EYJAFJALLAJÖKULL VOLCANIC ASH: INFLUENCE ON PM 2.5 MEASUREMENTS IN SOUTHERN ITALY

ANTONIO LETTINO[1]*, ROSA CAGGIANO[1], SAVERIO FIORE[1], MARIA MACCHIATO[2], SERENA SABIA[1], SERENA TRIPPETTA[1]

[1]*Istituto di Metodologie per l'Analisi Ambientale, National Research Council of Italy (IMAA - CNR), Tito Scalo Z.I., 85050, Italy*
[2]*Dipartimento di Scienze Fisiche (DSF), CNISM, Università Federico II, Napoli, 80126, Italy*
lettino@imaa.cnr.it

The strong eruptions of the Eyjafjallajökull volcano (Southern Iceland) on 14th April 2010 produced injection in atmosphere of volcanic ash particles that reached Southern Italy on 20 April. In order to evaluate the falling of the volcanic ash particles onto the ground at a long distance from the eruptive centre, PM2.5 in-situ measurements were performed at the Istituto di Metodologie per l'Analisi Ambientale of the National Research Council of Italy (IMAA -CNR, Tito Scalo - Southern Italy) from 20th to 26th April 2010. Concentration of PM2.5, chemical composition, mineralogical and morphological features of the PM2.5 particles collected during the passage of the volcanic ash were investigated. Results show that PM2.5 and Al, Ca, Fe, K, Mg, Mn and Ti daily concentrations were characterized by an increasing pattern during the first days of sampling. Field Emission Scanning Electron Microscope (FESEM) observations revealed the presence of volcanic ash particles in PM2.5 samples. Complex secondary aerosols that could be related to Eyjafjallajökull volcanic emissions were found in the fine fraction (Feret Diameter 0.8μm). Moreover, volcanic ash particles were also found in the coarser fraction: they are mainly composed by mixtures of different minerals strictly connected to basaltic-to-andesitic magmas and characterised by Energy Dispersive X-ray Spectrometer (EDS) spectra always and are signed by the presence of sulfur. Finally, SEM-observed volcanic particles show the presence on their surfaces of very little particles that can be condensate phases of soluble components manly derived from the oxidation and hydration of sulphurous anhydride released during eruptions.

Keywords: volcanic ash, chemical composition, SEM