NATIVE PLATINUM IN ROMANIA: THE SINGLE OCCURRENCE – PIANU VALLEY, SEBEŞ MTS.

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ABSTRACT: *Known as an important occurrence of gold, at Pianu native platinum has been also found as early as 1855. The platinum contains also Fe (about 9%), a common fact for platinum occurrences. As a source for platinum the ultrabasic rocks (most serpentinites) have been considered, widely distributed in the Sebeş Mts., however not direclty occurring in the catchment area of the Pianu Valley.*

Keywords: *native platinum, alluvial deposits, Pianu Valley, Sebeş Mts., Romania*

Introduction

The history about the presence of native platinum in Romania is amazing. It was first mentioned by Ackner (1855) who presented an information given in a newspaper, i.e. the Wiener Zeitung: "Nach der Wiener Zeitung (?) sind Spuren des Platins (Eisenplatins) im Goldseifenwerke von Olahpian mit Titan, Nigrin u.v.a. vergesellschaftet, entdeckt worden." ["According to the Wiener Zeitung (?) traces of platinum (iron platinum) have been found in the alluvial gold workings at Pianu, in association with titanium, nigrine and many others."]

The discovery of a very old alluvial sample from Pianu in the mineralogical collection of the Babes-Bolyai University in Cluj-Napoca prompted a first analysis to be undertaken, which was published in an abstract in 2004 (Udubaşa et al., 2004). The alluvial sample is very small and the presumed grains of platinum are very few, allowing only electron microscopy analyses to be carried out.

Occurrence of platinum

Platinum and the associated minerals of other PGE are generally restricted to the magmatic ore deposits associated with ultrabasic and basic rocks and especially to their alluvial derivatives, the later being the most important industrial sources of PGE. The great Ni deposits as Sudbury, Norilsk, Nijne Tagilsk contain Pt as subproduct, and at Bushveld there is the Merensky Reef, rich in PGE. Hydrothermal occurrences are mentioned in South Africa (Rietfontein in Transvaal) and Columbia (Antioquia) where Pt occurrs in quartz veins associated with hematite. The Boss Mine in Nevada should also be reminded, where Pt is associated with bournonite and plumbojarosite. In the alluvial occurrences the platinum is associated especially with gold and chromite. Other details thereof can be found in the works of Ramdohr and Strunz (1967), Ramdohr (1955) and many others. It should also be mentioned that the platinum has been first found in alluvia at Pinto, Columbia, in

1601 and in Ural in 1822 (Ramdohr and Strunz, 1967).

The mineral association in the Pianu Valley occurrence

The Pianu Valley is mainly known as an important alluvial gold occurrence, with a long history of gold recovery by washing (mostly panning). Anyhow, many other minerals have been identified (about 50 mineral species) such as oxides (magnetite, ilmenite, rutile, chromite or chromium-bearing spinel, corundum, hematite), phosphates (apatite, monazite) as well as silicates (garnets, olivines, zircon, titanite, kyanite, etc.) and even sulphides (pyrite, pyrrhotite, chalcopyrite). Native gold, copper, iron and lead were also mentioned although the last ones may represent in fact artifacts (as suggested by Udubaşa et al., 2004). Some new data about the Pianu gold have been presented more recently by Popa et al. (2007) and Tămaş-Bădescu (2010). As already known (Udubaşa et al., 1992a, based on older data) the Pianu gold showed a very high fineness (almost 1000 ‰) a fact confirmed also by recent ICP-MS analyses (Popa et al., 2007), i.e. 961-969 ‰.

Platinum analyses

Naturally occurring native platinum commonly contain Fe (more rarely PGE), which varies between 8 and 20 wt% (even 30 % in older analyses). N. Vysotsky (1925, fide Ramdohr, 1955) classified the natural platinum as function of iron content, i.e. polyxen (6-11 % Fe) and ferroplatinum (16-21 % Fe). Such names are now no more officialy accepted and are considered as platinum varieties. Already Dana (1892) considered polyxen as a synonim of platinum. The same was accepted for ferroplatinum (Dana, 1944).

Most frequently the iron content in native platinum clusters around 9 % Fe, which falls in the field of the former polyxen. Electron microprobe analyses on the Pianu platinum gave the results presented in Table 1. The analyses have been carried out on rounded grains with zoning appearance (see Udubaşa et al., 2004).

Table 1. Analyses of native platinum

Sample / Elements [‰]	A	B	C	D	E	1
Pt	93.92	91.15	91.41	90.87	90.63	73.02
Fe	6.08	8,85	8.59	9.13	9.37	16.42

A-E: Pianu platinum. Source: Udubaşa et al., 2004; working conditions: SEM Philips 515, equipped with EDAX, acc. volt. 25 kV, corr. progr. PV 9900)

1: Borovka, Urals, Russia. Includes also 3.2 % Cu, 1.05 % Ni, 4.74 % PGE. Source: A.G. Betehtin (1960).

Source of platinum

The source of Pianu gold has been discussed by Udubaşa et al. (1992b) and it has been envisaged that several source rocks or formations can be seen as primary source of gold: (1) anisofacial rocks occurring on shear zones in medium grade metamorphics of the Sebes Mts., i.e. ultrabasites, eclogites and granulites; (2) nests of titanian hematite in quartz lenses (proved to contain abnormal gold concentrations) in kyanite micaschists and (3) some amphibolites.

Some analyses thereof are given by Udubaşa et al. (1992b). Pegmatites should also be considered as possible source, as these rocks are frequently found in the area. Popa et al. (2007) showed that the Pianu gold contains also 292-1446 ppm Sn

(EPMA).

As concerns the source of platinum, that is surely not coeval with that of gold, the single possibility is to accept the presence of ultrabasites in the catchment area of the Pianu Valley.

Such rocks have not been identified in this area but it is presumed to have been existed, now being dismembered by shear zones or faults.

Other sources cannot be taken into consideration, as e verywhere in the world such rocks are the unique source of platinum.

In other parts of the South Carpathians there have been mentioned either platinum minerals (sperrylite) in the East Făgăraş Mts. (Codarcea et al., 1952) or platinum associated with cobaltpentlandite in the Cu-Ni-Co ores at Brădet – Vâlsan, Cozia Mts. (Udubaşa et al., 1988).

They are associated either with serpentinites or metagabbros, respectively.

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