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Isotopes geochemistry as a tool to understand the environmental impact of ore mineral deposits

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Twenty years after the introduction of multicollector-ICP-MS, most of the periodic table elements have been investigated for variations of their isotopic composition. Metals and metalloids stable isotopes received a particular attention and nowadays there is about 1 publication coming out per working day. These studies have shown that isotopes geochemistry could not only be a powerful tool to better understand the formation processes of ore deposits but also the environmental impact of the subsequent destruction of the ore, whether naturally or by anthropogenic intervention.

Indeed, ore deposits are submitted to various climatic conditions and are weathered conducting to an abnormal enrichment in the environment (soils, water...). However, most of the ore destruction is due to the anthropogenic interaction for economic purposes. During the exploration of ore deposits, the environmental impact is then at two different levels, first a release when the ore is extracted from its environment and second when it is transformed/manufactured in human factory.

We will expose how isotopes geochemistry tool can be used in addition to the concentration measurements in order to highlight the environmental impact of ore destruction. Such a tool has been successfully used in lake sediments and soils from environment with more or less anthropogenic activities. During this presentation, we will show how most of the environment compartments can be affected or involved by the ore destruction. For this, we will present some examples showing such environmental impact since the Roman Era to nowadays without forget the industrial revolution.