Ecole Doctorale des Sciences Fondamentales

SUBJECT OF THE THESIS

Title of the thesis: *New models for silicic lava flow emplacement.*

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Project Summary:

There are no quantitative thermodynamic emplacement models for slow emplacement of silicic (block) lava flows. Yes, there are one-or-two thermal models for block lava flow activity; but even these only begin to scratch the surface of an earth science emplacement process for which we are largely ignorant. Our initial studies of silicic lava flow textures and structures here in the Auvergne reveal that such silica-rich flows likely slide, creep, and thrust forward under their own momentum, making a glacier the best analogy for such flow regimes.

The hypothesis of this thesis is thus: can we build new end-member thermo-rheological models for silica-rich lava flow systems that convolve all field-observed flow regimes?

This project will thus (i) collect and examine facies, textural, and geochemical data for silicic flows that are shear dominated and/or fold dominated; (ii) describe and parameterise the associated flow thermo-dynamics, so as to (iii) build a new thermodynamic emplacement model for emplacement of highly viscous lava flows.

To do this we will examine case type silicic lava flows that crop out in the Auvergne, the Aeolian Islands, Sardinia, the Eastern United States, and Hawaii.