

Modeling of Magmatic and Eruptive Processes in Different Tectonic Conditions: Interpretation of Volcanic Activities Near Izu Peninsula, Japan

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Volcanic eruptions happen sometimes at a pre-existing summit crater and sometimes from new fissures generated on the flank. It is proposed that the preference between these two eruption sites is determined by which of the two pressures needed to move magma into an established conduit and a new fissure is smaller. The preference depends on the summit height, the magma density in the conduit, the lithostatic pressure at the chamber, and the pressure to open fissures in the tectonic stress. The eruption style is also influenced by the eruption site. Based on this idea, different features of volcanic activities near Izu Peninsula, Japan are interpreted. The Higashi-Izu group of monogenetic volcanoes is considered to have formed with a strong extensional stress associated with collision of the Izu Peninsula with the Honshu arc. Fuji volcano has had periods with dominant summit or flank eruptions by turns every 1000-3000 years because the preference has changed with the vertical and horizontal growth of the volcano. In some eruptive activities of Izu-Oshima and Miyake-jima volcanoes, a summit eruption immediately follows a flank eruption and vice versa reflecting the change of the magma density during the preceding event.