SINGLE-PARTICLE ANALYSIS OF ATMOSPHERIC INORGANIC AEROSOL IN THE BASILICATA REGION (SOUTHERN ITALY)

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150 samples of airborne particulate matter (PM10) were collected from April 2007 to July 2008 in four different areas of the Basilicata region (southern Italy). A total of about 150.000 particles was analyzed by a Field Emission Scanning Electron Microscope equipped with an Energy-Dispersive Spectrometer (FESEM-EDS). The data set was reduced by INCA Feature software using mineralogical criteria. Eight particle groups were identified among which Silicate, Sulfur and Industrial particles were found to be the most abundant. Allumosilicates are by far the most common type of particles even if a part of these can be spherical-shaped fly ash particles. The industrial area of Potenza, characterized by metallurgic industries, seems to affect significantly the high presence of metal particles (mainly Fe-Zn spinels) found in many samples analyzed. The anthropogenic pressure given by Na, Cl and Na-S particles found both in the Lavello and Matera samples is likely to be linked to combustion processes from waste dumps or incinerators situated in these areas. The Viggiano area is episodically characterized by high concentrations of calcium sulphates and S-only particles as well as a significant presence of siliceous nanospheric particles aggregate. The Viggiano sampling station is situated close to a big oil rig which is likely to be the major cause of the presence of these particles in the atmosphere. Significant differences were found in the particulate concentration and composition of the samples collected in different seasons and different parts of the day. In summer crustal particles are the most abundant, while in winter both sulfur-rich particles and industrial particles are the most abundant, especially during the nighttimes due to climatic conditions (atmospheric stability, thermal inversion etc.). Sulfur-rich particles are more concentrated during the daytime because of solar radiation and anthropic emissions.

Keywords: single-particle analysis , airborne, Scanning Electron Microscopy