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Overview about polluted sites management by mining activities in coastal-desertic zones

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In Chile the main mining operations as well as artisanal and small-scale mining (copper, gold and silver) are located in desert areas. A large number of abandoned polluted sites with heavy metals and metalloids (Hg, Pb, Cu, Sb, As) remain in coastal areas close to human centers. The aim of this work was to identify the best remediation alternatives considering the physic-chemical characteristics of the coastal-desertic soils. The concentrations of above mentioned pollutants as well as soil properties were determined. The results showed variable concentration of the pollutants, highest detected values were: Hg (46.5 mg kg-1), Pb (84.7 mg kg-1), Cu (283.0 mg kg-1), Sb (90 mg kg-1), As (2,691 mg kg-1). The soils characteristic were: high alkalinity with pH: 7.75-9.66, high electric conductivity (EC: 1.94-118 mScm-1), sodium adsorption ratio (SAR: 5.07-8.22) and low permeability of the soils. Coastal-desertic sites are potential sources of pollution for population, and for terrestrial and marine ecosystems. Exposure routes of pollution for the population include: primary, by incidental ingestion and inhalation of soil and dust and secondary, by the ingestion of marine sediments, sea food and seawater. Rehabilitation of coastal-desertic sites, by using techniques like soil washing in situ, chemical stabilization, or phytostabilization, is conditioned by physic-chemical properties of the soils. In these cases the recommendation for an appropriate management, remediation and use of the sites includes: 1) physic chemical characterization of the soils, 2) evaluation of environmental risk, 3) education of the population and 3) application of a remediation technology according to soil characteristic and the planned use of the sites.
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