



International Lithosphere Program

- Activity Report 2023 – Task Forces

Project title: **Deformation and magmatic processes from the lithosphere to the surface: integrated multidisciplinary approaches**

Project no.: **2021-TF2**

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1. Highlights of recent ILP Task Force work/results

The efforts during this third year of activity of the TF II were mostly devoted:

- 1) to improve the international collaboration in the framework of several researches carried out by the various teams in different continents, focused on the main topic of this project. The approaches were as synergistic as possible, trying to integrate different methodologies comprising field geological, geomorphological and geophysical data with numerical and analogue modelling. Results have been published in 82 peer reviewed papers, see the complete list of publications on the website dedicated to this TF II: www.ilptaskforce2.unimib.it
- 2) To prepare and submit international projects for possible funding.
- 3) To disseminate our findings and reinforce the researchers network; we organized various sessions at international congresses as specified below.

2. Presence at international meetings/workshops (this year)

- EGU 2023, GMPV8.1 EDI, Volcanic processes: tectonics, deformation, geodesy, unrest, Conv.: Acocella, Gudmundsson, Agustsdottir, Heap, Jonsson, Pinel.
- EGU 2023, TS3.3 EDI, Studying active faults from the near-surface to seismogenic depth: an open challenge. Conv.: Bonali, De Nardis, Ferrarini, Arrowsmith, Alania.
- EGU 2023, GMPV4.2 EDI, Critical and strategic raw materials for a sustainable development: ore deposits, new resources and recovery of mine wastes. Conv.: Bussolesi, Grieco, Cavallo, Yang, Tzamos.
- EGU 2023, TS10.2 EDI, Magma migration and volcano deformation modelling through different points of view. Conv.: Poppe, Maestrelli, Davis, Harnett, Drymoni, Montanari, Lupi.
- EGU 2023, GMPV7.5 EDI, Understanding magmatic processes: from storage dynamics to eruptive behaviour, with implications for volcanic hazards. Conv.: Pontesilli, Petrone, Eibl, Mollo, Ubide, Braschi, Barr.

3. Important publications of ILP Task Force members (max. five)

- Bretagne, E., Wadsworth, F. B., Vasseur, J., Humphreys, M. C., Dingwell, D. B., Dobson, K. J., Mangler M., & Rooyackers, S. M. (2023). The permeability of loose magma mush. *Geology*. doi.org/10.1130/G51133.1

- Clunes, M., Browning, J., Marquardt, C., Cortez, J., Drymoni, K., & Kavanagh, J. (2023). Inclination and heterogeneity of layered geological sequences influence dike-induced ground deformation. *Geology*, 51(3), 278-283.
- Corti, N., Bonali, F. L., Russo, E., Drymoni, K., Mariotto, F. P., Gudmundsson, A., Esposito R., Cavallo A. & Tibaldi, A. (2023). Feeders vs arrested dikes: A case study from the Younger Stampar eruption in Iceland. *Journal of Volcanology and Geothermal Research*, 443, 107914.
- Drymoni, K., Tibaldi, A., Bonali, F. L., & Mariotto, F. A. P. (2023). Dyke to sill deflection in the shallow heterogeneous crust during glacier retreat: part I. *Bulletin of Volcanology*, 85(12), 73.
- Guillou, H., Scao, V., Nomade, S., Van Vliet-Lanoë, B., Liorzou, C., & Guðmundsson, Á. (2023). Combined unspiked K–Ar and ⁴⁰Ar/³⁹Ar dating applied to the dating of 80–260 ka old Icelandic sub-glacial rhyolites. *Quaternary Geochronology*, 77, 101457.

4. New contacts (this year)

D. Jaldín, Universidad Católica del Norte, Antofagasta, Chile
 L. Giambiagi, IANIGLA, CCT Mendoza, CONICET, Mendoza, Argentina
 D. Espinoza, Institut Für Geowissenschaften, Universität Potsdam, Potsdam, Germany
 K. Luengo, Departamento de Ciencias Geológicas, Universidad Católica del Norte, Antofagasta, Chile
 A. Luppino, Università di Milano Bicocca, Italy
 A. Santander, Departamento de Ciencias Geológicas, Universidad Católica del Norte, Antofagasta, Chile

5. Usage of ILP funding (this year)

All the funds have been used for reimbursement of mission expenses of young researchers and PhD students related to scientific research and congress participation.

In particular, the ILP funds have been employed to carry out geological, volcanological and structural field work in the Caucasus (Azerbaijan), on Mt Etna (Italy) and in the Northern Volcanic Rift Zone of Iceland. Part of the ILP funds has also been used to help young researchers to cover the inscription fees to the EGU 2023 congress of Wien.

6. Activities planned for 2024

Plans for 2024 include researches in the field in various continents, lab work, sessions at international and national congresses, and training activities. Both outdoor and lab works will be related to different approaches and methodologies, trying to be as synergic as possible. In particular it is expected to work at different scales and geodynamic settings, comprising reverse and transcurrent settings, as well as rift zones. At least three sessions will be organized at EGU, and possibly other congresses. Training activities comprise an international geological-geophysical field school that will be held in September 2024 in the Caucasus in Azerbaijan, under the umbrella of ILP and of NATO SfP activities.