



## Long-term monitoring of particulate matter concentrations in Cyprus, Eastern Mediterranean

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Herewith, we present an extended time-series of seventeen years of particulate matter ( $PM_{10}$ ) observations conducted at the background Agia Marina monitoring station in Cyprus (EMEP, 532m a.s.l). The above time series has been analyzed on a multiannual, annual and diurnal basis to extract novel information on the contribution of the natural and anthropogenic PM sources influencing the ambient air in Cyprus and the Eastern Mediterranean Area. The analysis showed that the mean levels of  $PM_{10}$  at Agia Marina ( $29.6 \pm 10.1 \text{ ug m}^{-3}$ : 1996-2012) are comparable to the ones reported for the Finokalia background station in Greece ( $28 \pm 30 \text{ ug m}^{-3}$ : 2000-2005) and the rural Erdemli station in Turkey ( $36 \pm 28 \text{ ug m}^{-3}$ : 2000-2001) suggesting a common regional influence on the observed levels. Additional  $PM_{2.5}$  observations during the 2010-2012 period showed that the coarse particles comprise a large fraction (40-50% depending on the respective season) of the total  $PM_{10}$  particles as depicted from the ratio  $PM_{2.5}$  to  $PM_{10}$ . Noteworthy, the statistical analysis of the deseasonalized annual  $PM_{10}$  data revealed a significant decreasing trend of  $\sim 0.6 \text{ ug m}^{-3} \text{ y}^{-1}$  (Mann-Kendall,  $\alpha < 0.05$ ,  $Z = -2.3$ ) leading to an overall decrease of  $\sim 9 \text{ ug m}^{-3}$  during the monitoring period (1996-2012).

Moreover, the spatial distribution and variability of particulate matter in Cyprus has been examined by performing  $PM_{10}$  observations at all major urban centers including the capital Nicosia ( $50.4 \pm 22.2 \text{ ug m}^{-3}$ : 2005-2012), Larnaca ( $52.3 \pm 21.9 \text{ ug m}^{-3}$ : 2003-2012), Limassol ( $52.0 \pm 21.3 \text{ ug m}^{-3}$ : 2006-2012), Paphos ( $42.3 \pm 18.3 \text{ ug m}^{-3}$ : 2005-2012) as well as at the industrial Zygi area ( $43.6 \pm 23.1 \text{ ug m}^{-3}$ : 2002-2012). The acquired information focusing on the understanding of the factors impacting on ambient PM levels is of particular importance in the view of proposing updated and effective mitigation strategies. The latter is mandatory as the current 24h EU limits of the PM exceedances of  $50 \text{ ug m}^{-3}$ , is frequently exceeded in Cyprus. Notably, almost 40% of the days in the city centers are characterized by elevated  $PM_{10}$  levels ( $> 50 \text{ ug m}^{-3}$ ). However, when taking into account the regional influence of the transported air massed on the daily  $PM_{10}$  levels by subtracting the background levels of Agia Marina station, the respective number of the computed exceedances becomes significantly lower (8%).