

ZOLTÁN SZALAI (*)

TRACE METAL POLLUTION AND MICROTOPOGRAPHY IN A FLOODPLAIN, THE HÁROS ISLAND (Budapest)

ABSTRACT: SZALAI Z., *Trace metal, pollution and microtopography in a floodplain, the Háros Island (Budapest)*. (IT ISSN 0391-9838, 1998).

Floodplains are particularly vulnerable environments to pollution. In the vicinities of cities heavy metals transported by rivers accumulate in floodplain deposits and vegetation. In the paper the results of investigations directed at the filtering capacities of floodplain deposits during two flood waves. From the analyses of groundwater samples it was found that Pb, Cd and Co contents of groundwater grow with depth in alluvial soils. The observation is explained by the spread of contamination upwards from deeper horizons.

KEY WORDS: Trace metal, Floodplain, Groundwater, Háros Island (Budapest).

RIASSUNTO: SZALAI Z., *Inquinamento da metalli e microtopografia in una piana di esondazione, l'Isola di Háros (Budapest)*. (IT ISSN 0391-9838, 1998).

Le pianure di esondazione sono particolarmente vulnerabili all'inquinamento. In vicinanza dei centri urbani i metalli pesanti trasportati dai fiumi si accumulano nei depositi delle piane di esondazione fluviale e nella vegetazione. In questo articolo sono esposte le ricerche volte a conoscere le capacità di filtraggio e assorbimento dei depositi alluvionali dell'Isola di Háros lungo il Danubio presso Budapest, durante due ondate di piena. Dall'analisi di campioni di acqua della falda idrica è stato constatato che il contenuto in piombo, cadmio e cobalto aumenta con la profondità del suolo. Ciò si spiega con la propagazione della contaminazione dagli orizzonti più profondi.

TERMINI CHIAVE: Metalli in tracce, Piana alluvionale, Falda idrica, Isola di Háros (Budapest).

INTRODUCTION

Recently public awareness of the hazards of environmental contamination through trace metals has increased.

(*) *Geographical Research Institute, Hungarian Academy of Sciences, P.O. Box 64. H-1388 Budapest, Hungary.*

Author expresses his gratitude for laboratory analyses. The spectrophotometric measurements were performed by Katalin Perényi, other analyses by Mária Balogh-di Gléria.

Several publications deal with this problem in various disciplines, e.g. agricultural sciences, pedology, plant physiology, ecology and physical geography. Investigations of the impacts of heavy metals on the environment have been carried out in various areas, but only few of them in floodplains. The test area selected for the present study is the Háros Island, a peninsula in the Danube section at Budapest, near Budatétény. The Háros Island seemed to be ideal for this kind of examination, because although it is close to the industrial and residential areas of Budapest, the Island itself remained in quasi-natural conditions, and, despite its small area, it includes all typical floodplain features.

MATERIAL AND METHODS

The soil types were identified from soil profiles and samples collected from auger holes. Soil profile sites and groundwater level observation wells were located next to the quadrats (units of detailed vegetation survey). The colour of soil samples was determined using the Munsell Colour Chart. In the laboratory humus content, grain size composition, pH and CaCO₃ content of the samples were measured. The CaCO₃ content was determined using Scheiber calcimeter and the humus content applying the calorimetric method. The positions (horizontal coordinates and altitudes) of quadrats were determined by triangulation.

There occurred two small flood waves on the Danube following each other within a short period in August and September 1996. Groundwater was sampled twice during each flood wave, first in the beginning and again in the final phase of the wave. Lead, cadmium and cobalt contents of groundwater were identified with a Zeiss AAS 30 graphite furnace atomabsorption spectrophotometer. The samples were deposited 1:8 HNO₃/H₂O. We measured the chemical oxygen demand (COD) with a Merck SQ 118 spectrophotometer.