# Analog model for the fracturing during the uplift of a cryptodome

# Hiroaki Komuro[1]

[1] Geoscience, Shimane Univ

http://terra.riko.shimane-u.ac.jp/komuro/index.html

Various types of fracutres were produced by the growth of a 1977-78 cryptodome in Usu Volcano. Analog model experiments with clay cake reveal the process of these fracturing. An oblique uplift caused by magma intrusion along the Toya caldera wall yields an asymmetric graben, en echelon faults, strike slip faults etc. However, as a new cryptodome in 2000 has extruded at the shoulder of Toya caldera, it is not probably controlled by the caldera wall. Accordingly, fracturing hazard has extended to no fracture zone of the 1977-78 eruption.

During the 1977-78 eruption of Usu Volcano built at the south rim of Toya caldera, various types of fracutres were produced by the growth of the Usu shinzan cryptodome. The front side of the growth new mountain subsided as an asymmetric graben, but fractures with the right-handed en echelon arrangement were formed at the back side of it. Many strike slip faults were also formed around some distance from the cryptodome. However, no faults were observed in the extracaldera area. These various fractures should originate in the asymmetric bulging of a subsurface lava dome which rised along the caldera wall.

Analog model experiments with clay cake reveal the process of these fracturing. An asymmetric graben is produced along the extension zone between the oblique uplift block and the fixed block. A hinge fault with the clockwise rotation around a pivot yields minor faults with the right-handed en echelon arrangement under left-handed strike-slip strain on the model surface. This fault pattern is interpreted as the Riedel shear. These experimental results are similar to the case of Usu shinzan.

However, a new cryptodome around Nishiyama craters during the eruption in 2000 is different from the case of 1977-78 eruption. The position of the new cryptodome is the shoulder of Toya caldera, which is the outside of caldera. As the new cryptodome is not probably controlled by the Toya caldera wall, fracturing hazard has extended to no fracture zone of the 1977-78 eruption.