Geophysical Research Abstracts
Vol. 19, EGU2017-1505-3, 2017
EGU General Assembly 2017

Analogue modelling on the interaction between shallow magma intrusion and a strike-slip fault: Application on the Middle Triassic Monzoni Intrusive Complex (Dolomites, Italy)

Maria Michail (1), Massimo Coltorti (1), Piero Gianolla (1), Alberto Riva (1,2), Matthias Rosenau (3), Costanza Bonadiman (1), Olivier Galland (4), Frank Guldstrand (4), Øystein Thordén Haug (4), Michael Rudolf (3), and Tobias Schmiedel (4)

(1) University of Ferrara, Department of Physics and Earth Sciences, Ferrara, Italy (mchmra@unife.it), (2) GEPlan Consulting s.r.l., Ferrara, Italy, (3) GFZ German Research Centre for Geosciences, Lithosphere Dynamics, Potsdam, Germany, (4) University of Oslo, Physics of Geological Processes (PGP), Oslo, Norway

The southwestern part of the Dolomites in Northern Italy has undergone a short-lived Ladinian (Middle Triassic) tectono-magmatic event, forming a series of significant magmatic features. These intrusive bodies deformed and metamorphosed the Permo-Triassic carbonate sedimentary framework. In this study we focus on the tectono-magmatic evolution of the shallow shoshonitic Monzoni Intrusive Complex of this Ladinian event (ca 237 Ma), covering an area of 20 km2. This NW-SE elongated intrusive structure (5 km length) shows an orogenic magmatic affinity which is in contrast to the tectonic regime at the time of intrusion. Strain analysis shows anorogenic transtensional displacement in accordance with the ENE-WSW extensional pattern in the central Dolomites during the Ladinian. Field interpretations led to a detailed description of the regional stratigraphic sequence and the structural features of the study area. However, the geodynamic context of this magmatism and the influence of the inherited strike-slip fault on the intrusion, are still in question. To better understand the specific natural prototype and the general mechanisms of magma emplacement in tectonically active areas, we performed analogue experiments defined by, but not limited to, first order field observations. We have conducted a systematic series of experiments in different tectonic regimes (static conditions, strike-slip, transtension). We varied the ratio of viscous to brittle stresses between magma and country rock, by injecting Newtonian fluids both of high and low viscosity (i.e. silicone oil/vegetable oil) into granular materials of varying cohesion (sand, silica flour, glass beads). The evolving surface and side view of the experiments were monitored by photogrammetric techniques for strain analyses and topographic evolution. In our case, the combination of the results from field and analogue experiments brings new insights regarding the tectonic regime, the geometry of the intrusive body, and the deformational pattern of the evolving system.