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► To cite this version:

Mélissa J Drignon, Laurent Arbaret, Alain Burgisser, Jean-Christophe Komorowski, Caroline Martel, et al.. Transition from effusive to explosive activity during lava dome eruption: the example of the 2010 eruption of Merapi volcano (Java, Indonesia). American Geophysical Union, Fall Meeting 2014, Dec 2014, San Francisco, United States. pp.abstract #V51B-4759. insu-01386845

HAL Id: insu-01386845

<https://insu.hal.science/insu-01386845v1>

Submitted on 24 Oct 2016

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Transition from effusive to explosive activity during lava dome eruption: the example of the 2010 eruption of Merapi volcano (Java, Indonesia)

Mélissa J Drignon^{1*}, Laurent Arbaret¹, Alain Burgisser¹, Jean-Christophe Komorowski³, Caroline Martel¹, Radit Yaputra⁴

email address: melissa.j.drignon@gmail.com

¹ Institut des Sciences de la Terre d'Orléans (ISTO), CNRS, Université d'Orléans, BRGM, Orléans, France
² ISTerre, Université de Savoie – CNRS, Chambéry, France
³ Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, Paris, France
⁴ Pusat Vulkanologi dan Mitigasi Bencana Geologi, CVGHM, Yogyakarta, Indonesia
 *Current Address: College of Earth, Ocean and Atmospheric Sciences, Oregon State University, Corvallis, OR, USA



Merapi volcano (Java, Indonesia) is one of the most dangerous volcanoes on Earth. It is known to produce lava domes that collapse in deadly pyroclastic flows because of gravity or auto-explosivity. Even though this volcano is mostly effusive, explosive eruptions occur in its history, most recently in 2010. Two major explosive events occurred that year, the first one on October 26, and the second one on November 05. They produced explosive columns that quickly collapsed in pumice-rich pyroclastic flows that ran up to 15.5 km from the summit. The 2010 eruption was very well observed, making this event a good candidate for investigating the effusive-explosive transition with a full suite of geochemical and geophysical data. The pumice of these two events was analyzed and the data used in a two-step computer model in order to investigate the pre-explosive conditions. The explosive-effusive transition often occurs at arc volcanoes. The parameters driving this transition (overpressure, eruptive volume, . . .) are known but the relative importance of each parameter remains unclear. This study demonstrates the primacy of overpressure in determining the eruptive mode of the volcano, with volume and other parameters contributing only to the magnitude rather than the character of the event.



4. Preliminary Source Depths

