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Analysis of Focal Mechanism and Microseismicity around the Lusi Mud Eruption Site, East Java, Indonesia

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The 29th of May 2006 numerous eruption sites started in northeast Java, Indonesia following to a M6.3 earthquake striking the island.Within a few weeks an area or nearly 2 km2 was covered by boiling mud and rock fragments and a prominent central crater (named Lusi) has been erupting for the last 9.5 years. The M.6.3 seismic event also triggered the activation of the Watukosek strike slip fault system that originates from the Arjuno-Welirang volcanic complex and extends to the northeast of Java hosting Lusi and other mud volcanoes. Since 2006 this fault system has been reactivated in numerous instances mostly following to regional seismic and volcanic activity. However the mechanism controlling this activity have never been investigated and remain poorly understood.

In order to investigate the relationship existing between seismicity, volcanism, faulting and Lusi activity, we have deployed a network of 31 seismometers in the framework of the ERC-Lusi Lab project. This network covers a large region that monitors the Lusi activity, the Watukosek fault system and the neighboring Arjuno-Welirang volcanic complex.

In particular, to understand the consistent pattern of the source mechanism, relative to the general tectonic stress in the study area, a detailed analysis has been carried out by performing the moment tensor inversion for the near field data collected from the network stations. Furthermore these data have been combined with the near field data from the regional network of the Meteorological, Climatological and Geophysical Agency of Indonesia that covers the whole country on a broader scale.

Keywords: Lusi, microseismic event, focal mechanism