Chair: Physics of Fluids group

Bubble in volcanoes – Part II: Numerics

Description

Bubbles play an essential role in magmatic and mud volcanoes. It has been shown that the growth, motion, and burst of the bubbles at the interface of the conduit control the eruption (see Figure 1). In this project, we aim to understand more about the role of bubbles in volcanoes. In particular, we will study the burst of bubbles at the liquid-gas interface that is believed to control the eruption.
In our simulation, we will use an in-house developed read-to-use code to solve the problem of the bubble bursting at the surface of magma. We will ignore heat-transfer at this stage and focus on the hydrodynamics of the process. We will use a Non-Newtonian model to mimic the properties of magma or mud.

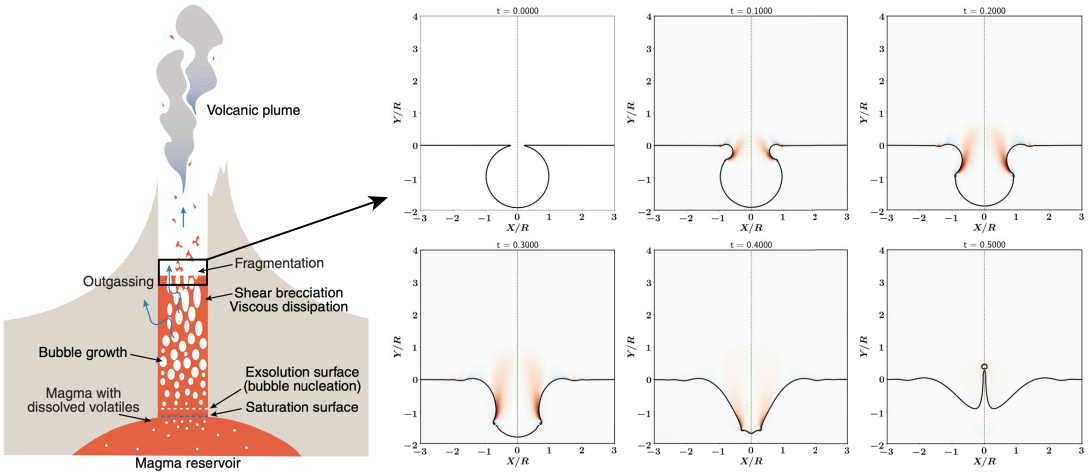

Figure 1: A schematic showing the role of bubbles in a volcanic eruption (on the left, Gonnermann and Manga, 2007). The simulation of the collapse of the cavity formed by bursting of bubbles at the magma-air interface (on the right).

What you will do and what you will learn?

In the Physics of Fluids group, we are looking for enthusiastic students to join our newly established projects on fluid mechanics of volcanoes.

1. You will learn about fundamental geophysical fluid mechanics and bubble dynamics.
2. You will learn the fundamental of Computational Fluid Dynamics (CFD).
3. You will learn how to do basic and advance data analysis.

If you have any questions, fell free to contact Vatsal (details below).

Supervisors

Supervision	E-mail	Office
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Project timeline

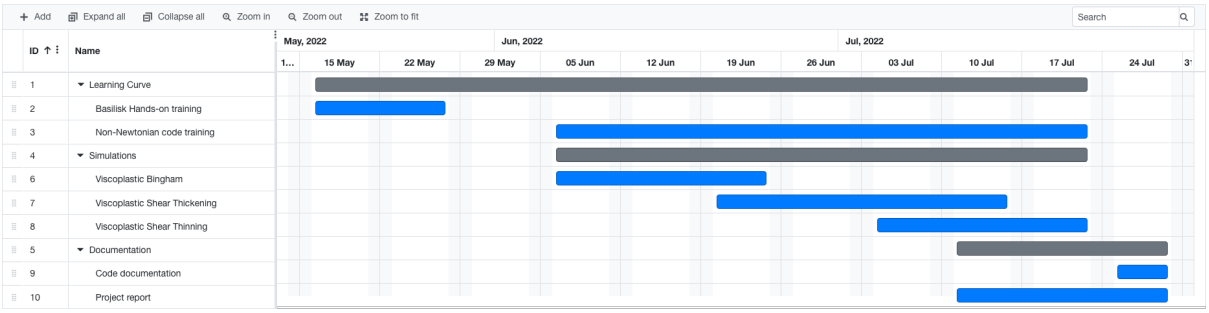

Figure 2: Timeline and trainee program

Sign: _____

Mahashay Jee.
Intern

Sign: _____

Vatsal Sanjay.
Daily supervisor

Sign: _____

prof. dr. Detlef Lohse.
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References

Gonnermann, Helge M and Michael Manga (2007). "The fluid mechanics inside a volcano". In: *Annu. Rev. Fluid Mech.* 39, pp. 321–356.