

Ecole Doctorale des Sciences Fondamentales

Title of the thesis: Fracturing in a volcanic edifice, destabilisation and debris avalanche

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Summary :

The crisis of Merapi volcano (Java, Indonesia) of 2020-2021 alerts us to the fact that a volcanic crisis could potentially evolve into a flank slide with no apparent change in magma supply conditions. The consequences of such a transition are catastrophic in terms of risks for the populations near such volcanoes. This thesis project proposes to better understand the conditions under which such a transition can occur and to identify the precursors of volcanic flank destabilization.

The objective will be to model the fracturing processes developing in a volcanic edifice using a discrete element model (DEM) specifically adapted to the problem. This model will be based on the DEM method implemented in the open source calculation code YADE-DEM (<https://yade-dem.org/doc/>), which is currently a tool increasingly used in civil engineering as well as in mining and petroleum engineering.