

## **The Domerapi project. Dynamics of an arc volcano with extruding lava domes, Merapi (Indonesia): from the magma reservoir to eruptive processes**

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Volcanoes are complex systems that transfer magma from deep storage zones to the surface through a set of dykes and conduits. At each level, numerous coupled phenomena modify the chemical and physical properties of the magma and the state of the surrounding medium, producing geophysical and geochemical signals that may be detected at the surface. In the case of andesitic volcanoes, magma reaches the surface as lava flows, domes that may destabilize gravitationally or explosively to form pyroclastic flows that travel many kilometers along the flanks of the volcano or via vertical explosive columns of fragmented magma. These different eruptive styles generate drastically different human, structural and environmental impact.

In order to improve our understanding of these magmatic processes and their interplay with eruptive dynamics, DOMERAPI project proposes a multi-disciplinary approach that involves and integrates petrological, geochemical and geophysical methods. This strategy is quite appropriate to understand complex dynamic systems where any individual technique would give only a narrow and limited perspective. DOMERAPI includes analysis of existing data, but also designs new and novel field observations and innovative laboratory experiments. As a major objective, results obtained by different disciplines will be integrated in numerical conduit flow models and interpreted in terms of physical processes, to assist in eruption forecasting and eruptive scenario definition on volcanoes forming lava domes.

This project is focused on Merapi, a target exceptionally challenging after the paroxysmal eruption of October-November 2010. Such a project provides the opportunity to investigate the transition between moderate and violent explosions related to dome growth and collapse and the longterm impacts of such an event on dome-forming type volcanoes. To reach that goal, the permanent monitoring system will be implemented with a dense multiparametric network of sensors, making Merapi one of the best monitored volcanoes in the world. The results will have major implications for understanding magmatic processes, volcano monitoring, hazard assessment and risk reduction on other explosive island-arc volcanoes.

This cooperative project brings together Indonesian, French, American and German research teams that are highly specialized in their own field, such as in volcano monitoring, experimental petrology, physical volcanology, geophysical structure imaging or numerical modeling of magmatic processes.

DOMERAPI project began in 2013 and will last 4 years. It is funded by the french Agence nationale de la Recherche. We will present the scientific objectives of the project, the first experiments initiated in the field and results of petrological and geophysical studies of the 2010 eruption.