

ENVIRONMENTAL GEOLOGICAL STUDIES IN VAS COUNTY, WEST HUNGARY

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Abstract: Environmental damage through mining activities can be especially grave if there is no regional coordination of mining procedures and specific recultivation projects do not promote the authorisation of different investments. In this context the Ministry for Environmental Protection of Hungary launched a programme. It was aimed at providing professional aid for authorising open-pit mining through production of thematic maps. Our presentation is to show the first results of this work.

Key words: Environmental geology, hydrogeology, West Hungary

Introduction

Environmental damage through mining activities can be especially grave if there is no regional coordination of mining procedures and specific recultivation projects do not promote the authorisation of different investments.

In this context the Ministry for Environment and Regional Policy of Hungary launched a programme in 1997. It was aimed at providing professional aid for authorising open-pit mining through production of thematic maps. They allow Environmental Authorities to decide whether the area of specific raw material occurrences is not prohibited by environmental or nature conservation decree or there are no exploitation restrictions in force.

This task was given to our Institute. We elaborated the thematic basis of an environmental geological map series. Using archive, partially digital data we compiled the maps and established an information system in ArcView format.

In this paper the maps of Vas county are presented (**Fig. 1**). It is area in West-Hungary and the Little Hungarian Plain (Kisalföld) richest in sand and gravel pits.

Preliminaries

The complex geological mapping of the Kisalföld (Little Hungarian Plain) started in 1982. It was aimed at providing governmental bodies, ministries and municipal authorities with baseline information on a set of geoscientific issues related to a 11 000 km²-large sector in the NW part of Hungary (**Fig. 2**). They included the geological, hydrogeological, engineering geological, pedological, environmental geological and geophysical settings of the area. It can thus be regarded as a complex geoscientific project.

The database relies on drilling data acquired during the systematic geological mapping and related results of laboratory analyses. Consequently, more than 4000 boreholes have been penetrated in a network providing excellent data for digital processing. Laboratory analyses included the following items:

- sedimentological tests from the uppermost 10 m of the profile from at least every m
- fundamental soil-mechanical tests for each typical formation
- detailed laboratory analyses of the groundwater's dissolved solid content
- recordings of the groundwater level and its fluctuation in observation wells

The versions of the geological map series of Kisalföld and later, following digital acquisition and processing the information system were produced on the basis of laboratory analyses and in-situ measurements.

During the processing of the afore-mentioned Vas county we used the elements of the geological information system with open pits and areas sensitive to environmental hazard added (nature conservation areas, protected zones of drinking water supply, etc.).

Maps compiled during the project

- Surface geological map
- Geological formations with potential construction material occurrences (gravel, sand, ceramic clay)
- Construction material occurrences based on the results of previous investigations (using data of the Hungarian Geological Survey)
- Map of settlements, public utilities and protected areas

- Map of the state of groundwater
- Synthesising map

This short paper presents the elements of the synthesising map in detail.

Basic colours display areas where geological formations bear construction gravel and/or sand. The same colour with different shade indicates regions where previous investigations discovered predicted resources. White patches do not include potential resources or if present, they are presumably buried under thick cover.

A simplified black and white part of the map is shown on **Fig. 3**.

In the next step we classified the known factors restricting mining activities in 3 categories:

1. Spatial factors restricting mining activities

- Downtown residential areas
- Industry areas
- Paved roads, railway lines
- Wires of public utilities
- Lakes, surface water streams

In the presence of these factors mining activity can proceed with the observation of protected zones prescribed by the law

2. Factors prohibiting mining activity

These areas are protected in different degrees.

- Nature protection zones
- Nature conservation areas
- Water supplies under exploitation and their protected zone
- Protected zone of future water supplies

3. Recently exploited areas

Full green colour represents the extent of pits currently registered at the Hungarian Mining Office. We know much more, already abandoned, partially recultivated pits. Their presentation will become especially important, when we make regional assumptions on the resistance of areas to environmental pressure. These data were also collected in Vas county.

References

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Fig. 1 Situation of Vas county

