

Faculty of Natural and Technical Sciences, University “Goce Delčev”-Štip, R. Macedonia with a grant from the CEI-ES Know How Programme organize



1st INTERNATIONAL WORKSHOP ON THE PROJECT

**Environmental Impact assessment of the Kozuf
metallogenic district in southern Macedonia in
relation to groundwater resources, surface
waters, soils and socio-economic
consequences (ENIGMA)**

PROCEEDINGS

**Edited by:
T. Serafimovski & B. Boev
Kavadarci, 10th October 2013**

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NEW DATA RELATED WITH SCHLICH ANALYSIS FROM THE LUKAR AND STARA REKA, THE KOZUF AREA, R. MACEDONIA

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Abstract

In R. Macedonia there are a number of occurrences of gold more or less been studied. One of the methods used in prospection of potential localities is schlich method. In this paper presents the results of preliminary schlich prospection which was performed along the river Lukar and Stara Reka in Kozuf volcanic area that is associated with Tertiary magmatizam in R. Macedonia. Tests showed the presence of gold in taken schlich characterized by irregular shape.

Key words: schlich prospection, morphology, gold grains.

Introduction

Kozuf area is a volcanic complex located in the southern part of the Republic. Macedonia. This volcanic area belongs to the geotectonic Vardar zone.

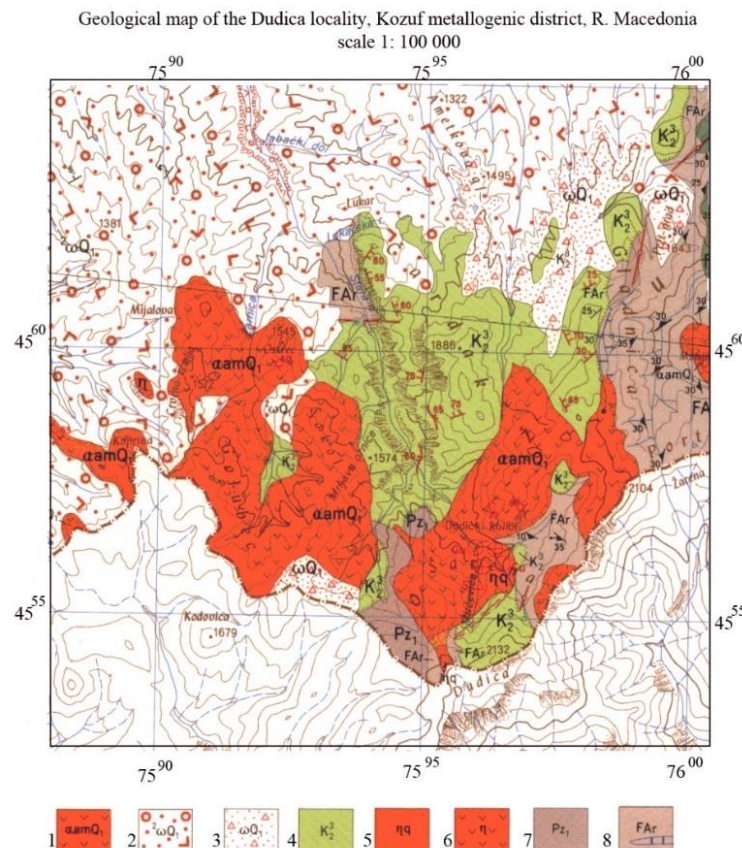


Fig. 1. Geological map of part of Kozuf area (section of OGK)

1. Amphibolitic andesite; 2. Agglomerative brechoide tuff; 3. Brechoid tuff;
4. Tabular limestone bancovite 5. Quartz keratophyre; 6. Keratophyre 7. Quartz porphyries; 8. Filites, argiloschists, sandstone and marble

The geological structure (Jankovic et al. 1997) of the complexes include Precambrian metamorphic rocks, Paleozoic metamorphic rocks Triassic-Jurassic sedimentary rocks, Upper Cretaceous sedimentary rocks, sediments Upper Eocene rock, complex of Pliocene sediments and pyroclastic and complex of Quaternary sediments. (Fig. 1).

Many researchers have investigated the relationship between the composition of alluvial native gold and potential sources. Chemical characteristics of alluvial grains and inclusions if present allows to determine the type of source mineralization. Identification of the source of mineralization in the early stages of regional research can help focus attention on the fields with the greatest potential economic significance. Therefore, in this region were performed research whereby samples of soil, stream sediment and water, and schlich preliminary tests in order to determine mineralogical composition and the presence of metallic minerals (Fig.2).

