

## Characteristics of Pyroclastic-flow Facies in Millennium Eruption of Tianchi Volcano, Changbai Mountains, China

Bo Zhao, Jian Dong Xu, Bo Pan, Mei Hong Yu

Institute of Geology, China Earthquake Administration, China

E-mail: zhaobo@ies.ac.cn

Tianchi volcano is the largest composite volcano in China, which is at the boundary between China and North Korea. In 946±3, there was a large plinian eruption in Tianchi volcano which is called millennium eruption. Millennium eruption produced widespread pyroclastic-flow deposits.

This paper has studied the strata, litho, geochemistry, grain-size and transportation of ground-surge from pyroclastic-flow of millennium eruption in Tianchi volcano. The main conclusions which have been got are as follows:

- (1) The proximal strata of pyroclastic-flow are combined with the eutaxite structures and lava-like structures. The median strata are combined with massive beds, pumice-rich layers, lithic-rich layers and welded zones which are representative of the transportation processes for gravitational differentiation. And columnar joints and block structures are also developed which are representative of the deposition processes for cooling. The distal strata are combined with coarse-tail beds, ground surge beds and climbing beds. There are also some altered beds because of flood. The distal pyroclastic-flow strata have some fluidized characteristics.
- (2) The proximal ignimbrite is alkaline trachytic welded tuff. The median ignimbrite is also alkaline trachytic welded tuff. And the distal ignimbrite is alkaline rhyolite. The welded tuff is weaker from the proximal to the distal.
- (3) The proximal and median black pumice is trachyte. And the distal gray pumice is rhyolite.
- (4) The median diameters of pumice which is less than 64mm from the median and distal strata have an increasing tendency with the distance increasing from the crater. And the median diameters become smaller with the depth increasing from the top of strata. The Sphericity (Spht) has an increasing tendency with the distance increasing from the crater. And the contents of lithoclasts in number percentage decrease with the distance increasing from the crater which reveals gravitational differentiation.
- (5) With the pumice becoming smaller, there are more angles, richer irregular shapes and simpler transportation. The grain-size distributions of fine ashes are similar and have a single peak which is close to the fines.
- (6) The histograms of ashes cloud and ground surge have a similar characteristic which is ladder-like and close to the fines. And the histograms of pyroclastic-flow have many peaks which are representative of the composite transportation.
- (7) There was hydration at the distal part of pyroclastic-flow, and the ground surge came from pyroclastic-flow and water interaction in Baixi.