



# UNIVERSITÀ DI PAVIA

## Corso di Dottorato in Scienze della Terra e dell'Ambiente

### FORM PER PROGETTI BANDO DOTTORATO

#### 1. Project title

Assessing the origin and migration of potentially toxic elements (PTEs) in water resources from the former Balangero asbestos mine using isotope techniques

#### 2. Proposer

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#### 4. Key words

(Max. 5 – at least 2)

neutral mine drainage, natural background level, stable metal isotopes

#### 5. Abstract

(Max.1.500 characters with spaces)

The former Balangero asbestos mine (~30 km NW of Turin, N Italy) operated the extraction of chrysotile from the 1920s to the 1990s. The mine is hosted in serpentinite rocks and is characterised by the presence of veins of different origin and composition, and variably associated metallic ores. Since 1998, as “Contaminated Site of National Interest”, its remediation is under the responsibility of the Italian Ministry of the Environment, Land and Sea.

Potentially Toxic Elements (PTEs) groundwater contamination results from neutral mine drainage. The geochemical processes occurring in such an environment are still poorly known. In this context, the use of stable isotopes (water, sulphur, trace metals) can provide useful insights to define groundwater circulation and water-rock interaction processes leading to the PTEs solubilisation. Moreover the project aims at testing the applicability of stable metal isotopes (Fe, Ni and/or Cr) as emerging isotope techniques to trace the origin, the mobilisation and the possible mitigation measures to reduce the environmental impact and the health risk to the population.

The results will allow confirming the natural origin of the elevated PTEs concentrations in groundwater, identifying the impacted areas, and evaluating the risk for the inhabitants and the environment. In addition, they will serve as a basis for the identification of possible mitigation or remediation procedures to be implemented in and around the former mining site.