



## **Sources of atmospheric aerosols controlling PM<sub>10</sub> levels in Heraklion, Crete during winter time**

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High concentrations of Particulate Matter (PM) in the atmosphere have negative impact to human health. Thresholds for ambient concentrations that are defined by the directive 2008/50/EC are frequently exceeded even at background conditions in the Mediterranean region as shown in earlier studies. The sources of atmospheric particles in the urban environment of a medium size city of eastern Mediterranean are studied in the present work in order to better understand the causes and characteristics of exceedances of the daily mean PM<sub>10</sub> limit value of 50  $\mu\text{g m}^{-3}$ . Measurements were performed at the atmospheric quality measurement station of the Region of Crete, at the Heraklion city center on Crete island, during the winter/spring period of 2014-2015 and 2015-2016. Special emphasis was given to the study of the contribution of Black Carbon (BC) to the levels of PM<sub>10</sub>. Continuous measurements were performed using a beta-attenuation PM<sub>10</sub> monitor and a 7-wavelength Aethalometer with a time resolution of 30 and 5 minutes respectively. For direct comparison to background regional conditions, concurrent routine measurements at the atmospheric research station of University of Crete at Finokalia were used as background reference. Analysis of exceedances in the daily PM<sub>10</sub> mass concentration showed that the total of the exceedances was related to long range transport of Saharan dust rather than local sources. However, compared to the Finokalia station it was found that there were 20% more exceedances in Heraklion, the addition of transported dust on the local pollution was the reason for the additional exceedance days. Excluding dust events, it was found that the PM<sub>10</sub> variability was dependent on the BC abundance, traffic during rush hours in the morning and biomass burning for domestic heating in the evening contributed significantly to PM<sub>10</sub> levels in Heraklion.