

# The Miocene volcanic complex at Shimane Peninsula : formation by successive and multiple injections of differing magmas

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A Middle Miocene volcanic complex at Katsurajima, Shimane Peninsula, consists of lava domes, dykes and pyroclastic rocks formed by intrusions and injections of basic andesite -andesite - dacite - rhyolite magmas near the sea floor. Some lava domes show concentric or subparallel banded structures and irregular shapes. Projecting parts are glassy, due to quenching. The formation of the lava domes and magma type characteristics were investigated based on geology and the petrography, petrochemistry and paleomagnetism of 56 samples.

The results show the SiO<sub>2</sub> contents of the volcanic rocks span a wide range of 53.5 wt% to 72.8 wt%. The volcanic rocks were derived from at least 4 different magma series, namely, Group-1: SiO<sub>2</sub> 55.2-60.4 wt%, TiO<sub>2</sub> 1.30-1.53 wt%, K<sub>2</sub>O 0.70-1.47 wt%, P<sub>2</sub>O<sub>5</sub> 0.52-0.64 wt%; Group-2: 59.4-64.3 wt%, 1.10-1.28 wt%, 0.97-2.03 wt%, and 0.42-0.54 wt% respectively; Group-3: 64.7-72.8 wt%, 0.66-0.78 wt%, 1.88-2.37 wt%, and 0.19-0.22 wt%; Group-4 64.6-71.3 wt%, 0.86-1.43 wt%, 1.64-2.26 wt%, 0.28-0.62 wt%. A dyke with the composition SiO<sub>2</sub> 53.45 wt%, TiO<sub>2</sub> 1.30 wt%, K<sub>2</sub>O 0.80 wt%, P<sub>2</sub>O<sub>5</sub> 0.31wt% also occurs.

The chemical compositions of the volcanic rocks from each group vary continuously, and no compositional gaps are recognized. These chemical variations are due to fractional crystallization and/or magma mixing during the ascent of the magmas.

Variations in thermoremanent magnetization and the chemistry of the volcanic rocks suggest that the Group 1 to 4 magmas existed contemporaneously, ascended successively, and were successively injected in a short time. The banded volcanic complex was formed as a result of repeated injection, cooling, and solidification of these magmas.