sub>10</sub> annual and day averaged concentrations with the Directive 2008/50/EC. Specifically:

- annual mean PM<sub>10</sub> concentrations < 40 µg/m<sup>3</sup>
- 24 hour limit value of 50 µg/m<sup>3</sup> must not be exceeded more than 35 times in a calendar year. However the exceedences of the AQS attributable to natural events can be discounted with regards the compliment of the Directive.

**Objective:** To identify high PM<sub>10</sub> events, exceeding the daily EU AQS limit values for PM<sub>10</sub>, caused by natural particulate inputs produced by Saharan air mass intrusions.

**Method/Data:** Study daily averaged PM<sub>10</sub> concentrations available from monitoring stations in the Athens Metropolitan area during 2010 (3 traffic urban (TU) stations Aristotelous - ARI, Marousi -MAR and Pireaus-1 - PIR-1; and at 4 background suburban (BS) stations Lykovrisi - LYK, Agia Paraskevi - AGP, Thrakomakedones - THR and Koropi - KOR). The dataset was retrieved from the Hellenic Ministry of environment, energy and climate change.

## METHODOLOGY

The methodology presented in EC (2002) was used to identify possible Saharan dust influences on PM<sub>10</sub> concentration at the Athens monitoring network stations:

1. Comparison of simultaneous time series of different monitoring stations of the network and from a rural background (RB) area close to the monitoring sites (availability day-averaged data >50%). Identification of periods with peaks and coincident peaks in PM<sub>10</sub> concentration.

• Data for ALI station were available only for the period 29/7/2010 – 31/12/2010 therefore THR station was used as reference station. Grivas et al. (2004) have shown that THR can be considered as regional background location to the city of Athens. To verify this assumption, the results on African dust events and net dust load at THR were compared with those at ALI station during the period with concurrent measurements.

2. Confirmation of the occurrence of desert dust events during the highlighted periods by combining the above data with information on atmospheric circulation, meteorological conditions and satellite imagery (OMI aerosol index maps; satellite imagery from the NASA SeaWiFS Project (surface level); daily dust load and concentration maps over Europe and the