



Mapping of soil-sediment systems contaminations around a metal-ore smelter. The example of Cu in Lubumbashi (RD Congo).

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The Katanga is famous for its high richness in metal ores, mainly Cu- and Co-minerals. The ore treatments activities lead to metal spreading in the environment which do endanger the viability of ecosystems and human health.

The contaminations of soils and sediments around the Gecamines smelter in Lubumbashi have been evaluated through a multi-scale approach. In the first stage, a reference system about the natural contents in soils has been implemented. The main units of the detailed (1:20 000) soil map have been characterized through field observations and laboratory determinations : acido-basic and organic status, particle size distribution, cationic exchange capacity, total contents in Al, Fe, Mn, Cu, Co, Cd, Pb, Zn. An exploratory mapping of soil contaminations (Cu, Co, Cd, Pb, Zn) centered on the Gecamines cheminey was then conducted as a second stage of the approach. Detailed investigations were finally performed in the Gecamines district where signs of soil degradation were the highest.

The spatial continuity and the differentiation ($C : C_0+C$ ratio) of the studied parameters appeared weak. No clear effect of the dominant wind direction on the spatial distribution of the contaminants could be identified despite a clear degradation of the ecosystem in the area under dominant wind. However the detailed approach showed evidences of (i) significant wind deposits in the Gecamines district, (ii) and local man-made deposits but also (ii) important processes of redistribution in the landscape through erosion/sedimentation or anthropic activities.

Our results point out the difficulty to identify the sources of contaminations in an urban environment and stress the need to have approaches with complementary levels of details.