

Effects of magma geochemistry on lateral magma migration: a case study from the distribution of conduits at Oki Dozen volcano.

Kiyoshi Toshida[1]; Daisuke Miura[1]; Ryuta Hataya[1]

[1] CRIEPI

The lateral migration of magma as dikes within crust that result in parasite vent formation is common volcanic activity. It is highly important to evaluate the occurrence of such activity around the volcano for assuring the long-term stability of the HLW geologic disposal site. The geological and geophysical conditions that affect magma migration are determined by studying the parasite vent distribution of volcanoes located at different stress conditions.

The conditions that affect magma migration are (a) geochemistry of magma, (b) volcano edifice growth, (c) relation between the local stress field and regional stress field, and (d) geologic structures. The effect of geochemistry is found in the distribution of conduits at Oki Dozen volcano. The comparison between the mafic and silicic dikes, sills and parasite cones show that the mafic magma is more likely to migrate to particular orientation, while the silicic magma is more likely to change migration directions. The local stress field is formed by the magma activity: therefore, its extent is likely to change with the development of volcano edifice. Migration of magma is more likely to occur in differential stress regime, to the directions of maximum and minimum lateral stress.

The conditions (a) - (d) affect migration direction; therefore, it is important to evaluate the lateral migration direction. It is proposed that determination of the above conditions be included in the evaluation process for geologic disposal, and volcanic hazard assessment in general.