

## ATMOSPHERIC PARTICULATE MATTER BY SEM-EDX

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Particulate Matter, depending on its nature, has very different size, composition and morphology. By the combination of these criteria it is possible to distinguish the emitting sources (primary or secondary). The shape and the dimension of the particles have also a direct interaction with the risk assessment for human health. Scanning Electron Microscope S.E.M. was used for the dimensional and morphological characterization of P.M. on filters and the EDX system for chemical identification of the main constituents. With the proposed method quantitative results were obtained either for the number, surface and mass distribution of the particles or for the morphological characterization. Large numbers of particles were analyzed ( $>10^5$  single particles for each filter) due to image processing of the electron microscope images. Single particles chemical analysis was performed to have information on the nature of the aerosols and together with the dimensional and shape parameters (roundness and fractal dimension) allows to identify the most probable direct source emission or the secondary source processes. We also discussed information on the different possible formation pathways (chemical reaction in atmosphere, nucleation, condensation, coagulation and cloud processes). In particular it was possible to distinguish different shapes of particles found in urban, rural or marine environment by the analysis of several filters collected in different areas of the Tuscany region. The results show interesting correlation between PM10 concentrations and meteorological data. These results were found to be crucial for the characterization of the P.M. and for the sources apportionment study.