

Investigation of Heavy Metal Pollution of the Ecosystem nearby a Lead-zinc Mining Area in North Guangdong, China

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The investigation area is a lead and zinc rich basin valley in north Guangdong, with a metallurgical plant located at upstream. A total of 21 samples include water, soils, dusts, rice, local human hairs, etc were collected. The heavy metals elements Cd, Cu, Pb, Zn, Ni, Cr, As and Hg were analyzed by ICP-MS, ICP-OES and HG-AFS.

The results show that the main mineralogical composition elements Cd, Pb, Zn, As and Hg in all soil samples have very high positive anomaly. In part of the soil samples, elements Cd, Pb, Zn, As are exceeded the National Soil Quality Standards (GB15618-1995). The maximum concentration of Cd in soil sample is 9.6 $\mu\text{g/g}$, which is more than 9 times than the standards. Pb, Zn, As are 3-5times in exceed of standards. From the metallurgical plant to the distant, elements Cd, Pb, Zn, As, Hg present a trend of declining. And the depth profile analysis for surface soil beside a pond which is 4km from the metallurgical plant shows that the main metallogenic elements are richer at the depth of 0.2m than at the depth of 0.8m. Dust samples from the building's roof contain more heavy metals than the soils. The average concentration of Cd in the dust is 58.05 $\mu\text{g/g}$, which is 16.64 times greater than in the soil. Cu, Pb and Zn have high positive anomaly in part of the river and pool water samples. Rice and local human hair samples of natives contain great concentrations of Cd, Pb, As.

Through this investigation, we believe that this area is suffering seriously heavy metals pollution because of the mineral resources exploitation. The main pollution elements are the mineralogical composition elements, especially, Cd is more serious than the other elements. These elements could damage human's health through water, air and food (rice). Therefore, the emission of slag, waste gas, waste water and dust is urgent need to be changed and controlled.