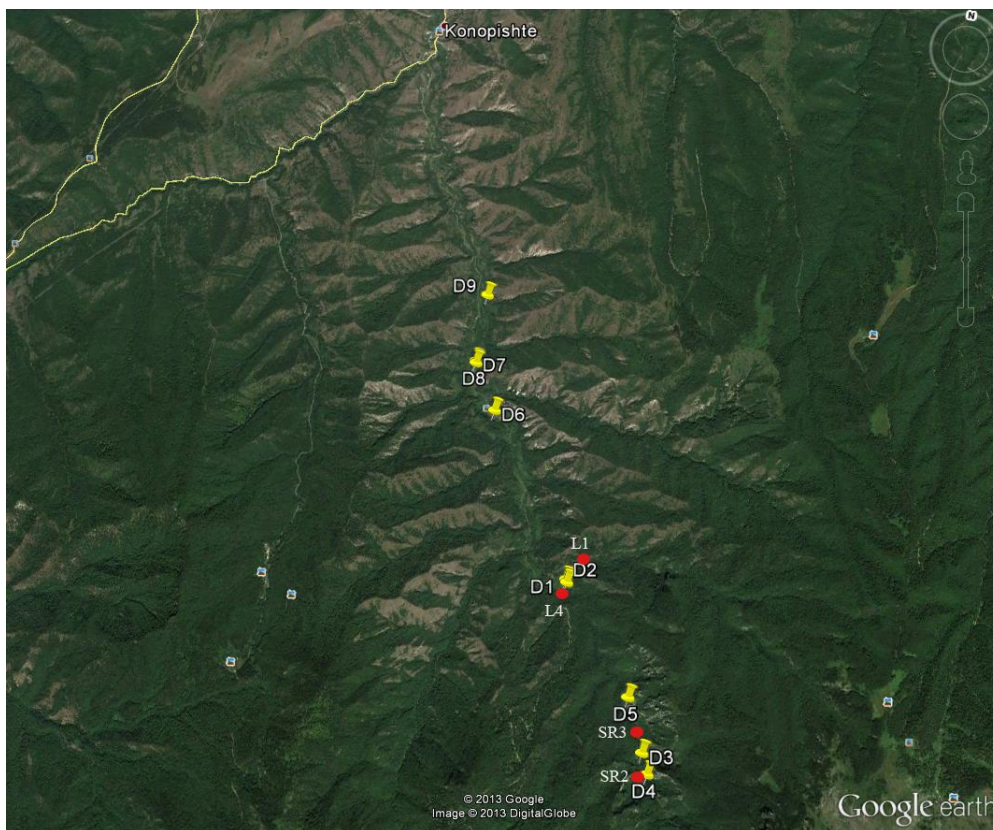


Fig. 2. Location of areas where they are taken schlich samples: SR2 and SR3-Old River and L1 and L2 - stream Lukar

Methodology and sampling

During the fieldwork the schlich method was applied. For this method, material was sampled from places that are convenient for access and have a high possibility of concentration of heavier minerals.

The mass of samples was between 15 and 20 kg depending on the availability of material. After the sampling, flushing of the samples was carried out and the schlich underwent

further processing. First of all magnetic separation of minerals was performed and both fractions were observed under binoculars. The gold aggregates found were separated manually and subjected to further study.

Results and discussion

Our tests showed the presence of gold in both rivers were examined. Total 4 were taken schlich samples. Two samples of Old River and two samples from Lukar. In all trials examined to determine the presence of gold- the Old River total three gold aggregates in Lukar two gold aggregates.

	Number of gold aggregates
Samples 1-Lukar	1
Samples 2-Old River	2
Samples 3- Old River	1
Samples 4 -Lukar	1

Besides gold aggregates in schlich samples were determine the presence of other metal and non-metal minerals and whose relative representation is given in Table 2

Table 2- Mineralocigal composition in schlich fron Old River and Lukar

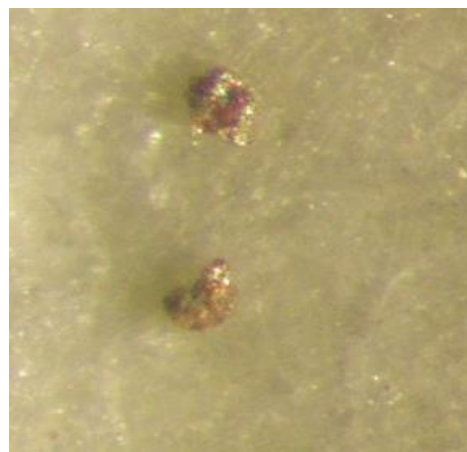
mineral	Sample 1	Sample 2	Sample 3	Sample 4
Gold	1 grain	2 grains	1 grain	1 grain
Pyrite	•	••	•••	•
Chalcopyrite	-	•	-	-
Galenite	-	•	•	•
Sphalerite	•	-	-	•••
Cirkon	•	•••	•••	•
Epidote	•	•••	••	••
Biotite	•••	•••	•••	•••

- rare
- weakly present
- present

The table shows that despite gold from the other metallic minerals was determine the existence of galena, sphalerite, chalcopyrite. Gold is with very small size. It features whit irregular shape (Fig. 3) which indicates that the transport is not very long or may indicate the vicinity of the primary mineralization. Measuring the shape of gold grains mostly circular form, the degree of curvature and flattened may indicate the type of source and length of Transportation (Mudaliar et all. 2007, Knight, 1999).



Sample 1 Lukar



Sample 2 Old River



Sample 3 Old River



Sample 4 Lukar

Fig 3. Pictures from gold aggregate

Morphology of gold aggregates is relatively preserved and roundness indicates that it was subjected to secondary processes. Such characteristic suggests that this gold probably has similar characteristics as the primary gold (Petrovskaja, 1973) and it has long suffered because transport form of gold depends on the length of transport.

From metamorphic minerals biotite is mineral was abundant in all four schlich. Zircons is present in samples from Old River while Lukar was little present. Epidote is less frequent.

Of particular interest in this preliminary schlich prospection was to determine the presence of gold as a mineral that is essential taking into account its economic importance and interest that causes the metal. Although these are preliminary tests on a small number of trials with a small number of tiny golden in aggregate however, the presence of gold was to determine. These results indicate the need to implement more detailed schlich prospection that will cover the entire course of these streams and rivers that dredge at this area. That way we can answer the question of whether this is a potential space in terms of precious metals. The fact the Kozuf region is promising in terms of this metal (Persival, 1990, Persival et al., 1992, 1994, Serafimovski et al, 1999)) is one more reason to continue further regional trials after preliminary results that will come with detailed geological, geochemical and other research.

Conclusion

- This is the preliminary investigation with sclich method which provide in this area
- It were determine four gold agregate with small size and irregular form
- This results indicate the presents of gold and another metalic mineral
- It is necessary to conduct a detailed sclich prospection

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