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SPATIAL ANALYSIS OF STREAM SEDIMENT SAMPLING GEOCHEMICAL DATA FOR SELECTED ELEMENTS, VOLCANIC COMPLEX MITROVICË - SAMADREXHË
ANALIZË HAPËSINORE E TË DHËNAVE NGA MATJET GJEOKIMIKE TË LUMENJËVE PËR ELEMENTE TË ZGJEDHURA, KOMPLEKSI VULLKANIK MITROVICË - SAMADREXHË

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PËRMBLEDHJE
Qëllimi kryesor i matjeve gjeokimike nga lumenjtë është të identifikojë zonat potenciale për hulumtime të mëtejshme. Për të arritur këtë qëllim duhet të specifikohen që në hapin e parë kufijtë e vlerës së secilit element që jemi të interesuar brenda provës gjeokimike. Në këtë punim janë përdorur të dhënat gjeokimike fillestare të pas përpunimeve të para për të evidentuar zonat me anomali për elementet e zgjedhura. Zona e hulumtuar gjendet në rajonin e njohur me lajmërime të mineralizimeve polimetalike të Pb-Zn-Ag të Stantërgut, Magjerës dhe Gumnishtës. Sipërfaqja e zonës së studiuar përfshinë rreth 327 km², me shtrirje 15 km në JP – VL dhe 32 km VP – JL. Kjo është arritur me analizimin e 275 provave gjeokimike. Secila prej tyre është analizuar për metalet e çmueshme (Au, Ag) dhe metalet bazë (Pb, Zn dhe Cu). Analiza hapësinore apo statistika hapësinore përfshinë një seri të teknikave për analizimin e të dhënave hapësinore. Rezultati i këtyre metodave varet nga vendndodhja e provave që janë objekt i analizës. Softverët për aplikimin e këtyre analizave hapësinore kërkojnë çasje në të dy karakteristikat: në vendndodhje dhe atributet e tyre. Për secilin element është krijuar nga një grup hartash (kombinim i hartave të vendndodhjes, hartave të izolinjave, hartave 3D wireframe dhe hartave 3D të sipërfaqes). Rezultatet e fituara duke prërdorur këto teknika tregojnë disa anomali për elementet e zgjedhura në pjesë të ndryshme të zonës së studiuar. .Gjithashtu vlen të theksohet se rezultatet e fituara janë të përafërta me ato të metodave statistikore.
Fjalët kyçe: prova gjeokimike, anomali, zona potenciale, analizë hapësinore, harta.

SUMMARY
The main purpose of geochemical survey from stream sediment is to identify potencial areas for further exploration. To achieve this goal should be specified in the first step limits the value of each elements we are interested within geochemical sampling. In this paper we used the raw geochemical data after pre-processing to identify areas with anomalies for selected elements. The survey area was determined in the adjacent area of the known Pb – Zn – Ag polymetallic occurrences of Stantërg, Magjerë and Gumnishtë with a certain potential for Au mineralization. They sum up to around 327 km², with a maximum 15 km SW-NE and 32 km NW–SE extension. Each of these sampling is analyzed for elements Ag, As, Au, Cu, Hg, Pb dhe Zn. Spatial analysis or spatial statistics includes a series of techniques for analyzing spatial data. The results of these methods depends from location of sampling that are the subject of analysis. Software for application of these spatial analysis require access to to characteristics: their location and their attributes. For each element was created a set of maps (combination of post map, contour map, 3D wire frame map and 3D surface map). Results obtained using these techniques show some anomalies for selected elements in various parts of study area. The performed comparison shows a closed agreement between obtained results by statistical methods
Key words: geochemical sampling, anomalies, potential area, spatial analysis, mapping

INTRODUCTION

Understanding the spatial distribution of data from phenomena that occur in space constitute today e great challenge to the elucidation of central questions in many areas of knowledge. Such studies are becoming more and more common, due to the availability of low cost software with user-friendly interfaces . These systems allow the spatial visualization of variables. Besides the visual perception of the spatial distribution of the data, it is very useful to translate the existing patterns into objective and measurable considerations.

