



Magnetic properties of the lichen *Pseudevernia furfuracea* transplanted near a cement plant in NE Italy

Aldo Winkler (1), Danijela Kodnik (2), Fabio Candotto Carniel (2), and Mauro Tretiach (2)

(1) Istituto Nazionale di Geofisica & Vulcanologia, Via di Vigna Murata 605, 00143, Roma, Italy (aldo.winkler@ingv.it), (2) Università degli Studi di Trieste, Dipartimento di Scienze della Vita, Via Giorgieri 10, 34127, Trieste, Italy

The magnetic properties of transplanted samples of the epiphytic lichen *Pseudevernia furfuracea* (L.) Zopf var. *furfuracea* have been analyzed in the framework of a biomonitoring study in NE Italy focused on a middle-sized cement plant (clinker production: 556,000 ton year⁻¹ in 2012).

The lichen transplants were exposed for 2 months in 40 sites distributed all around the cement plant: 37 sites were located at the knots of a 700 m step grid covering agricultural, forest and urban areas and a large industrial zone, and 3 sites were located in the nearby urban centers.

The elemental analysis of the exposed samples revealed a limited impact of the cement plant on the territory, while that of the industrial zone, located in the SW corner of the study area, seemed to be generally stronger. The magnetic properties of the transplanted lichens statistically agree with the elemental concentration dataset, showing that the cement plant has no significant impact on the magnetic properties of the lichens transplanted in the whole area. The samples from the industrial area show the highest values of magnetic susceptibility and of saturation magnetization and saturation remanent magnetization, in coherence with the spatial distribution of the elemental concentration values. The magnetic mineralogy is reasonably uniform throughout the whole set of samples, and is dominated by magnetite-like minerals. The magnetic mineralogy of the sample nearest to the cement plant is not magnetically distinguishable from that of the other lichen samples and does not seem to be linked to the magnetic properties of the cement therein produced.

The full agreement between the magnetic and elemental datasets underlines a modest environmental impact of the cement plant, with respect to the other industrial activities in the same area.