

# Minor resumed activity at KA crater of Mt. Usu and possible triggering mechanism by Tokachi-oki earthquake

# Jayme Margolin[1]; Hiromu Okada[2]

[1] Inst. Seismol. Volcanol., Hokkaido Univ.; [2] Inst. Seism. Volcan., Hokkaido University

Usuzan erupted along the west flank of Nishiyama, one of its parasitic crypto-domes, on March 31st, 2000, and after successful evacuation, the surface eruptive activity declined gradually and minor eruptive activity ceased on September, 2001, while its magmatic intrusion activity only lasted ca. 5 months. Even from the precursory stage of the eruption, various observations have been concentrated in this area and continue to record various phenomena. These include infrared thermal imaging and visual monitoring of the temporal variation of the new crater areas.

The infrared imaging equipment takes measurements of far-reaching thermal activity and allows for more thorough analysis of the ongoing activity. By using visual image and thermal observation, it is possible to detect recent changes in surface temperature in relation with recent

regional tectonic activity. A persistent trait of Usuzan volcano is that volcanic earthquakes precede an eruption.

On the 26th September 2003, the 8.0 magnitude Tokachi-Oki Earthquake caused numerous disturbances across Hokkaido. Located some 260 km from the epicenter, Usuzan expressed notable visual and thermal changes. Looking specifically at KA crater, the surface temperature of its crater lake seems to show an increase in temperature to 41.5 degrees C on November 1, 2003, which is a reversal of its original pattern of decreasing temperature expressed in the later stage of the 2000 eruption. By July 12, 2002, the surface temperature was once down to 12.8 degrees Celsius.

Also, the surface appearance has altered, which is seen through the water level, water color, and the presence of the amount of steam and black floating bubbles (similar phenomenon known also on the crater lake Oyu-numa, Kuttara - Noboribetsu). Thermal activity in the surrounding area in the Konpirayama crater region also shows some upheavals, which were not significantly recognizable. For example, steaming even became visible at Toyako-Onsen town from the summit of Konpirayama. No notable changes were recognized at NB crater and surrounding western crater area. We interpreted that Usuzan did show the triggering injection effect caused by a regional M8 earthquake. Various triggering effects also reported at some other volcanoes in Hokkaido, including Tokachidake and Tarumaisan.

The inferred mechanism is that small amount of magmatic gas was supplied through a once closed, but now a narrow channel, connecting the bottom of KA crater lake and the surrounding area, and the northwestern tip of the shallow intruded 2000 lava. In this situation, the case was luckily not a risky one, because the source was not from the major renewal supply from the larger magma chamber at great depth. Showa-Shinzan also displayed delayed minor eruptive activity forming Ato-yama crater on May 2, 1947, after 2 years long quiescence since the end its lava-dome formation. But the case was not an earthquake triggering.