the copper smelter at O'Kiep in the Northern Province is surrounded by a distinct increase in copper values across geological boundaries. At Rustenburg, the center for the processing of PGE ore from the Western Bushveld situated in the Northwest Province, high levels of Cu, Ni, Pt, and Pd are clearly detected in surrounding areas. Significant correlations were also found between geochemical signatures and the reported condition of geophagia and hepatitis in cattle and sheep grazing in areas underlain by a specific dolomite formation.

Geochemical Assessment of Passive Treatment Methods for Acid Mine Waters from a Flooded Uranium Mine

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The generation of acid mine waters, commonly termed acid mine drainage, is one of the key environmental aspects of mining if sulfide bearing ores are mined. The discharge of such acid mine waters, strongly enriched in sulfate, heavy metals, and radionuclides, after the flooding of the underground operations of an abandoned uranium mine in East Germany might cause contamination of ground and surface waters and prove to be hazardous to the environment. This paper outlines the assessment of different approaches for an *in situ* treatment of these mine waters by conventional neutralization methods like addition of caustic soda or lime and by treatment methods using cheap industrial materials such as fly ash from lignite-burning power plants and scrap iron. Focal points are the effectiveness of the various methods and the mechanisms of the reduction of contaminant levels. The results of a laboratory study indicate that, besides neutralization with lime or caustic soda, water treatment with fly ash or fly-ash cement is an effective method for the *in situ* neutralization of acid mine waters and the reduction of contaminant levels. In contrast, due to kinetic reasons, the underground storage of scrap iron is not an effective method for the removal of uranium from acid mine waters, although neutral pH and reducing conditions can be obtained, which result in a decrease in the concentration levels of various other toxic heavy metals in the mine water.

Trace-Element Contamination in The Environment of Recife Metropolitan Area, Pernambuco, Brazil

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The purpose of this study is to evaluate qualitatively and quantitatively the contamination of the environment with heavy metals in the Recife Metropolitan Area (RMA), Pernambuco State, Brazil. To achieve this objective, aerosol-loaded filters, collected through a network of 10 monitoring stations in the RMA by the local environmental agency (CPRH) will be analyzed. The first station was installed in 1991 in Downtown Recife. So far, only total suspended particulate (TSP) concentrations have been determined for all stations. In some stations smog, sulfur, and nitrogen oxides have been determined (CPRH, 1996). A total of 788 well-kept aerosol-loaded filters have been collected through high-volume manual samplers. Using TSP concentration data for a four-year period (1991-1994), the air quality in Recife Metropolitan Area has exceeded the primary standard values, according to Brazilian standards in the three stations.

A preliminary site characterization is being made at the Santo Antonio (downtown) Station, which exceeded the TSP primary standard values. This will provide a first insight into the heavy metal concentration versus Total Suspended Particles. Among the 788 aerosol-loaded filters collected, 33 were analyzed for Zn (0.1-1.0 mg m^{-3}, Pb (0.009-0.003 mg m^{-3}), Cd (0.001-0.002 mg m^{-3}), Cu (0.001-0.019 mg m^{-3}), Fe (0.010-0.020 mg m^{-3}), Mn (0.003-0.009 mg m^{-3}), Ni (0.001-0.002 mg m^{-3}). These analyses showed a higher concentration of metals during the dry season (August to February) than those for the wet season (March to July). As a result, the local environmental agency can make recommendations for pollution reduction and propose relevant legislative measures where applicable.

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Environmental Geochemical Mapping in Sardinia (Italy)

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Geochemical data obtained during regional mineral exploration programs carried out by the Italian Government in different regions of Italy in the 1970's and 1980's, can be reutilized to compile regional geochemical baseline maps. Geochemical baseline maps, in Italy, have already been compiled by our research group for two Regions, Calabria and Monti Peloritani (Sicily) and, partially, for Sardinia. We