New data concerning the high-Mg rocks of the Siberian trap formation in the Noril'sk region

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The problem

The huge Siberian trap province consists of the tholeiitic basalts in general. High-Mg rocks are very rare, especially in its Western part. Meanwhile their composition and origin are very importent to the reconstruction of the evolution all trap magmatic system and the ore-forming processes.

There were discribed two main horizons of the picritic basalts in the Noril'sk region: inside the Gudchikhinsky and the Tyklonsky Formations (Godlevsky, 1959; Dodin, 1964; Fedorenko *et al*., 1996 etc.). Numerous basic-ultrabasic intrusions located here contain the picritic gabbro-dolerites as well, sometimes with Pt-Cu-Ni deposits. It is believed that they are the result of the interaction between the Tuklonsky magma and the surrounding rocks, and thus they belong to the Nadezhdinsky Formation (Naldrett, 1992; 1996; Ligthfoot *et al*., 1997). But the relationships between intrusive and effusive rocks are not recognized enough.

The main goal of this study was to understand the origin of high-Mg intrusive rocks in term of their connection with the effusive rocks. To solve this problem we have investigated the complete section of the Nadezhdinsky Formation in the Mikchangda river basin. It consists of two different units: the lower part is represented by layered flow (about 70 m thickness) and the upper part consists of 7-10 massive flows (140-150 m thickness). The lower part is the most interesting because it contains the interlayers of picritic basalts (17-19 mas.% MgO, the summary thickness is about 15 m). among the tholeiitic basalts. All rocks of the layered flow are characterized by very similar features: they have high LILE concentrations, Ta-Nb negative and Pb positive anomalous, very low Cu, Ni, Co contents. Olivine composition not vary significantly: Fo content changes from 76 up to 78 mol.%, NiO – 0.09-0.11 mas/%, HREE -0.1-0.3 ppm. In contrary , picritic gabbro-dolerites of the ore-bearing intrusions possess another behaviour of these elements – average LILE, high metal contents and another typomorphical features of olivines (Fo_{78-83}, NiO – 0.2-0.3 mas.%, HREE>3 ppm).

Conclusions

For the first time the high-Mg rocks were established in the Nadezhdinsky Formation. This is the third level of the location of the picritic basalts in the vertical secton of efusive rocks in the Noril'sk region. They can be formed from the tholeiitic basalts to adding 32 % olivine crystals (Krivolutskaya *et al*., 2005) . These picritic basalts are not comagmatic rocks for the picritic gabbro-dolerites from intrusions with unique Pt-Cu-Ni ores. The latters were formed from another magmas.

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Age distribution and geochemistry of cinder cones in the Bandas del Sur, South Tenerife (Canary Islands)

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The three shield massifs of Anaga, Roque del Conde and Teno (constructed between 11.9 and 3.9 Ma, Guillou *et al*. 2004) are the oldest volcanic units exposed on Tenerife island. In the central part of the island, the prominent Las Cañadas volcano formed between ~3 and 2 Ma. Three caldera-forming eruptions occurred between 1.59 and 0.17 Ma (Martí *et al*. 1994; Bryan *et al*. 1998) and are collectively responsible for the development of the Las Cañadas Caldera (Martí *et al*. 1994, 1997). The Bandas del Sur Formation, in the south of Tenerife, records two explosive volcanic cycles of basaltic to phonolitic eruptions with more than seven ignimbrite sheets, erupted from the Las Cañadas edifice. These cycles correlate with the caldera-forming eruptions. Each cycle started with flank eruptions of the Las Cañadas volcano associated with alkali basaltic lavas and the formation of cinder cones within the Bandas del Sur (Bryan *et al*. 1998).

The cinder cones within the Bandas del Sur are important volcanic units for understanding the explosive volcanic cycles on Tenerife during the Pleistocene. Palaeomagnetic studies, major and trace element geochemistry, as well as Y/Nb vs. Zr/Nb plots, and radioisotopic dating (K-Ar) have been carried out on prominent cinder cones to discover their stratigraphic position. Combining our results with previous K-Ar data, the cinder cones and lavas can be subdivided into three stratigraphic units. Each unit shows specific Y/Nb ratios and distinctive remanent magnetization. Multielement plots, as well as variation diagrams depicted for each unit yield further information with respect to mantle source and degree of partial melting. The first two units were constructed between 0.948-0.779 Ma and 0.323-0.300 Ma. These units define volcanic cycles ending in violent plinian eruptions. The third and youngest unit possibly marks the beginning of a further volcanic cycle 0.095 Ma ago.

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