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Platinum group elements in south Longzhou Mountains, Sichuan, SW China

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Longzhou Mountains are located in the southern part of the Sichuan Province, between Huili and Miyi towns. Their geology is dominated by a pile of Emeishan volcanics (basalt, tephrite and basaltic andesite) including at least four eruptive cycles [1]. A set of 45 samples of volcanic rocks and related intrusions (olivine pyroxenite to peridotite) from the southernmost part of Longzhou Mountains have been investigated in this study.

All samples have been analysed for Pt, Pd, Rh, Cu, Ni, Co and S at the Sichuan Geological Bureau for Geology and Mineral Resources. PGE have been pre-concentrated with lead oxide and analysed by emission spectroscopy, with detection limits better than 0.2 ppb. Ni, Cu and Co were analysed by ICP-AES while S contents were determined by titration iodometric procedure. Mineral composition was investigated with the electron microprobe in the Geology Department, Rhodes University, South Africa.

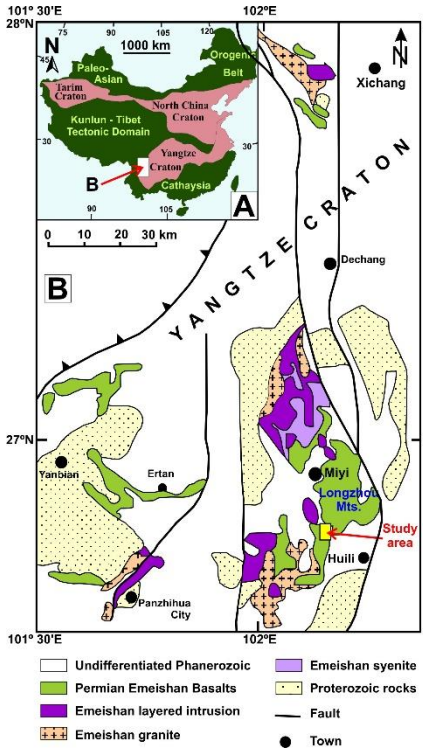

Fig. 1. Location of the study area in

China (A) and in the western margin of the Yangtze Craton (B).

The volcanic rocks in the Longzhou Mountains contain clinopyroxene and plagioclase phenocrysts and numerous quartz microxenoliths ± melted, often showing epidote reaction crowns. The sulphur in the volcanic rocks is less than 0.5% while in the ultramafic cumulate intrusions can exceed 2%. The PGE contents in the volcanic rocks are commonly less than 10 ppb. Six basalt samples within a ca. 1.5 km^2 area show PGE enrichment (31-156 ppb Pt+Pd+Rh). In the same area, one slag lump from an old Cu smelter showed a content of 1.6 g/t PGE (1.1 g/t Pt + 0.5 g/t Pd) at ca. 40 wt% sulfide. The sulfides (pyrrhotite, pentlandite and chalcopyrite) from the ultramafic body at Qingshuihe contain inclusions of michenerite (PdBiTe), sperrylite ($PtAs_2$), native gold, volynskite ($AgBiTe_2$), tellurobismuthite (Bi_2Te_3) and clausthalite (PbSe).

The high PGE contents in the basalts is associated with large clinopyroxene phenocrysts, showing incipient accumulation with the formation of pyroxenite-type aggregates, which would suggests accumulation of the PGE-rich phases, as well. The widespread quartz microxenoliths indicate contamination with upper crust matter, which would have induced sulphide saturation and accumulation. Nevertheless, unlike the ultramafic intrusions, where PGE occur in sulphides, the high PGE content in volcanic rocks seems to be unrelated to sulphide accumulation. The PGE-rich samples show smaller S contents (< 100 ppm) than other basalt samples; Pt and Pd show no correlation with sulphur. It can be inferred that the Pt enrichment in basalts is related to the concentration of the metal in clinopyroxene [2]. The presence of PGE as micronuggets can also be envisaged as an explanation of metal enrichment.

References:

[1] Qi L et al. (2008) Lithos 106:222-236.
[2] Righter K et al. (2004) Geoch. Cosmoch. Acta 68:867-880