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Microtomography investigation of asbestos and fibrous minerals bearing ophiolites

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High-resolution X-ray Computed Tomography (HRXCT) or micro-CT (μCT) or CT is a frequently used non-destructive 3D imaging and analysis technique for the investigation of internal structures of a large variety of objects, including geo-materials (Cnudde & Boone, 2013) and NOA (Naturally Occurring Asbestos). We adopted such technique on a series of specimens collected from various sites , which include active either active and abandoned quarries in northern and southern Italy, in order to image and quantify the size and 3D distribution of potentially dangerous fibrous minerals within asbestos-bearing rocks. Harmful asbestos minerals that are regulated by law (in Europe and in several countries worldwide) include chrysotile, tremolite, crocidolite, anthophyllite, actinolite and amosite (Bloise & Miriello, 2018). This approach has been supported by other analytical techniques on the same rocks, which allow the mineral chemistry, rock fabric, and asbestos minerals to be detected and characterized. Preliminary results indicate a potential natural hazard for health effects linked to the occurrence and spatial distribution of fibrous minerals like tremolite and serpentine polymorphs within the studied rocks. Our study might contribute to a better understanding of asbestos and asbestiform minerals geometry and arrangement within rocks, and of fibres splitting and release into the environment. At the same time, establish it could also indicate new ways to limit exposure or regulate public accesses to risky sites.

References

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