# Silicate liquid immiscibility in tholeiitic melts of Wang-Tian'e volcano (NE China)

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The largest volcanoes of Changbaishan volcanic area in NE China are Changbaishan Tianchi and Wang-Tian'e. In contrast to the Changbaishan Tianchi association of differentiated alkaline rocks, lavas of Wang-Tian'e volcano vary from basalt to basaltic andesite and belong mostly to the tholeiitic series and, less frequently, to the alkaline series. Silicic rocks are rare. The goal of this study is to estimate the crystallization conditions, composition and evolution path of Wang-Tian'e basaltic melts.

Melt inclusions in plagioclase of the tholeiitic basalts were studied. Plagioclase ($An_{75-80}Ab_{19-24}Or_{0.8-1.3}$) was the first mineral which crystallized in this system. Melt inclusions contain a plagioclase rim and Fe-rich glass or fine-grained aggregate of clinopyroxene, Ti-magnetite, ilmenite, apatite and sulfides. Two types of silicate globules were identified in these inclusions: Fe-rich and Si-rich. Fe-rich globules contain 21-29 wt.% FeO, up to 6 wt.% MgO, 2-7 wt.% $Al_2O_3$, 2 wt.% $K_2O$, 1 wt.% CaO and more than 5 wt.% $H_2O$ at 45-51 wt.% $SiO_2$. Si-rich globules contain up to 13.5 wt.% $Al_2O_3$, 6 wt.% $K_2O$, 2.2 wt.% $Na_2O$ at 71.5 -72 wt.% $SiO_2$.

The inclusions were homogenized at temperatures of 1180-1190ºC. The composition of homogenized mel inclusions is, in general, practically identical to the rock composition: 10-12 wt.% FeO, 15-16 wt.% $Al_2O_3$, 3-3.5 wt.% $TiO_2$, 4-4.5 wt.% MgO, 3-3.5 wt.% $Na_2O$, 1.3-1.5 wt.% $K_2O$, 8-9 wt.% CaO, 0.6-0.8 wt.% $P_2O_5$ and 0.3-0.6 wt.% $SO_3$ at 49-51 wt.% $SiO_2$.

The presence of Si-rich globules in Fe-rich glasses in the inclusions indicates that low temperature silicate liquid immiscibility could play a role during tholeiitic melt evolution. This was shown by E. Roedder for the quartz-fayalite-leucite system [1]. The formation of hydrous Fe-rich globules in Fe-rich glasses could be attributed to kinetic effects during melt ascent to the surface. This study was supported by the Grant of the President of Russian Federation, proj. MK-2419.2019.5, and the Russian Foundation for Basic Research, proj. 17-05-00767.

[1] Roedder E. (1951) *Am. Mineral.* **36**, 282-286.