



Analysis on Newly Active of Changbaishan Volcano

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Changbaishan (Baitoushan) volcano, located at the northeast frontier of the North China craton. A huge explosion occurred 1000 years ago, following rhyolite pumice eruption in 1668 and 1702 AD.

A large integrated monitoring system is established to observe the seismicity, surface deformation and geochemical variations, including a permanent station and a seasonal seismic networks, and a mobile GPS measurement.

The volcano observing data are analyzed by province's seismological bureau, and transmitted to the Volcano research Center as well as. A set of databases is developed based on the monitoring data, geological investigation data in the GIS frame, to make integrated analysis on the volcano risk.

The seismicity in Changbaishan Volcano had significant changed since Jun of 2002, the month's average number was changed from 7.3 (Dec,1999 - May,2002) to 85.6 (Jun,2002 - May,2004). The events are most volcano-tectonic, the magnitude are less than 3, and most were appear as swarm, the depths are less than 5km from the ground, within the shallow crust.

The seismicity enhanced since Sep of 2004, the maximum magnitude is $M_L=4.4$ on Dec. 17, located 20km from the crater lake. The surface deformation shows short-term variation before this quake.

The volcano summit area uplift 6.4cm during 2002-2004, based on the leveling measurement in a 28km baseline, and the maximum horizontal extension can reach 4cm according to the GPS measurement at the same time. The maximum strain can be $10^{-6}/\text{yr}$ in this area.

The geochemical data of Changbaishan volcano spring also were discussed in this talk. The geochemical signal shows decrease trend from 1994-2002, and notability transition around 2002-2003. The helium isotope shows obviously increase in 2003-2004, the highest isotope ratio of $^3\text{He}/^4\text{He}$ equal to 6.26Ra, is the highest in China, and similar with the volcanoes in west Pacific Arc.

Based on a 7-grades table of risk levels of volcano in China, the risk of re-eruption of Changbaishan volcano is also discussed.