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## Variability in regional background aerosols within the Mediterranean

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**Abstract.** The main objective of this study is the identification of major factors controlling levels and chemical composition of aerosols in the regional background (RB) along the Mediterranean Basin (MB). To this end, data on PM levels and speciation from Montseny (MSY, NE Spain), Finokalia (FKL, Southern Greece) and Erdemli (ERL, Southern Turkey) for the period 2001 to 2008 are evaluated. Important differences on PM levels and composition are evident when comparing the Western and Eastern MBs. The results manifest W-E and N-S PM<sub>10</sub> and PM<sub>2.5</sub> gradients along the MB, attributed to the higher frequency and intensity of African dust outbreaks in the EMB, while for PM<sub>1</sub> very similar levels are encountered.

PM in the EMB is characterized by higher levels of crustal material and sulphate as compared to WMB (and central European sites), however, RB nitrate and OC + EC levels are relatively constant across the Mediterranean and lower than other European sites. Marked seasonal trends are evidenced for PM levels, nitrate (WMB), ammonium and sulphate. Also relatively higher levels of V and Ni (WMB) are measured in the Mediterranean basin, probably as a consequence of high emissions from fuel-oil combustion (power generation, industrial and shipping emissions).

Enhanced sulphate levels in EMB compared to WMB were measured. The high levels of sulphate in the EMB may deplete the available gas-phase NH<sub>3</sub> so that little ammonium nitrate can form due to the low NH<sub>3</sub> levels.

This study illustrates the existence of three very important features within the Mediterranean that need to be accounted for when modeling climate effects of aerosols in the area, namely: a) the increasing gradient of dust from WMB to EMB; b) the change of hygroscopic behavior of mineral aerosols (dust) via nitration and sulfation; and c) the abundance of highly hygroscopic aerosols during high insolation (low cloud formation) periods.

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