



Mineralogical and geochemical study of serpentinite and related soils in the area of San Severino Lucano (Basilicata, Southern Italy): an example of N.O.A. occurrence and impact on population

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The health issue associated to the exposure to asbestos is now a day well-known thanks to many study carried out over the last decades. Asbestos minerals are the mainly constituents of serpentinite and metabasite rocks and could be present in the related soils developed after them. As a consequence of human activities, the release of asbestos minerals into the air increase the risks for human health related to the potential fibres inhalation. With the aim to determine the presence of N.O.A. (Naturally Occurring Asbestos) and their impact on the population, serpentinite rocks and related soil samples located at the San Severino Village (Basilicata region, Southern Italy) have been collected and investigated. This village represents a interesting case study because of the geographic insulation from large urban centers as well as industrial and/or commercial plants, that likely exclude sources of asbestos and asbestiform minerals other than those ones related to the geological features.

Detailed characterization of representative specimens was carried out by means of different analytical techniques such as Optical microscopy, XRF, XRPD, SEM-EDS, TEM and TG/DSC. Results pointed out that all the samples contain asbestos minerals (e.g. chrysotile asbestos, tremolite-actinolite) with fibres size that may be associated with carcinogenesis when breathed (World Health Organization, length $>5 \mu\text{m}$; width $<3 \mu\text{m}$). Moreover, the interpretation of endo- and exo- thermic peaks of DSC-DDSC curves allowed the serpentine polymorph distinction and the recognition of other phases characterizing the samples (e.g. chrysotile, lizardite, antigorite, polygonal serpentine). In addition, the preliminary geochemical investigation on both rocks and soils highlights that four toxic elements (Cr, Co, Ni, V) in almost all the specimens exceed the regulatory thresholds for public, private and residential green use.

In conclusion, our study aims to raise awareness in population who lives near to sites where NOA can be found as well as the institutions that should publish local maps indicating areas with mineralogical concerns, provided that the dispersion of fibres could be associated with health issues.

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