

## **Portable multi-analytical approach for identifying asbestos minerals in situ**

BLOISE A.<sup>1\*</sup>, MIRIELLO D<sup>1</sup>

<sup>1</sup> Department of Biology, Ecology and Earth Sciences,  
University of Calabria, Rende, CS, Italy  
(\*correspondence: andrea.bloise@unical.it)

An innovative, and as yet, untested approach is to analyse serpentinite and metabasite rocks containing asbestos using a portable multi-analytical device, which combines portable digital microscope (p-DM), portable X-ray Fluorescence (p-XRF) and portable micro-Raman Spectroscopy (p- $\mu$ R) [1]. The analyses were carried out in two inactive quarries of serpentinitic and metabasitic rocks from the Gimigliano-Mount Reventino Unit (Southern Italy) already characterized in previous studies [2], with the aim of testing the efficiency of these portable tools. This fact was never recognized in previous papers. Although, is well known worldwide that natural occurring asbestos (NOA) and asbestos containing materials (ACMs) can adversely affect human health.

The detection of asbestos minerals is essential from both a scientific and legislative point of view, especially for the administrative agencies whose task it is to safeguard public health and implement construction and safeguard policies (e. g., civil constructions, building stones, road yards and quarry excavations). The characterization of outcropping rocks using portable devices enabled us to detect the presence of chrysotile and asbestos tremolite. The results of this study show that the simultaneous use of various portable devices (p-DM, p-XRF and p- $\mu$ R) may prove useful for: i) the rapid identification of fibrous asbestos minerals especially when sampling is not possible (e.g. doorways of churches or columns with serpentinite rocks); ii) developing a targeted sampling plan for identifying areas polluted with both asbestos minerals and heavy metals.

[1] Bloise A. & Miriello D. (2018), Submitted to Geosciences.

[2] Bloise, A. Critelli, T. Catalano, M. Apollaro, C. Miriello, D. Croce, A. Barrese, E. Liberi, F. Piluso, E. Rinaudo, C. Belluso, E. (2014), *Environmental Earth Sciences* 71 (8), 3773-3786.