Carrara Alexandre

Born May 18th 1991 in Creil, France

Postdoctoral Research Associate

Department of Earth and Space Science – University of Washington
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Research Experiences:

2020 – present Postdoctoral Research associate (Appointment on Nov 1st)
Department of Earth and Space Sciences – University of Washington
4000 15th Ave NE, Seattle, WA 98195, United States
Numerical modeling of magmatic reservoir processes and magma dynamics
Supervisor: Prof. George W. Bergantz

2020 Visiting researcher (2 months, January – March)
Departamento de Geociencias – Universidad de los Andes
Cra 1 No 18A-12, Bogotá, Colombia
Numerical modeling of seismic wave propagation in magmatic reservoirs

2016 – 2019 PhD student at ISTerre Chambery on modeling magmatic reservoir processes and the study of the acoustic properties of magmas. – University Savoie Mont Blanc, Chambery, France. Supervisors: Dr Alain Burgisser and Dr Philippe Lesage

2016 Intern at Isterre on the study the deformation of volcano edifices using satellite data (Radar, optical)– University Savoie Mont Blanc, Chambery, France. Supervisor: Dr. Virginie Pinel

2015 Intern at Isterre on the study of the ascent of magma from the reservoir to the surface using numerical modeling– University Savoie Mont Blanc, Chambery, France. Supervisor: Dr. Virginie Pinel

Education:

2019 PhD in Earth Sciences–Solid Earth, University Grenoble–Alpes, France
Dissertation title: *Numerical modeling of the physical processes causing the reawakening of a magmatic chamber and of the associated geophysical signals*
Supervisors: Dr. Alain Burgisser and Dr. Philippe Lesage

2016 MSc in Earth Sciences–Solid Earth, University Grenoble–Alpes, France
Dissertation title: *Study of recent Colima volcano eruptive activity based on new SAR data from Sentinel-1A satellite.* Supervisor: Dr. Virginie Pinel

2014 Bachelor degree in Earth Sciences – University of Aix-Marseille, France

2010 High School graduation – Lycée Arthur Rimbaud, Istres, France

Publications:

Published:

Carrara, A., Burgisser, A., Bergantz, G.W., 2020. The architecture of intrusions in magmatic mush, *Earth and Planetary Science Letters*, 549, 116539. https://doi.org/10.1016/j.epsl.2020.116539

Burgisser, A., **Carrara, A.**, Annen, C., 2020. Numerical simulations of magmatic enclave deformation. *Journal of Volcanology and Geothermal Research,* 392, 106790. https://doi.org/10.1016/j.jvolgeores.2020.106790

Carrara, A., Pinel, V., Bascou, P., Chaljub, E., De la Cruz-Reyna, S., 2019. Post-emplacement dynamics of andesitic lava flows at Volcán de Colima, Mexico, revealed by radar and optical remote sensing data. *Journal of Volcanology and Geothermal Research,* 381, 1–15. https://doi.org/10.1016/j.jvolgeores.2019.05.019

Carrara, A., Burgisser, A., Bergantz, G.W., 2019. Lubrication effects on magmatic mush dynamics. *Journal of Volcanology and Geothermal Research*, 380, 19–30. http://doi.org/10.1016/j.jvolgeores.2019.05.008

Lesage P., **Carrara A.**, Pinel V., Arámbula-Mendoza R., 2018, Absence of detectable precursory deformation and velocity variation before the large dome collapse of July 2015 at Volcán de Colima, Mexico. *Front. Earth Sci.*, 6:93. https://doi.org/10.3389/feart.2018.00093

Pinel V., **Carrara A.**, Maccaferri F., Rivalta E., Corbi F., 2017, A two-step model for dynamical dike propagation in two-dimensions: Application to the 2001 July Etna eruption, *Journal of Geophysical Research: Solid Earth*, *122*(2), 1107-1125. https://doi.org/10.1002/2016JB013630

In review:

Breard E. C. P., Dufek J., Fullard L., **Carrara A.**, Exp. 2020, The basal friction coefficient of granular flows with and without excess pore pressure: implications for pyroclastic density currents, water-rich debris flows, rock and submarine avalanches. In review in *Journal of Geophysical Research Letters Solid Earth*.

Currently in preparation:

Carrara, A., Burgisser, A., Bergantz, G.W., exp. Jul. 2021. Numerical modeling of mixing in magmatic mush resulting from intrusions. Currently prepared for a submission as an invited research article in *Journal of Volcanology and Geothermal research*.

Carrara, A., Lesage, P., Burgisser, A., exp. 2021. The seismic properties of eruptible magmas. Currently prepared for a submission as a research article to *Geophysical Journal International*.

Communications:

Invited oral presentations:

Carrara, A., Burgisser, A., Bergantz, G.W., 2020. The architecture of intrusions in magmatic mush, Department of civil engineering, Universidad de los Andes, Bogotá, Colombia. 02/28/2020.

Carrara, A., Burgisser, A., Bergantz, G.W., 2020. The architecture of intrusions in magmatic mush, Department of Earth science, Universidad de los Andes, Bogotá, Colombia. 02/19/2020.

Participation in international conferences:

IAVCEI 2017 (Portland, USA), AGU 2018 (Washington, USA), EGU 2020 (Remote)

Teaching:

Geological mapping – Master degree – University Savoie Mont Blanc – 2017 – 16h of classes

Scientific programming – Bachelor degree – University Savoie Mont Blanc – 2018 – 20h

Numerical modeling – Bachelor degree – University Savoie Mont Blanc – 2018 & 2019 – 8h

Applied mathematics – Bachelor degree – University Savoie Mont Blanc – 2019 – 12h

Advised 11 undergraduate students during their numerical modeling projects (heat and wave propagation forward modeling) – 2018 & 2019 – ~24h

Grants:

MERB scholarship (100k€): French research minister scholarship funds for financial support during my PhD

AO7bis – Labex OSUG, University Grenoble–Alpes, help for student international mobility (2500€)

Two student international mobility grants from the doctoral school TUE, University Grenoble–Alpes (both 1000€)

Skills:

I use and am familiar with the following numerical methods: Discrete Elements Method (DEM), Finite Volumes Method (FVM), Finite Elements Method (FEM), and Finite Differences Method (FDM)

I'm familiar with the following softwares or codes: MFIX, Paraview, Visit, Imagej, Maxima, MELT (PELE), QGis, COMSOL, ENVI, GoCAD, ROI-PAC, SPECFEM 2D-3D, Gmsh

I use the following programming languages: Fortran, Matlab, Python.