

Deformation of Lokon Volcano Observed by InSAR and GPS Techniques

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Abstract: Volcano deformation reflects the dynamic processes beneath the surface and should be monitored to understand the volcanic activities. One of the most active volcano in Indonesia is Lokon, which located in North Sulawesi Province. We combine the interferometric synthetic aperture radar (InSAR) and GPS observation techniques to study deformation around Lokon Volcano during 2008 - 2011, to reveal the precursor of Lokon Volcano eruptions in 2011. Deflation-inflation patterns are detected by InSAR and quantified by GPS observation. Displacement rate of Lokon GPS observation points in the period of 2009 - 2011 ranged from 1.1 to 7 cm a year. Strain patterns that occur in the areas are compression surrounding Tompaluan crater and extension in the eastern slope. Location of the pressure source for August 2009 - March 2011 measurement was at a depth of 1800 m beneath Tompaluan crater. Deformation in the Lokon Volcano is characterized by the compression zone in the summit and crater area caused by magma activity raised into the surface from a shallow magma source which is accompanied by a high release of volcanic gases. Accumulated pressure release and deformation rate as measured in the Lokon Volcano remain low.

Keywords: eruption, deformation, Lokon volcano, InSAR, GPS