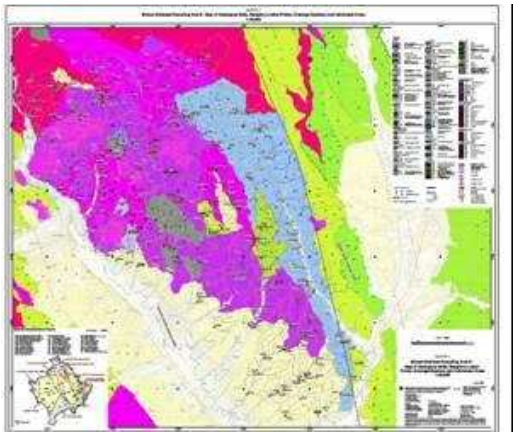

Fig. 1. Map of geological units

A geochemical study in mining exploration consists of two particular stages. The first one corresponds to experimental data acquisition, by collection of samples and their analysis. The second step, and on which we focus our attention in this research, concerns the treatment and interpretation of available numerical information. The specific features of geochemical exploration studies are the treatment of a huge amount of data, the imprecision of this data, the multivariate character, and especially, the spatial dependence of variables. This study attempts to achieve the numerical characterization of the anomaly, and its differentiation from the background. In this work, as a new attempt, raw data after pre-processing have been mapped as image and set of maps (3D wireframe, contour and 3D surface maps).

GELOGICAL BACKGROUND

The area belongs to the External Vadar Zone (EVZ). The Volcanic complex Mitrovicë – Samadrexhë is dominated by Jurassic and Neogene volcanic rocks from several eruption centres, interlayered by metamorphic and sedimentary units (fig.1). The survey area was determined in the adjacent area of the known Pb – Zn – Ag polymetallic occurrences of Stantërg, Magjerë and Gumnishtë with a certain potential for Au mineralisations. They sum up to around 327 km², with a maximum 15 km SW-NE and 32 km NW–SE extension.

DATA ACQUISITION

The data set used for this research comes from a stream sediment sampling (294 samples) carried out by The Independent Commission for Mines and Minerals (ICMM) contracted the project "Database Maintenance for the ICMM Information Management System Geodatabase Kosovo Lot 1 and Lot 3" to Beak Consultants GmbH.

The samples were analyzed over a suite of 53 elements by ICP-MS measurements but for this study the main attention was on precious metals (Au, Ag) and base metals (Zn, Pb, Cu).

METHODOLOGY

The main objective of this research is to recognize the promising area for Au, Ag, Zn, Pb and Cu elements in study area. In order to better evaluate of the ability of the anomaly separation methods, as a new approach, the raw geochemical data were mapped and target areas were recognized. The comparison of obtained results using a new approach shows a good agreement with those results which concluded using statistical methods. For this porpose it is used of SURFER 9 software, by making a method, geostatistically. Consequently, grid file used to draw the different maps (Post, Contour, 3D wire frame and 3D surface)) for each element separately. At lats, the illustrated maps were

interpreted to indentify the target area for studied elements. The draw maps are given in Figure 2-6.

