

Repeated subsurface dike intrusions beneath Izu-Oshima Volcano during recent 50 years

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A subsurface dike which had been placed in past magmatic event and are currently shrinking due to cooling contraction can cause a local subsidence of the ground surface. We found such subsidence in the repeated precise leveling data around Izu Oshima volcano Japan which erupted in 1986.

The following pieces of evidences strongly suggest that the found subsidence is caused by cooling contraction of subsurface dike placed in past volcanic event (some of them were during 1986 event, and others are older)

- 1) The way of decay of subsidence rate is in good agreement with model prediction,
- 2) The subsidence rate (typically 10mm/a at the epoch 10 years after the event) itself is explainable by the contraction of a dike of 5m thickness, 10 km width (vertical) which cooled by about 100 degrees in a few years,
- 3) The spatial distribution of such suggested dikes is in good agreement with configuration of the vents of the past fissure eruptions derived from geological studies (e.g. Tsukui et al. 2006).
- 4) Such subsidence can last for about a century and be detectable by repeated precise leveling even about 50 years after the intrusion.

This finding also strongly suggests that such subsurface dike intrusions occurred during past eruptions during the last century (e.g. 1933-1939, 1950-1951) because leveling data before 1986 clearly register similar local subsidence along a northwester to southeast belt running through the central part of the volcano. This knowledge should be taken into account in the eruption prediction and quick response procedures in case of the next eruption.