

New findings on mineral fibres characteristics and concentration in groundwater and their mobility through water flowing in Naturally Occurring Asbestos (NOA) rich settings

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In Naturally Occurring Asbestos (NOA) rich settings, water pollution by asbestos is likely to occur from weathering and erosion of asbestos-bearing rocks, such as meta ophiolites (e.g. serpentinite rocks and metabasites). Asbestos water dispersion may occur as a consequence of superficial and groundwater flow through rock formations containing NOA, depending on several characteristics of either the rocks (e.g. mineralogical composition, fracture grade) and hence the water (e.g. pH, speed).

Given the importance of groundwater resources as source of drinking water and for agricultural and industrial activities, groundwater asbestos pollution represents an environmental problem and could even constitute a risk for human health. In fact, waterborne asbestos can come into contact with human beings as airborne fibres after water vaporization, or by ingestion, especially if they are present in drinking water. While a lot is known about diseases caused by airborne asbestos respiration (IARC, 2012), not enough has been yet understood about potential noxiousness of its ingestion. For this reason, the necessity to set a Maximum Contaminant Level (MCL) for asbestos in potentially usable water is still debated (WHO, 2020).

To investigate asbestos occurrence in water due to natural environmental causes, we selected a study area in Piedmont, not far from Torino, a region surrounded by the North-Western Alps which are rich in NOA and also in naturally occurring asbestiform minerals non-asbestos classified (Compagnoni & Groppo, 2006; Belluso et al., 2019). There, sampling and analysis campaigns regarding the water system have been settled to investigate if, how and which type of mineral fibres (particularly asbestos ones) could occur in water, trying to correlate them to the local geolithology and hydrogeology.

The results of two surface water and groundwater sampling and analysis campaigns will be presented. The main aim is to investigate the principal aspects related to asbestos and asbestiform fibres presence in water, particularly groundwater, linked to hydrological and geolithological characteristics of the reservoir and to evaluate the seasonal variability. Additionally, following recent findings on asbestos mobility through soil (Mohanty et al., 2021), guidelines to create a flow model which describes mineral fibres mobility in aquifers will be presented following laboratory tests based on contaminated water circulation through packed columns.

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