

Magmatic evolution of the Cima d'Asta pluton: constraints from geochemistry and geochronology

(Proposer: Dr. Omar Bartoli, Dr. Bruna B. Carvalho, Prof. Andrea Marzoli)

Silicic magma reservoirs that solidify as granitic (*s.l.*) plutons are formed from a variety of magma types derived from differentiation of mantle-originated magmas and/or partial melting of crustal materials. Notwithstanding, granites may have relatively uniform compositions or may contain a diverse range of components. After more than a century of studies, the mechanisms of pluton growth are still a matter of debate, in particular whether large volumes of magma are emplaced rapidly in a very small number of pulses or incrementally, over a protracted period of time as many small pulses. In addition, the nature of the sources as well as the extent of their involvement in the formation of felsic plutons are not clear and trace element patterns and radiogenic isotopes of lithophile elements on bulk rock may provide ambiguous information.

The aim of this PhD project is to investigate the Cima d'Asta pluton by means of modern cutting edge approaches and techniques. This complex is one of the main post-collisional Permian intrusions present in the Alps and its magmatic activity is likely related to the voluminous silicic volcanic eruptions and formation of multiple calderas forming the Athesian Volcanic District.

After detailed sampling and petrographic screening, bulk-rock geochemical characterization and mineral-scale isotope data (in particular Sr isotope composition of plagioclase and apatite) will be used to constrain the different magma batches contributing to the growth of the pluton. U-Pb zircon dating will then be applied on the diverse components previously identified, in order to reconstruct the number of magma batches and consequently the timescales of the magmatic activity. Additionally, characterization of the Hf and O isotopic composition of zircon crystals will allow to identify possible crustal and/or mantle components of the pluton.

Collaborations: Federico Farina (Milan University), Joshua Davis (Département des Sciences de la Terre et de l'Atmosphère, Université du Québec à Montréal)

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