

Arsenic load input to Caudal River (northwestern Spain) from abandoned mercury mining works

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In Asturias (Northwestern Spain) there are abundant abandoned mine sites, and mercury mines contain the highest pollution potential due to the presence of mercury and particularly arsenic, which appears either in the form of specific (orpiment and realgar) and non specific minerals (As-rich pyrite). The instability of As-rich minerals is affected by the wet climate of the region leading to the production of As-rich mine drainage and spoil heap leachates which are incorporated to surface water or infiltrated in the ground to reach the groundwater level. A study including the three most important abandoned mercury mines of the region ("La Soterraña", "La Peña - El Terronal" and "Los Rueldos") has been accomplished; it is focused on the estimation of the contaminant load in mass of arsenic transported in mine drainage and spoil heap leachates from each of these three scenarios to the surface water courses. The estimation of the contaminant load has been evaluated by considering the total arsenic concentration and water flow upstream and downstream of the mine works in the three scenarios. Water courses flowing through these areas

are all tributaries of the Caudal River, which is one of the most important rivers at a regional scale. After a monitoring period of three hydrological years, the average monthly contaminant load in mass of arsenic incorporated to Caudal River has been estimated in: 13,2 kg/month from La Soterraña mine site, 1012 kg/month from La Peña-El Terronal mine site and 1.1kg/month from Los Rueldos mine site. This contaminant load constitutes a constant monthly input of arsenic to Caudal River. The sub-catchments of La Soterraña, La Peña-El Terronal and Los Rueldos sites only constitute a 0,25%, 1,8% and 0,16% respectively of the Caudal River catchment. Due to the high water flow of this river there is a great dilution and therefore the total arsenic concentration is below the analytical detection limits (0.03 mg/l); on the other side, an important part of this arsenic load is retained on the river sediments, representing a potential risk of pollution of the aquatic ecosystems of the river.

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