

# Volcanic Superfaults: a field and experimental investigation

(Proposer: Dr. Telemaco Tesei co-supervisors Prof. Matteo Massironi, Prof. Giulio Di Toro)

Catastrophic collapse of calderas, typically associated to Plinian and ultra-Plinian eruptions, occur via the failure of a roof pendant into the magmatic chamber at shallow crustal levels. This collapse triggers or is triggered by ring faults at the edge of the calderas which may potentially control the rate of eruption and evolution of the caldera itself. These “superfaults” (Spray, 1997) may fail at high velocity ( $>0.1$  m/s) and accommodate huge amounts of slip (tens to hundreds of meters) in a single event. Despite their decisive role during caldera collapse, they are still enigmatic structures and their mechanics is severely understudied.

This project aims at studying the internal structure and mechanisms of volcanic superfaults analyzing both ancient (Ivrea, Latemar) and modern (Bolsena, Campi Flegrei) examples caldera faults in the field. To understand the failure mechanics of these faults, the PhD Student will combine field observations with the experimental study of the natural fault rocks at elevated Temperature and fluid-rich conditions.

For this research, He/She will take advantage of a number of state-of-the-art experimental and analytical facilities of the Department of Geosciences. These include the unique hydrothermal rotary shear apparatus for mechanical tests, hyperspectral cameras for field investigation and FEG-SEM microscope for microstructural investigations.

Fondi disponibili: DOR Tesei e Massironi

