Rationale
Existing models of volcanic degassing consider the feeder conduit to be cylindrical, while there is strong evidence that it is flattened instead, like a dyke; such approximation affects our interpretation and understanding of deep magmatic processes.
This study aims at determining the impact of system geometry on active degassing dynamics in terms of bubbles’ rise velocity and stability.

Flow Regimes
Bubble rise through magma inside a volcanic conduit is effectively described by an appropriate flow regime, therefore eruptive dynamics can be studied in the framework of two-phase flow. e.g. slug flow will result into Strombolian paroxysms.

Why: Gas Motion
The shallower the slope, the higher the difference in velocity between the head and tail of the bubble.

Why: Syrup Motion
Shallower slopes promote a faster syrup re-occupation of the channel cross sectional area after the slug passage.

Why: Volume Distribution
There is a maximum size for the first detaching bubble, independent of the original slug size, but dependent on the slope geometry.

Scaling
- Dynamical \( \frac{p \cdot w \cdot v}{\eta} < 2300 \) laminar flow conditions
- Kynematical Newtonian Fluid \( \rightarrow \) Non-Newtonian Fluid Pure Silicate Melt \( \rightarrow \) Real Magma Golden Syrup \( \rightarrow \) + sugar xls, bubbles
- Geometrical
  - Slug volume \( \rightarrow \) slug length/channel width
  - Slope \( \rightarrow \) 1/sin(slope)
  - Wall Roughness Effect (negligible)

Conclusions
- System geometry controls rise velocity, which in turn controls break-up
- There is a specific size to the bubbles a system of a certain size and geometry can deliver
- Being able to measure that size (through geophysical techniques) we can invert it to infer upper conduit geometry