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Revealing magmatic bodies under Gede Volcano, West Java, Indonesia, using three-dimensional local earthquake tomography and small long-period earthquake analyses

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Gede Volcano is a representative of semi-plugged arc volcanoes. Prior to 2011, we observe Gede exhibits seismic swarm every few years, but only minor visible degassing with the last eruption at Gede occurred in 1957. Since 2011 when we gradually upgrade seismic network, we recorded swarms consists of tens to a couple hundred Volcano Tectonic (VT) earthquakes in few days to a few weeks period. Previous studies of swarms of earthquakes and tilt shed light into possible periods of magma intrusion that did not reach the surface with some control of the tectonic forces around Gede Volcano. Further evaluations suggest that earthquakes swarms not only consist of VT type earthquakes but also small long-period (LP) earthquakes that occurred at shallow depths. In addition, we conducted three-dimensional seismic P-wave travel time tomography to image the magma source(s) beneath Gede Volcano. We used travel time arrivals from > 700 VT earthquakes that occurred beneath the volcano over the period 2011-2017. Combining results from the long-period earthquakes analyses and tomography, we aim is to further find the magmatic bodies under the volcano at shallow depths (< 2 km) up to about 8km.