4.5.P17

Exogenous factors of the PGE, Au, Ag concentrations at the Chineysky massif slope deposits (Transbaical Region)

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Productive slope deposits of PGE, Au, Ag have been discovered at the Chineysky stratified massif of gabbroids on the basis of the morphological and compositional peculiarities. They are a principally new, non-traditional type of ore bodies for the primary Pt-Cu-Ni deposits. The slope deposits are located at the lower horizons of the slope cover overlying the gentle contact of gabbroids with host terrigenous rocks (PR_1ud) and near-contact sulfide ore bodies. The slope cover extends up to 1.5-2 km from the top. Its thickness increases at the same direction from 1 to 6-8 m. The cover is composed of various fragments of underlying rocks, and its pelitic fraction is colored by iron oxides and hydroxides, malachite and chrysocolla as the result of chemical weathering.

The concentration ratios for PGE, Au, Ag in primary sulfide ores and overlying slope deposits shows clearly defined accumulation of precious metals in the slope cover. Sperrylite ($PtAs_2$), Au-Ag solid solution (with the Ag content from 14.72 to 75.35 atomic %) and the Pd minerals were found in the slope cover. The Pd minerals occur only in the upper cover part, and are not found in the foot one, because of their low physicochemical stability. The Pt and Au contens increase by 10 to 100 times during the process of heavy concentration enrichment, whereas some Pd fraction is washed out together with pelitic material due to the sorption of Pd by goethite.

The formation of the slope deposits under condition of the Transbaikal bald mountainous relief is connected with fluvioglacial processes, which cause heavy minerals to sink to the lower horizons of the slope cover during its slow movement down the slope. These slope deposits are a clear example combination of both endogenous and exogenous factors for precious metal concentration in ores, which results in not only excessive content of PGE, Au, Ag, but substantially increase the industrial value of the primary Pt-Cu-Ni deposits. The occurrence of similar slope deposits is possible to find for other Pt-Cu-Ni deposits, which were weathered under the same orogenic climatic conditions.

4.5.P18

U-Th dating of paleosols of known age at Vico volcano (Latium, Italy)

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Vico is a Quaternary stratovolcano belonging to the Roman Volcanic Province. Its activity started at 0.42 Ma [1] and includes silica-saturated trachytes, followed by high-K lavas [2]. A large palaeosol separates two ignimbrites named B and C. We found an additional thin ignimbrite layer, BC, itself mantled by a paleosol, between ignimbrites B and C.

As soils mainly consist of detrital components derived from the underlying rock mixed with authigenic components (evaporites, carbonates, iron oxides, organic matter), it is necessary to unravel the contributions of each to the U and Th budget. Independent dating of soil formation was hoped to distinguish detritus-dominated, ^{230}Th-rich components from mainly authigenic ones.

^{40}Ar/^{39}Ar ages of the ignimbrites are well constrained: our ages of 177±7 ka for B and 153±6 ka for the new BC layer, fit with the age of 151±3 ka for C [3] and provide a tight chronological frame to assess U-Th systematics in palaeosols. The soil overlying BC must have been formed between 153±6 and 151±3 ka.

We based our U-Th investigation on a sequential chemical extraction of following the stepleach procedure of [4]. Results on the soil overlying BC are very scattered; no reasonable combination of two steps is older than 60 ka. The Fe+Al hydroxides and the aqua regia-soluble residue, in principle the most chemically retentive components of the soil, give a two-point apparent age of 49±5 ka. Leach step 3, attributed to authigenic carbonate, has an age of 15±1 ka. Organic-rich steps with or without other leach steps give 9±2 ka.

Summary: the BC soil, which was mantled by the > 100 m thick ignimbrite C, was evidently not protected from chemical reworking and did not retain the record of primary soil formation processes. Soil U-Th appears to mostly record wetter climate conditions of the Holocene.

References

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