

## **Preliminary research on mud volcanoes and earthquakes activity in the northern tianshan mountain,xinjiang**

Qiong Wang

Earthquake Administrator of Xinjiang Uygur Autonomous Region, China

E-mail: wangqio8715@sina.com

Mud volcano is the phenomenon of fluid geology on the condition of special tectonic and hydrological geology, and it is associated with oil and gas belt, and its eruptive material consists of low-temperature sand rock, underwater and nature gas from several Kilometer underground.

Mud volcano formation has usually the following geologic condition: Having rich clay strata in the deep and high pore fluid pressure; Having the screening zone of Argillaceous strata, which can keep deep sediment being in the high pore fluid pressure state; having the channel of deep mud eruption, which is related with active fault; having the active fault, which is dynamic mechanism triggering the mud volcano activity (Gao Xiaoqi, 2008; Milkov, 2000; Zhu tingting, 2009).

There are many mud volcanoes in the northern Tianshan mountains, Xinjiang, and mud volcanoes in the Dushanzi, Khorgos, Shihezi and Usu are typical (Wang Dao, 2000). These mud volcanoes locate in Anticline axis of the piedmont depression belt of the northern Tianshan mountains, where most outcropping strata are sand rocks. These rocks are rich in multi-layer groundwater, which is characteristic of high pressure, high salinity and rich gas or oil. Under the action of regional principal compressive stress in the NS direction, the rocks in the region appear deformation and rupture, and pore stress is abnormal.

Earthquake and mud volcano are both the reflection of the modern crustal motion, mud volcano and earthquake activity have some genetic relation. When regional tectonic stress increasing continuously, rock pore stress in closed construction gradually strengthens, which causes mud volcano eruption, as same that earthquake preparation and occurrence result from increasing the regional tectonic stress. Earthquake activity may accompany mud volcano activity, and large-scale mud volcano activity could trigger small earthquakes.

Shihezi to Usu region in the northern Tianshan mountains is not only the concentrated area of mud volcano activity, but also mid-strong earthquakes in the region are active. Khorgos mud volcano erupted a great deal of muddy water with hydrocarbon gases and high mineralized water when Zaisang M7.3 earthquake on Jun.14, 1990, KAZAKSTAN, occurred, which is 450km from M7.3 earthquake. Tuositai mud volcano erupted much mud and sand before and after Usu M5.2 earthquake on Oct.25, 1990, which is 40km from M5.2 earthquake. The 24-hour observation record shows that Usu mud volcano spewed mud before Nilka M6.0 earthquake on Nov.1, 2011 and Xinyuan M6.6 earthquake on Jun.30, 2012.

If mud volcano locates near source region of mid-strong earthquake activity, mud volcano eruption activity may be taken as short-impending precursor of strong earthquake. By monitoring mud volcano activity, it is possible to trace dynamic change of regional stress, and provide one new idea for short-impending prediction.