Composition and Textural characteristics of the Holocene pumice erupted from Changbaishan volcano, NE China

HONGMEI YU, JIANDONG XU

Institute of Geology, China Earthquake Administration, Beijing 100029, China (yuhongmei@ies.ac.cn)

Changbaishan volcano (also known as Baekdusan) located on the border between China and North Korea, is one of the largest active volcanoes in China. It is a huge central stratovolcano and has gone through the formation of lava shield (2.77-1.66 Ma), lava cone (1.12-0.04 Ma) and Holocene eruption. It has experienced at least five explosive eruptions in the Holocene, i.e. 5,000 BP eruption, AD 946 eruption (also called "millennium eruption"), AD 1668 eruption, AD 1702 eruption and AD 1903 eruption.

In this study, the component and quantitative microstructure of pumices from three explosive eruptions in Holocene (BP 5000 eruption, the millennium eruption and AD 1668) of Changbaishan volcano were studied in detail. The results show that, the pumices from BP 5000 eruption and the millennium eruption are all pantellerite in composition, but the later is more acid than the former. The pumices from AD 1668 eruption are high potassium trachyte in composition. The pumices from these three eruptions compose of vesicle with different sizes, vesicle wall and a small amount of phenocrysts (< 15%). The yellow pumices from BP 5000 eruption are small, and have the smallest vesicles (about 1 μm) but the most number density (4.23×10^{16} $/m^3$). The sizes and numbers of vesicles in gray pumice from BP 5000 eruption and gray white pumice from millennium eruption are relatively similar, the smallest vesicles are several micrometers, and the number densities are 1.76-3.25×10^{15} $/m^3$. The vesicles in black pumice from AD 1668 eruption enlarge to centimeters, and are general larger than 10 μm in size. The vesicle number (3.68×10^{14} $/m^3$) decreases and vesicle walls thicken. Finally, according to the components and vesicle number, parameters, such as decompression rates, the height of eruption column and magma discharge rate etc., were obtained. The results from this study may provide important scientific basis for understanding magma process and determining the intensity of historical eruptions of Changbaishan volcano.