Geophysical Research Abstracts
Vol. 18, EGU2016-368-1, 2016
EGU General Assembly 2016

Ground-based GPS monitoring at the Lusi eruption site and external perturbations.

Alwi Husein (1,2,3), Adriano Mazzini (1), Soffian Hadi (3), Bagus Santosa (2), Muhammad Charis (3), and Dwinata Irawan (3)

(1) CEED, University of Oslo, Oslo, Norway, (2) Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia (alwihusein86@gmail.com), (3) Badan Penanggulangan Lumpur Sidoarjo, Sidoarjo, Indonesia

The Indonesian Lusi mud eruption started in May 2006 and since then has been continuously spewing hot mud over a surface of 7 km2 that is today framed by high containment dams. The shape of the eruption site constantly evolved during the last 9.5 years. After an initial cone-shaped morphology, the original ground level has been characterized by an overall progressive subsidence, typical at eruption sites, compensated by the continuous eruption of boiling mud breccia. Numerous external factors appear to influence the evolution of the Lusi morphology and its activity. Of particular interest is the interaction between the frequent seismicity, the activity of the neighboring volcanic arcs, the Watukosek fault system that intersects Lusi, that in turn alter the eruption activity and posture.
In order to study the evolution of the Lusi system, we continuously monitor the area using a GPS ground-based method. The investigation is conducted ombining the data from a base station located ∼5 km to the south of Lusi, coupled with several secondary benchmark stations scatterred just around the crater and the embankment that frames the eruption site. These data are complemented by rover GPS stations connected to the system. About 400-1000 point measurements are collected during each survey depending on the condition of the mud terrain.
The collected data allows monitoring the evolution and the displacements occurring around the eruption site as well as the changes in mud erupted volumes and the related variations in flow rate. Results reveal that the ongoing subsidence and other significant morphological changes occurring at Lusi site are directly correlated with recorded seismic events as well as regional volcanic activity at various sites. During such events the normal gradual collapse trend is reversed and are observed lateral and/or vertical elevation increases resulting in several centimeters of dislocation during the analyzed time frame. This monitoring reveals that even events located more than 300 km away from Lusi have a significant effect at the active eruption site.