Chronology and petrogenesis of volcanic rocks from the Wudalianchi area, Northeast Asia

B Zhang[1,2,3], JQ Liu[1,2,3]

[1]*Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China*
[2]*Institutions of Earth Science, Chinese Academy of Sciences, Beijing 100029, China*
[3]*University of Chinese Academy of Sciences, Beijing 100049, China*

Wudalianchi volcanic clusters, consists of 14 Quaternary volcanos in Northeast China (Fig.1), which could characterize by low-relief, well preserved, concentrated distribution and K-rich. Composite cone of most volcanos indicates they experienced multiple eruptions. According to the field obversion, most volcanos experienced quiet eruption with lava flow in the early phase and lava flow with weak explosive in the late phase. 54 K-Ar ages of basalt from this area record the earliest eruption of ~2.1 Ma, and the eruption continued to ~65 ka (Fig.2). Laoheishan and Huoshaoshan are the latest erupted volcanos in ~1719-1721. The eruption interval (~0.66 Ma during the early Pleistocene decreased to ~0.217 Ma in the end of early Pleistocene and ~80-100 ka during the middle Pleistocene, ~32 ka during the end of middle Pleistocene, Fig.2) implies more frequent volcanic eruption since the early Pleistocene and the area may has the danger of potential eruption. Otherwise, all the K-rich volcanic rocks show similar geochemical data, which implies the same origin and the origin kept uniform during the Quaternary. U-Th disequilibrium in volcanic rocks didn't show the contribution of Pacific plate's subduction (Zou et al., 2011). The distribution of 14 volcanos are obvious controlled by faults, which belong to the Song-Liao rift system. Continental rifting resulted the lithospheric extension and low-degree melting of phlogopite-bearing peridotites in the upper mantle and potassic magma experienced leucites crystallization in shallow crust (Li et al., 2012). The faults also provide the channel of magma ascend.

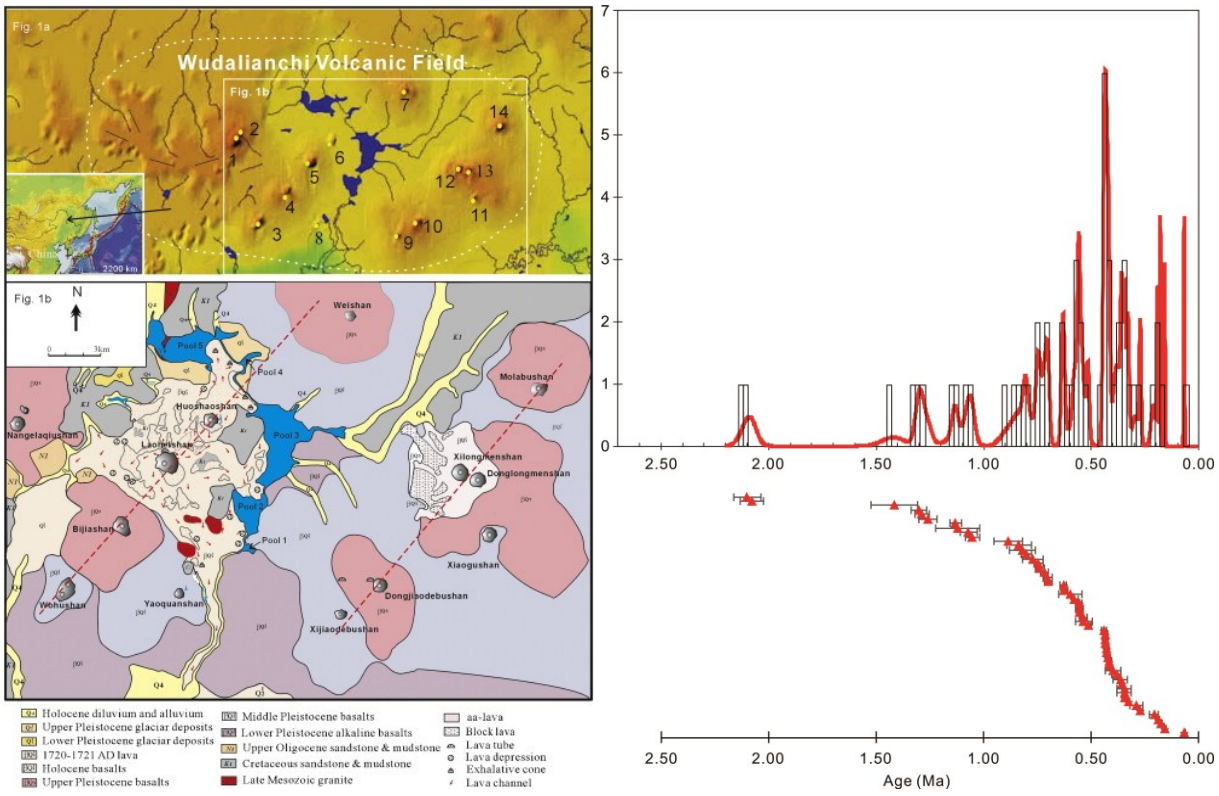

Fig. 1 Geomorphic feature and geological map of Wudalianchi area (Xiao et al., 2009), volcanos are labeled with numbers, the volcanos mainly concentrated in 2 NNE trend lines which controlled by the faults, and the barrier lakes were formed by the Quaternary lava flows; Fig.2 Spectrum of geochronological data from the Wudalianchi area (K-Ar ages of basalts without xenolith) , volcanic activities were concentrated in Pleistocene and the eruption interval seems decreasing since the Pleistocene.

References

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