



Pre and co-eruptive deformation field at Merapi volcano from kinematic GPS surveys in the summit area

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Merapi volcano (Java, Indonesia) is in almost continuous activity with growth of an andesitic lava dome inside a horse-shoe shape crater. To monitor the evolution of near field surface displacements and to model the associated magmatic sources parameters, we established starting 1999 a new strategy based on a dense network of about 50 benchmarks measured with a combination of static and kinematic GPS positioning. The measurement of this network takes only few hours (when summit access is possible), and brings a 1.5-cm error on the three-component displacement vectors. Data processing has been automated in order to be easily used as one of the monitoring techniques by the observatory.

We present the results of 16 surveys from 1999 to 2007, a period that includes two eruptive episodes in 2001 and 2006. Our results show large pre-eruptive and co-eruptive displacements associated to these eruptions, and evidence for deep fracturing in the vicinity of the main crater rim.