

Ground deformation associated with the eruption of Lumpur Sidoarjo mud volcano, East Java, Indonesia

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Mud volcano is a rare phenomena happen in recent human history. Lumpur Sidoarjo (LUSI) mud volcano provide a noteworthy opportunity to study its mechanism from its very beginning. Since it first eruption on May 2006, LUSI has been released more than 12 million meter cubic of mud, buried more than 640 Hectare of land, and force more than 30 thousand peoples to be relocated.

We use 93 of ALOS PALSAR images to gain temporal evolution of the ground deformation. The time-series displacement evolution were derived using Small Baseline Subset (SBAS) method from 915 interferograms by utilizing STAMPS software (Hooper, GRL, 2008).

Although the deformation adjacent to the center of activity were not able to obtain due to low coherence resulting from the mud-flow, a line-of-sight (LOS) extension were still observed along the elongated rim around 1.5-2 km from the center of activity as large as 20 cm/year. This fact inferred that the deformation is dominated by subsidence. However, a shortening of LOS which indicated an uplift, were observed, but limited only to the ascending images. We also found another elongated-shape subsidence area in the north-west side, and almost perpendicular to the main subsidence area with similar rate. However, we are considering these two deformation area are explained by different source.

Despite the decreasing rate of gas emission, our time series analysis shows that the deformation is quasi-linear during the time of the analysis. This suggests that the source of deformation has been stationary over time and and also it will a take long time for this eruption to cease.