

CONCLUSIONS

The Katanga Mines Series “Série des Mines”, belongs to a system of sedimentary strata of late proterozoic age, and is host of stratabound polymetallic mineralization(s), also including Platinum Group Elements.

The discovery of the PGE potential of the Katanga deposits was circumstantial, and due to a combination of climatic, alteration, human and mineralogical factors. Despite the invisibility of any PGM, the attention of the first prospectors had been drawn by high concentrations of eluvial native gold.

The contained PGE have been mined for decades as by-products of the Cu-Co-U-Ra extraction, without knowing if they were supported by carrier minerals, and by which ones. This knowledge was hampered by the small dimensions of the PGM individuals, and the lack of adequate analytical instruments. During a search beginning in 1903 until about 1990, the only PGM species which were known were native platinum (Buttgenbach, 1908), and oosterboschite and Pd-trogtalite (Johan et al., 1970).

The use of adequate detection and study methods, systematically applied to historical samples recognised in the past as PGE ores, allowed to confirm the former results and to notably extend the list of Katanga PGM.

These PGM belong to several groups (native metals, alloys and intermetallics; chalcogenides and oxides), and numerous species exceeding by far what is known from placer deposits of PGM.

With the exception of the oxides, the PGM occur frequently as idiomorphic crystals.

The first group is mainly composed of Pt and Pd compounds, the other PGE (Ir, Ru, Rh) being also present but in much lower concentrations and as very rare and small individuals.

Hitherto unrecognized intermetallic compounds (e.g. Pd \gg Cu,Se) and Au-potiarite have also been detected. The latter species was detected in a locality not yet recorded as PGE-bearing.

Among the chalcogenides, the selenides and the tellurides are overwhelmingly represented, as theoreticized by several researchers (e.g. Jaireth, 1992). Other Pd-tellurides than merenskyite are suspected (telluropalladinite, keithconnite?), as well as other Pd-selenide(s) (palladseite?).

The PGE-chalcogenides occur in all investigated samples, either definitely sulphidic, (Shinkolobwe-siegenite/vaesite), or definitely lithic (silicified dolostones and chloritites).

The presence of abnormal compositions (common chalcogenides containing minor amounts of PGE, coeval with their PGE-devoid equivalents (e.g. Pd-calaverite, Pt-tyrrellite); PGM containing minor amounts of the common metals of the ores (e.g. Cu, Co, Ni), suggests that one is probably dealing with a general phenomenon, which deserves some further consideration.

The oxides are represented either by definite, well crystallized species ((Pd,Cu)O quadr.= "palladinite"), or by undetermined compounds of several elements (Fe-Cu-Co-Ni-Ce-Pd-Pt-Ir-Ru-Pb-...S-Se-Te-As-Ox.), probably comprised of sub-micrometric mixtures (mineraloids) and adsorption compounds.

The oxides often include residues of their chalcogenide precursors, which suggests either an on-going or an interrupted oxidation process.

The oxidic PGM occur everywhere, except in the sulphidic samples.

One of the most peculiar oxidic compound is the PGE-heterogenite, which occurs as cavity fillings in a not less peculiar rock, i.e. chloritite. This Pt-heterogenite contains several wt. % Pt, even at spots where no discrete discontinuities under SEM-BS can be disclosed. Discrete particles of native metals and alloys (Pt, Ir, Ru, Rh) occur also as in the same heterogenite and in the chlorite.

These rocks have attracted the attention of the first investigators by their "exceptional PGE contents". Their origin and stratigraphic position are still unresolved.

The Katanga PGE/PGM cannot be connected to any visible or inferred parental ultrabasic or basic eruptive rocks. On the contrary, the connection with evaporitic facies and post-depositional diagenetic phenomena is a case in point of a very unconventional ore type.

The Katanga case puts us perhaps on the track of other possible analogues, for instance among the numerous stratabound Cu deposits of the world, which have never been investigated for their PGE potential. This fully justifies a reassessment of the Katanga PG minerals, ores and rocks, based on complete and systematic chemical and isotopical PGE analyses.

The linguistic and stylistic help of Jo Schaper is heartily acknowledged (<http://www.geocommunications.net>). All remaining imperfections are the author's.