

Liquid Immiscibility of Boninites in Xiangcheng, Southwestern China, and implication to Genetic Relationship Between Boninite and Komatiitic Basalt

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Boninitic rocks and associated high-magnesian basalts and high-iron tholeiites in Xiangcheng area constitute the basal horizon of the arc volcanic sequence in Triassic Yidun Island-Arc, southwest China. The boninites occur as pillowed-massive and ocellar lavas, the latter possesses well-developed globular structure and alternate with the former. These boninites are characterized by the absence of olivine and low-Ca pyroxenes phenocrysts and low CaO/Al₂O₃ ratios (<0.67) and high Cr (>1000ppm) and Ni (>250ppm). The normalized abundance patterns (NAP) for trace elements by primitive mantle are similar to that of Low-Ca modern boninites and SHMB in Archean and Proterozoic.

Liquid immiscibility for the generation of the ocellar boninites is supported by following several lines of evidence: (a) sharp contact between ocelli and matrix, (b) the stable volumetric ratios of ocelli/matrix and local coalescence of ocelli in ocellar rocks, (c) identical micro-spinifex textures and mineral assemblages with different modal mineral contents in ocelli-matrix pairs, (d) the appearance of the bubbles and acicular clinopyroxenes crossing the boundary between ocelli and matrix, as well as (e) distinct compositions of both ocelli and matrix corresponding to high-Mg andesite and komatiitic basalt, respectively. The close association and geochemical similarities of ocellar boninites with pillowed-massive ones suggest that the parent magma prior to immiscibility is boninitic. The primary features of the ocellar boninites indicated

by high Mg/(Mg+Fe²⁺) ratios and Cr and Ni abundances show that liquid immiscibility took place in early stage of the evolution of the boninitic magma. The smaller miscible gap in boninites than tholeiites possibly is relative to lower FeO*/(MgO+FeO*) ratios and high MgO contents of the boninitic magmas.

The associations of komatiite-komatiitic basalt-boninite (or SHMB) and immiscibility phenomena in high-Mg lavas in some Archean greenstone belts and ophiolites have been reexamined. It is proposed that liquid immiscibility of boninitic magma probably is a genetic link between boninites (or high-Mg andesite) and komatiitic basalts with "great similarities".

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Keywords : boninite, komatiitic basalt, liquid immiscibility, arc volcanic sequence, Triassic, China

An Application of Finite Element Method of Elastic and Plastic Mechanics in the Evaluation of Landslide Stability — A Case Study of Hanyuan Landslide in Sichuan, China

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There are many kinds of methods to evaluate landslide stability quantitatively, such as different types of limit equilibrium methods (LEM), various kinds of engineering graphic methods (EGM), and many sorts of finite element methods (FEM) of elastic and plastic or viscoelastic mechanics, as well as discrete element one (DEM), etc. As all the kinds of stresses and strains inside of a landslide composed of different mediums can be shown by using the finite element method of elastic and plastic

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mechanics (FEMEPM), and all of parameters can be gotten easier than other FEMs in practice, it can present wherever the deformation and failure in a landslide more objectively. Therefore, this method is regarded as one of the most effective and perfect methods in evaluation of landslide stability and being used more and more in the field of landslide study and evaluation. The presentation introduces an application of this method according to a case study of Hanyuan landslide in Sichuan, China. In this case study, based on Mohr-Columb yield criteria, a new concept, the ratio of Mohr's strength is introduced to show the calculated. The stabilities of

three landslides in the group of Hanyuan landslides are evaluated under present and future situation by using exploring information. All the results are about the same as their actual situation. Finally, some suggestions of controlling the landslides are made.

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