ASBESTOS IN THE NATURAL ENVIRONMENT – EUROPEAN OCCURRENCES AND THE LACK OF LEGISLATION

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Naturally occurring asbestos in Europe

Asbestos fibers, recently referred to as naturally occurring asbestos (NOA), are found in the environment as a result of certain geological processes. Asbestos fibers pose a human health risk in any moment if they become respirable or less frequently ingestible from contaminated waters. NOA fibers in Europe are part of ophiolitic environments in mafic and ultramafic rocks that previously underwent metamorphic and tectonic stages. Occurring together with the regulated asbestos (chrysotile, the amphiboles riebeckite, actinolite, anthophyllite, grunerite and tremolite) there are other minerals showing asbestiform habit that in one case also pose human health risk (e.g., balangeroite), whereas at other cases these are harmless (e.g., brucite, pyroaurite, HYSKAJ et al., 2020). However, the presence of these latter may lead to the overestimation of the amount of and risk related to the given asbestos occurrence.

For this reason, the mapping and detailed mineralogical characterisation of natural asbestos occurrences is necessary to create a database, make advice on safe land use, help urban planning and public awareness. Various fibrous phases such as brucite (nemalite), pyroaurite-2*H* or even the elongated mineral particulates (EMP) are often mixed with or accompanying clearly hazardous phases (regulated asbestos). In such cases, it is important to perform a detailed local phase and chemical analysis in order to properly estimate the asbestos hazard at the natural occurrence. Only a macroscopic evaluation would lead us to an overestimation of the asbestos fibers present in the host rock. At the moment there are few actions taken on the national level (France - CAGNARD & LAHONDÈRE, 2020; Italy - BARALE *et al*., 2020) to map and show the likelihood of NOA based on previous geological information.

Legislation and guidance

Asbestos minerals are all declared as Type 1 carcinogen agents regardless of the asbestos mineral species (IARC, 2012). In Europe it is prohibited to mine, process and use asbestos, the only accepted activities related to asbestos is the removal of asbestos-bearing materials from buildings. In working environments, there is an exposure limit set at 0.1 fibres/cm^3 in 8-hour time-weighted average (TWA) (2009/148/EC). The focus of these regulations is to protect workers or possible exposure from the industrially used asbestos (the true, highly fibrous variety of chrysotile and the amphiboles used). In nature, all transitions from cleavage fragments to real fibers are possible to occur. The natural asbestos occurrences are not included or regulated in any of the directives.

So far, many studies on NOA have followed the recommendations of the World Health Organization (WHO, 1997) on fiber identification and counting criteria but also on analytical methodology. Being a carcinogenic agent, having no safe threshold of exposure and occurring naturally in several countries in Europe, a European Union-level collaboration of experts is needed to set up criteria for identifying risky localities, creating a risk assessment framework and the legislative background for NOA treatment and management, with special emphasis laid on the society-related aspects like safe landuse.

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