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Size-segregated mass distributions of aerosols over Eastern Mediterranean: seasonal variability and comparison with AERONET columnar size-distributions

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Abstract. This work provides long-term (2004–2006) size segregated measurements of aerosol mass at a remote coastal station in the southern Europe, with the use of size-selective samplings (SDI impactor). Seven distinct modes were identified in the range 0–10 μm and the dominant were the "Accumulation 1" (0.25–0.55 μm) and the "Coarse 2" (3–7 μm) modes. The seasonal characteristics of each mode were thoroughly studied and different sources for submicron and supermicron particles were identified, the first being related to local/regional and transported pollution with maximum in summer and the latter to dust from deserted areas in Northern Africa maximizing in spring. On average, $\text{PM}_{2.5}$ and PM_{10} accounted for 60% and 40% of PM_{10} mass, respectively. The representativity of the ground-based measurements for the total column was also investigated by comparing the measured aerosol mass distributions with the AERONET volume size distribution data. Similar seasonal patterns were revealed and AERONET was found adequate for the estimation of background levels of both fine and coarse particles near surface, with certain limitations in the case of pollution or dust abrupt episodes due to its low temporal coverage.

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