Absolute gravity signals at the Sakurajima volcano since 2009 through 2018

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In this paper, we present gravity signals based on continuous absolute gravity measurements since 2009 through 2018. During this period, several hundreds to a thousand eruptions/explosions were observed every year during 2009 through 2015 (phase 1). Significant seismicity and crustal deformations were observed on Aug. 15, 2015 (phase 2), followed by unusual quiescence since August 2015 (phase 3). Gravity signal after eliminating groundwater disturbance showed remarkable features according to the phase of volcanic activity as described below. During the phase 1 characterized by frequent vulcanian eruptions from the Showa crater, gravity fluctuated about a mean with rather small amplitude of 10 microgals, suggesting dynamic equilibrium is achieved at the magma chamber; magma supply from deeper interior is balanced with mass loss through eruptions. The phase 2 is interpreted as a dyke intrusion event, which causes elastic deformation and short-term gravity change almost simultaneously. In the current phase 3 (2016-2018), gravity shows monotonous increase of 10 microgal/yr, suggesting deflation of magma.

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