

**P 8.7: Poster Session 1 on Monday, 16:30-18:30****Plants as biomonitors for volcanic emissions**

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Biomonitoring techniques have been widely used in environmental studies to monitor anthropogenic pollutant. Recently such techniques have been applied also to ascertain the impact of contaminants naturally released by volcanic activity.

In the present study a biomonitoring surveys has been performed in many different active volcanic systems: Mt. Etna and Vulcano (Italy), Nisyros (Greece), Nyiragongo (DRC), Masaya (Nicaragua), Gorely (Kamchatka, Russia). We sampled leaves of different species *Betulla aethnensis*, *Pinus nigra*, *Populus tremula*, *Senecio aethnensis* and *Rumex aethnensis* on Etna, *Cistus creticus* and *salvifolius* on Vulcano and Nisyros, *Senecio ssp.* on Nyiragongo, a Fern on Masaya and *Salix arctica* at Gorely. All samples were analyzed by ICP-MS and ICP-OES for 49 elements after acid digestion with a microwave oven (HNO<sub>3</sub> + H<sub>2</sub>O<sub>2</sub>).

Major constituents in leaves are K, Ca, Mg, Na, Si, Al and Fe ranging from about 10<sup>3</sup> to 10<sup>5</sup> ppm. Manganese, Sr, Rb, Ba, Zn, B, Cu show also relatively high concentrations (10<sup>0</sup>-10<sup>3</sup> ppm) while the remaining elements (As, Bi, Cd, Ce, Co, Cr, Cs, Ga, Li, Mo, Ni, Pb, Sb, Sc, Se, Th, Tl, U, V, Y and lanthanide series) display much lower values (10<sup>-4</sup>-10<sup>1</sup> ppm). Nearly all investigated elements show their highest concentrations in the samples collected closest to the main degassing vents (open craters, fumarolic fields). Increased concentrations are also found in the samples collected in the downwind direction where volcanic emissions are prevalingly dispersed.

Leaves collected along radial transects from the active vents, highlight that the levels of metals decrease from one to two orders of magnitude with increasing distance from the source. The decrease is stronger for volatile elements, which are highly enriched in volcanic emissions, (As, Bi, Cd, Cs, Pb, Sb, Tl) than for more refractory elements (Al, Ba, Sc, Si, Sr, Th, U). The different species of plants show significant differences in the bioaccumulation processes for most of the analyzed elements, in particular lanthanides, which are systematically enriched in Rumex leaves. Needles of pine (non-deciduous tree) represent a good tool for biomonitoring investigation because they are important tracers of accumulation with time.

The high concentrations of many toxic elements in the leaves allow us to consider some of these plants as highly tolerant species to the volcanic emissions, and suitable for biomonitoring researches further confirming their strong potential in tracing the impact and geographic distribution of these natural contaminants.