Review of: "Episodic transport of discrete magma batches beneath Aso volcano"

Hsin-Hua Huang[1]

1 Academia Sinica

Potential competing interests: The author(s) declared that no potential competing interests exist.

This work combines geodetic and seismological observations to carefully and quantitatively image the transport process of discrete magma batches beneath Aso volcano. The built model provides an important piece to the trans-crustal magmatic plumbing system regarding the magma dynamics at shallow depths. The finding of shallow magma storage zone (SMSZ) and the proportionality between its mass changes (estimated by VLPs) and eruption sizes (Fig. 6) is stimulating. I think it is commonly accepted that individual eruptions originate from discrete batches of magma, but those batches are thought to be within or a part of the magma reservoir rather than a buffer zone as SMSZ outside of the reservoir. More studies will be needed to test whether this is a ubiquitous feature beneath active volcanoes. Whether this SMSZ can be just viewed as one of the multi-layering trans-crustal magma chambers is also worth a think. In this regard, a high resolution tomographic imaging of the Aso volcano may be helpful to give some insights into this question. For instance, a recent ambient noise tomography work (Huang et al., EPS, 2018) has shown a low velocity anomaly around the location of the SMSZ (Anomaly L4 in Fig. 14d). The references for the structural imaging of the Aso volcano listed in the work seem to be not that up to date. Furthermore, one more thing to think about is the larger negative volume changes than the positive changes after the 2014 eruption. It is reasonable to attribute to involving more gas during the eruption but then the question is after emitting such large amount of the gas, the whole SMSZ should be less pressured than before but why the 2015 and 2016 eruptions still come closely. Most of my comments are open questions rather than the criticism to the work. This work that illuminates the intermittent volume changes of a discrete magma batch (i.e. SMSZ) with an unprecedented resolution via repetitive VLP measurements has no doubt sharpened our understanding to the shallow magmatic dynamics already. Following this work, using a technique (e.g. ambient noise interferometry) that can non-invasively and continuously monitor the SMSZ could be critical and possible to forecast the impending eruptions of the Aso volcano.