Fig. 2 Territory of the geological mapping project

Fig. 3 Detail of the synthesising map

Figures

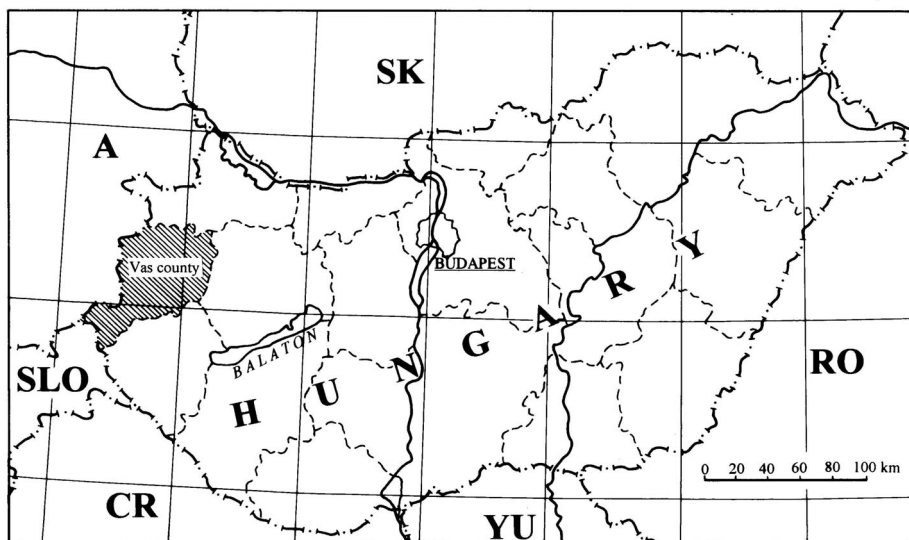


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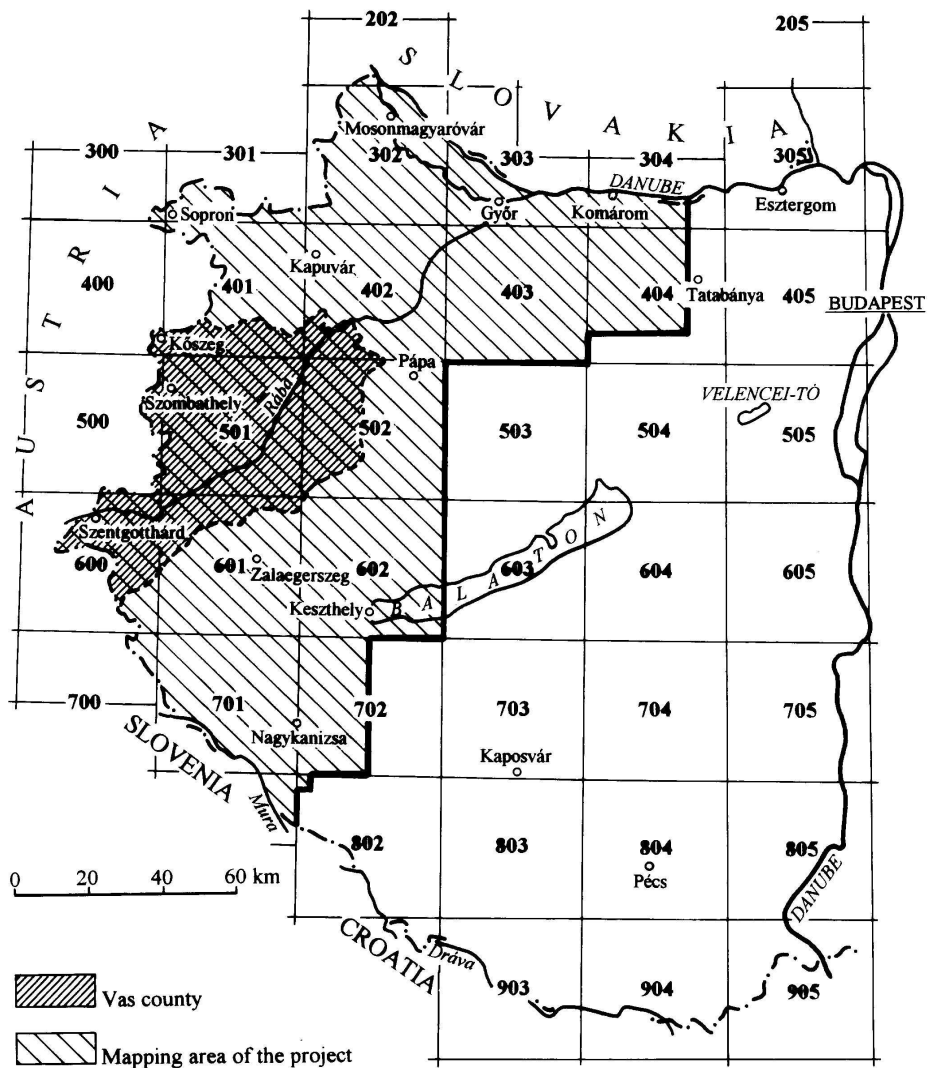


Fig. 2 Territory of the geological mapping project

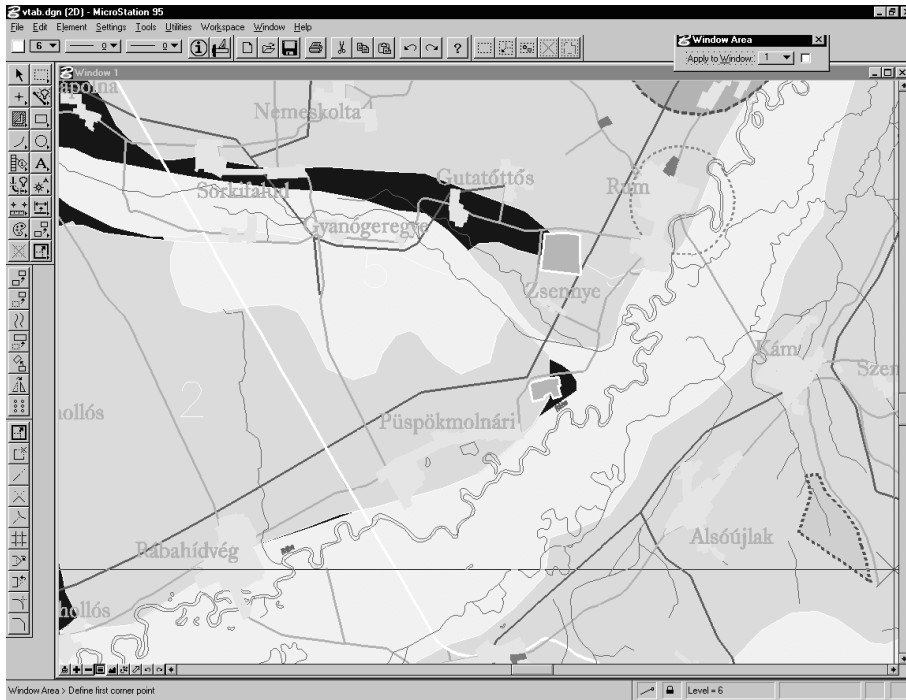


Fig. 3 Detail of the synthesising map