



THE USE OF MOSS-BAGS TECHNIQUE TO VOLCANIC AEROSOLS INVESTIGATION ON MT. ETNA (ITALY)

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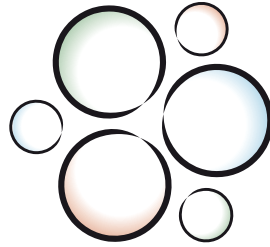
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Explosive eruptions and volcanic passive degassing inject large quantities of gas and particles into the atmosphere that are ultimately deposited at the Earth's surface through wet or dry deposition processes, affecting the atmosphere, the hydrosphere and the biosphere. Mount Etna (Italy) is one of the most prodigious and persistent source of gases and particles to the troposphere (Calabrese et al., 2011). Volcanic emissions were studied at Etna volcano by using moss-bags technique. Mosses (*Sphagnum* species) were exposed around the volcano at different distances from the active vents to evaluate the impact of its emissions into the atmosphere and in the local surrounding. Chemistry, micromorphology and mineralogy of volcanic particulate intercepted by mosses were investigated using scanning electron microscopy (SEM) equipped with energy dispersive spectrometer (EDS). Concentrations of major and a large suite of trace elements were analysed by inductively coupled mass and optical spectrometry (ICP-MS and ICP-OES) after total acid digestion. The results confirmed the huge amount of silicates, sulfates and halides compounds emitted into the atmosphere from Mount Etna. X-ray microanalysis showed that chemical composition of the particles is mostly defined by silicate (from pure silica to metal-rich silicate composition) and sulfate/halide compounds. The contents of major and trace elements in the *Sphagnum* moss-bags significantly increased after their exposure to volcanic emissions, confirming mosses as efficient accumulators. Metals uptake rate rapidly decreases with the distance from the volcanic emission vents. The elements that showed the greatest accumulation after exposition were S, Na, Fe, Al, Cu, V, As, Cd, Li, Se, Sc, Th, Bi, Tl. This study confirmed the marked environmental impact of volcanic emissions in the eastern sector of Etna, leading to an intense "geochemical anomaly" of volatile major and trace elements due to the fumigation by the volcanic plume, in agreement with passive biomonitoring studies reported by previous authors. Finally, moss-bags techniques provide a cheap and efficient method to investigate quantitatively in space and time the environmental impact of volcanogenic atmospheric deposition.

Calabrese S., Aiuppa A., Allard P., Bagnato E., Bellomo S., Brusca L., D'Alessandro W., Parello F. (2011) Atmospheric sources and sinks of volcanogenic elements in a basaltic volcano (Etna, Italy). *Geochimica et Cosmochimica Acta*, 75. pages 7401-7425

The background of the cover features a microscopic view of various blue dust particles of different sizes and shapes, some spherical and some irregular, set against a dark background. The particles are illuminated from the side, creating highlights and shadows that give them a three-dimensional appearance.

DUST



2014

**Book of
ABSTRACTS**

**International Conference on
ATMOSPHERIC DUST**

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Book of Abstracts



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PREFACE

This volume contains the abstract of the scientific contributions presented to DUST2014, the 1st International Conference on Atmospheric Dust, held in Castellaneta Marina (Italy) from 1 to 6 June 2014. The meeting was organized by the Associazione Italiana per lo Studio delle Argille - onlus (AISA, Italian Association for the Study of Clays) and the Istituto di Metodologie per l'Analisi Ambientale (IMAA, Institute of Methodologies for Environmental Analysis), National Research Council of Italy (CNR).

The scientific program of the meeting included 5 plenary lectures, 313 oral and 153 poster contributions. All the contributions were revised by 72 international experts, many of them being the conveners of the 34 sessions dealing with the seven themes of the Conference: Chemical & Mineralogical Studies, Geological Records, Health & Environment, Instrumentations & Measurements, MF: Modelling & Field Studies, The Universe of Dust - General Session. Our sincere thanks go to these colleagues who devoted their time to the DUST2014.

Our heartfelt thanks go to the many people who worked hard to organize the scientific and social events as well as to the Institutions and business enterprises which supported the meeting. We owe a special thank-you to the delegates, more than 400 coming from 52 Countries, who contributed to make this meeting a memorable event.

Saverio Fiore
Chair, DUST2014

Organized by

Italian Association for the Study of Clays (AISA - onlus)

Institute of Methodologies for Environmental Analysis (IMAA) - CNR

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