

# Prediction of future volcanic eruptions based on geological information: a case study of Towada volcano

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The prediction of future volcanic eruptions of Towada volcano based on geological information was carried out. At first, the magma-discharge stepdiagram of Towada volcano was constructed. In the post-caldera stage, middle scale eruptions (eruptive volume = more than 2 km<sup>3</sup>) show the strictly-periodic type (Koyama and Yoshida, 1994), and small-scale eruptions (eruptive volume = less than 0.6 km<sup>3</sup>) show the nonpredictable type. Based on the pattern of the magma-discharge stepdiagram, it is predicted that the strictly-periodic type eruption could occur at the earliest after 3000 years. The nonpredictable type eruption can occur in the near future. The time of next eruption can not be predicted, however, the eruptive volume can be predicted to order of 0.1 km<sup>3</sup>. This type eruption should be supposed when the volcanic hazard is considered. SiO<sub>2</sub> contents of whole-rock samples and groundmass glasses gradually have changed from basalt to rhyolite composition with time in the post-caldera stage. Therefore, it is predicted that rhyolite magma will erupt in the future eruption. A probability tree showing the transition of eruption style in one eruption event was constructed based on eight eruption events in the post-caldera stage. As a result, the eruption that possibility is the highest to occur for several hundred years in the future is as follows. The eruptive volume is order of 0.1 km<sup>3</sup>, and the magma is rhyolite composition. At first, pumice fall and ash fall deposits are provided by a relatively large plinian eruption, and then, ash fall deposits are provided by intermittent small-scale phreatomagmatic eruptions. The eruption ends afterward. The pyroclastic fall deposits of more than thickness 10 cm are distributed to east-southeast direction 30 km around from the vent.