

Mining Dumps - Hazardous Waste-Sites?

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The Pb-Zn deposits of the Graz Paleozoic are formed as stratiform to the Arzberg Formation (Schöckel Nappe) and as sedimentary exhalative deposits in the Lower Devonian. These deposits were exploited from the 16th century to the beginning of the 20th century.

Mining activities usually cause impacts on terrestrial and aquatic ecosystems. Investigating old mining areas, it is very important to understand mining induced long-term effects on soils, ground- and surfacewaters, and its consequences on surface morphology.

In this work two mining dumps of Pb-Zn deposits were chosen for the exploration of heavy metal contents in the soils and sediments of such dumps. One dump belongs to the mining area of Guggenbach, which was shut down in 1927. On this dump a thin soil layer has already developed. It is covered with deciduous trees and contrasts with the surrounding surface only by its typical morphology. The second dump originates from an exploration adit in the area of Großstübing in 1983. It differs markedly from the first dump. On this dump no soil has yet developed. These different stages of development are the starting point for checking the contents and changes of heavy metal distributions in the course of time.

The amounts of the elements Cd, Co, Cr, Cu, Fe, Ni, Mn, Pb, Zn were measured on samples < 40 µm with AAS. For estimating the bioavailability and the potential risk of heavy metals, other parameters like pH, C org., mineral components and the content of S of the soils were measured.

In the dump of Großstübing there are generally higher contents of Co, Cr, Cu, Fe, Ni and Mn. The contents of the heavy metals Cd, Pb and Zn are much higher in the dump of Guggenbach although the geochemical initial composition is the same. The data considerably exceed the limit value of the Sewage Sludge Regulation („Klärschlammverordnung“) of Styria.

Literature:

Sewage Sludge Regulation (Klärschlammverordnung der Steiermärkischen Landesregierung) 14.12.1987

SALOMONS, W., FÖRSTNER, U., MADER, P. (Eds.): Heavy Metals-Problems and Solutions. - Springer 1995

WEBER, L.: Die Blei-Zinklagerstätten des Grazer Paläozoikums und ihr geologischer Rahmen. - Archiv für Lagerstättenforschung der Geologischen Bundesanstalt, Wien 1990