

## History of Volcanic Activity, Magma Evolution and Eruptive Mechanisms of the Changbaishan Volcanic Province

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Three giant stratovolcano near the border of Sino-DPRK , including Nanbaotai volcano (2343 meters in altitude), Wangtiane volcano (2051 meters in altitude) and Tianchi volcano (2749 meters in altitude), record the migration path of volcanism in this area. All the volcanoes endured shield-forming and cone-forming stages. Wangtian'e volcano began to erupt in Pliocene and fall into silence in the early Pleistocene (4.77 Ma-2.12 Ma) (Fan et al., 1998). Tianchi volcano endured three eruption stages: potassium trachybasalt shield-forming stage in the early Pleistocene (2.77-1.203Ma), trachyte cone-forming stage in the middle and late Pleistocene (1.12-0.04Ma) and violent eruption of pantellerite in the Holocene (Fan et al., 2006, 2007).

The history record has implied many eruptions in the Changbaishan area in the Holocene time, whereas it is still hard to identify whether the exact eruption spot is in Tianchi volcano. Although scholars reach an accord on the Millennium eruption events in Tianchi volcano, the vague history records and the decoupled geological dating data are still under debating. On the south and north slope of Tianchi volcano, white pantellerite pumice are covered by black melted trachyte pyroclastic rocks, indicating a medium eruption has happened after the Millennium eruption events. Studies on major and trace elements and isotope geochemistry show that the Changbaishan volcanoes have a similar trachybasaltic magma system with its primary magma of potassic trachybasalt nature. The composition of the magma experienced a evolution from basaltic to trachytic to pantellerite (Fan et al., 2006, 2007).

The studies suggest that there are crustal magma chamber and mantle magma chamber under the Tianchi volcano. The two chambers interact with each other and cause batch eruption (Fan et al., 2007). Since the mantle chamber continually supplied trachybasalt influx from below to the crustal chamber, the Tianchi Volcano is a long-life volcano. Fractional crystallization and magma mixing were two important processes in the Tianchi Volcano-the former determined the bimodal characteristics of the volcanic rocks, and the latter triggered the volcanic eruption. Additionally, some mantle sourced magma of potassic trachybasalt compositions erupted directly to the surface and resulted in widespread isolated small cinder cones around the Tianchi volcano.

Subduction of the western Pacific plate and the subsequent back-arc extension of NE Asia dominate the mechanism of the Changbaishan Volcano.

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