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EGU24-16233
EGU General Assembly 2024

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Particulate Matter (PM) has a significant impact on the quality of life for an increasing number of people worldwide, especially in urban environments. Even though air quality control represents a crucial and actual problem, particulate analysis is often performed exclusively by the investigation of size distribution and concentration, providing limited information on the chemical composition and the origin of pollutants.

In this study it has been chosen to analyse PM_{10} samples coming from five air quality monitoring stations (Torino-Rebaudengo, Torino-Lingotto, Oulx, Ceresole Reale and Cavallermaggiore) of Regional Agency for the Protection of the Environment (Arpa Piemonte) spread in the Piedmont region. In particular, two stations (Torino-Rebaudengo and Torino-Lingotto) are located in the urban context of Turin (traffic and a background station) which is one of the most polluted city in Europe especially during winter when atmospheric stability condition combined to low precipitation and slow ventilation cause contaminant stagnation.

The analysis has been carried out using primarily Raman Spectroscopy to identify the main PM component. Scanning Electron Microscopy (SEM) equipped with an Energy- Dispersive X-ray (EDX) has been also used to obtain further information about the elemental composition and the size distribution, and to confirm the Raman results. A representative amount of particles with a geometric size between 1 µm and 10 µm has been analyzed to investigate the different PM composition and evaluate the chemical and seasonal variation in the PM composition. The main compound found are amorphous carbon, nitrate salts, sulfate salts, iron oxides, quartz and other silicate compounds, pollen but also few particles of titanium oxide and graphite.

Nitrate and sulfate content are directly related to warm and cold seasons; while amorphous carbon and iron oxides are strictly related to specific site features (geographic variation).