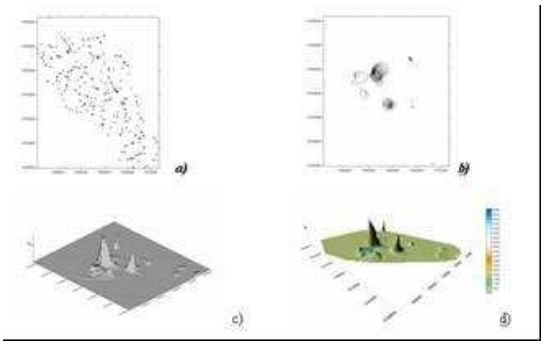

Fig.2 Post map, contour map, 3D wire frame map and 3D surface map for Au

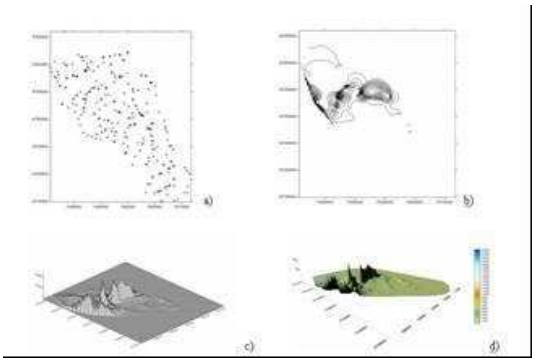

Fig.3 Post map, contour map, 3D wire frame map and 3D surface map for Ag

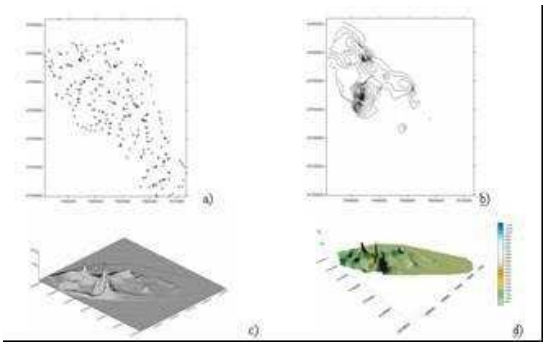

Fig.4 Post map, contour map, 3D wire frame map and 3D surface map for Zn

RESULTS AND DISCUSSION

The distribution of Au is marked by some extremely high values on a background of the normal low concentrations. More anomaly samples are located at the central part of study area (fig.2).The high grade values are grouped to clear outlined anomalies at the maps.

Ag shows widespread natural distribution patterns from the centre of the sampling area (with the highest Ag value) to the west, northwest and north (fig.3). These areas belongs to known Pb-Zn-polymetallic deposits and ore occurrences of Trepça – Gumnishtë and Magjerë. The high absolute values of Ag in normal stream sediments as well as the clearly structured anomalies in the centre of the investigated area and the aerial size of the Ag anomalies indicate a very strong potential for the detection of economic Ag deposits in the survey area.

The spatial distribution of Zn generally follows the patterns of Ag (Fig. 4). Major occurrences and natural anomalies are in the centre (Trepça – Gumnishtë) as well as in the northwest (Magjerë).

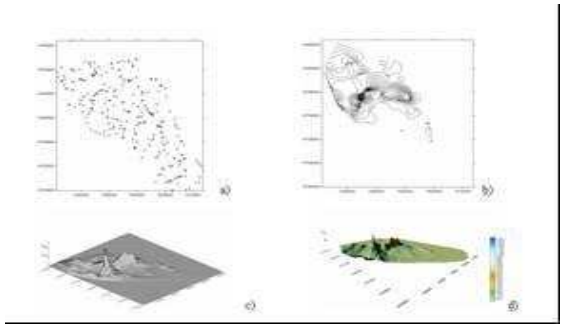

Fig.5 Post map, contour map, 3D wire frame map and 3D surface map for Pb

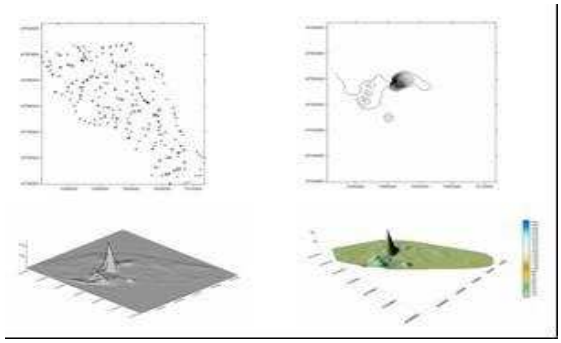

Fig.6 Post map, contour map, 3D wire frame map and 3D surface map for Cu

Pb is widely distributed in the centre (Trepça – Gumnishtë, in the west, north-west (Magjerë) of the study area (fig.5). Spatial distribution of Pb and Ag are almost same. Këtë e tregon edhe koeficienti i korrelacionit në mes tyre (r=0.86).
The survey area is not specialized in copper. No exclusive Cu anomalies were found.

CONCLUSIONS

The geochemical survey of the Mitrovicë - Samadrexhë Volcanic Complex area has detected a variety of geochemical anomalies. These anomalies, to a certain degree, can be explained by known mineral deposits, mainly of Zn-Pb-polymetallic composition.
In this study are processing 275 stream sediment geochemical data in region Mitrovicë - Samadrexhë and were identified promising area for Au, Ag, Pb,Zn.
Both, the spatial extend and the absolute values of Au (up to 10.2 ppm), Ag (up to 27.8 ppm), Pb (up to >10000 ppm) and Zn (up to >10000 ppm) indicate the high potential for the evidence of mineralisations.
For this purpose were used the SURFER Software.
The results obtained from spatial data analysis have enriched the statistical method of data processing.
Comparison of results using the new method shows a closed agreement between results obtained by statistical methods.
The indicated area for each element is suggested to execute additional sampling and complementary exploration to locate the source.

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