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Prior processes of Vulcanian eruption at Showa crater of Sakurajima volcano

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From our multi-parametric observations carried out at Sakurajima volcano, typical prior processes of a Vulcanian eruption have been revealed as follows. At a few hours before the eruption onset, magma starts to migrate and storage in shallow depth, which is recognized in record of strain change as an inflation process. Since a few tens minutes before the eruption, SO_2-gas discharge rate is gradually decreasing. This indicates that a sealing process at the crater bottom toward the eruption progresses. In the time of around 10-20 minutes before the eruption, inflating rate of the volcano starts to increase due to a construction of a plug above the conduit thus a formation of a gas pocket beneath the carter. At a few minutes before the eruption, small tremor starts to emerge and then its amplitude becomes larger with strain changes of inflation turning to be deflating and minor discharge of a hot gas as the pressure release through fractures newly constructed within the plug. Seismograms show that expansion process starts to occur at only one second before the eruption. It is probably the time when effect of the depressurization process reaches to the depth of dense magma head and sudden expansion of magma with degassing starts. About a half of a second later, such expanding magma rises and pushes the gas pocket up. It leads to swelling of crater ground and its failure. Consequently, the accumulated gasses and expanding magma itself ejects together from the crater as a start of eruptive surface phenomena.