

Characteristic ground deformation detected by GPS at Kuchinoerabujima volcano

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Since 1999, volcanic activity around Shindake crater of Kuchinoerabujima volcano has increased as shown by increase in seismicity beneath the crater and fumarolic gas emission rate at SW rim. We have conducted continuous GPS observation at the summit and flank of the volcano since April 2004. Inflation ground deformations around the summit crater were detected by the continuous GPS observation twice associated with remarkable increase in seismicity. In the first event, which occurred in January to June 2005, ground NW of the crater moved to NW at nearly constant rate of 1cm/100days and the horizontal movement attained about 3cm. On the other hand, the ground rapidly moved to the same direction and the deformation rate gradually decreased in the second event in September to December 2006. Peak of the seismicity mainly composed of high-frequency events appeared at the beginning of the deformation and the seismicity gradually decreased in the first event. However, the second event accompanied different pattern of change of seismicity. Prior to the start of inflation, a number of monochromatic events occurred in August. When the seismicity declined in September, the inflation began. The seismicity mainly attained its peak in November when the inflation rate rather declined. The peak of the seismicity delayed about two months and high-frequency events are dominated. At the beginning stage of the second inflation, the inflation may be, occurred in pre-existing failure zone formed by the first event in 2005, without seismicity and fracturing newly occurred above it in latter part of the second inflation. The observation results that the vertical displacement at NW rim of the crater and horizontal movement at the flank of the volcano in the first event were larger than those of the second event, suggests that inflation source of the second event became shallower and support the idea. In addition, an important result was included in the observational data at the flank of the volcano for a long-term activity forecast.