

## Major historical eruptions of Tianchi volcano, Changbai Mountain, NE China

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Tianchi volcano, is a huge stratavolcano located on the border of NE China and North Korea. The Millennium eruption of Tianchi volcano, erupted at somewhat AD 1000, is one of the world biggest eruptions in the last 2000 years. Historical documents reveal that the last eruption may occurred in about 300 years ago (AD1668 and AD1702). Activity of this volcano is monitored by all modern methods. Potential eruptions of this world most dangerous volcano attract attentions from both the public and the scientific. However, better understanding of the historical eruptions of Tianchi volcano will help us to learn more about the future activity. Here we report our recent studies on major historical eruptions of Tianchi volcano.

Five major eruptions, labeled as T1 to T5, in Holocene have been recognized in Tianchi volcano. The first one eruption, T1, occurred in about 5000 aBP, formed a thick layer of yellow pumice, widely distributed on and around the volcanic cone of Tianchi. The second one, T2, usually known as Qixiangzhan eruption, occurred in 2000 aBP, formed a small lava flow of black obsidian, with limited distribution on the northern peaks of Tianchi. T3 is the famous Millennium eruption, the most important eruptions in Tianchi. Volcanic productions, grey pumice, cover large area from Tianchi volcano to 1000 km eastward of Japan. After the Millennium eruption, several eruptions have been argued in the past few hundreds of years, and two eruptions, T4 (red) and T5 (black) have been recognized here. T5 may have a small vent at the water vent of Tianchi crater, and also distributed on the top of Tianchi cone and Bingchang. Mineral assemblage and major element geochemistry of volcanic glass of these historical eruptions have distinguishable features.

Fractional crystallization in crustal magma chamber dominates the nature of major historical eruptions of Tianchi volcano. Typical mineral assemblages of fractional crystallization are alkaline feldspar and hedenbergite, with minor other minerals of fayalite, quartz, apatite and Fe-Ti oxide. E probe data indicate that the historical eruptions have similar mineral chemistry. A simple model have been used to estimate the extent of fractional crystallization. If we take a magma of SiO<sub>2</sub> 64

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