

Curriculum Vitae

Mathieu Colombier

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Ph.D.

Research Experience

- 2018-2024** **Assistant Professor** at Ludwig-Maximilians-Universität, Munich, Germany
- 2015-2018** **Ph.D.** at Ludwig-Maximilians-Universität, funded by the ERC project EVOKES
Thesis topic: “The role of percolation threshold and water-magma interaction on volcanic eruptive style”
- Sept-Nov 2014** **Research technician** at Laboratoire Magmas et Volcans of Clermont-Ferrand, funded by IRD
- Mar-Jun 2014** **Research technician** at Laboratoire Magmas et Volcans of Clermont-Ferrand, funded by LabEx CLERVOLC
- Jan-Jun 2013** **M. Sc. research project** at Laboratoire Magmas et Volcans of Clermont-Ferrand; Topic: Textural characterization of trachytes from the 9400 BP Vulcanian eruption of Kilian volcano, Chaîne des Puys, France

Education

- 2015-2018** **Ph. D. (Dr. rer. nat.), Volcanology**; Summa Cum Laude (with highest honor) at Ludwig-Maximilians-Universität
- 2011-2013** **M. Sc., Volcanology and Petrology** at Laboratoire Magmas et Volcans, University Blaise Pascal of Clermont-Ferrand
- 2008-2011** **B. Sc.**, at Joseph Fourier University of Grenoble.

Grants awarded

- 2020** **Eurovolc TNA project:** 2,100 EUR
Funded proposal “TEPHRA: TExtural Properties, tHermlal history and monitoRing of explosive bAsaltic eruptions”
- 2017** **Swiss Light Source:** 60,000 EUR
Funded proposal for in situ vesiculation experiments at the synchrotron of the Paul Scherer Institute, Villigen, Switzerland
- 2019-ongoing** **LMU Mentoring Program:** 12,000 EUR

Publications

- 21 Cáceres, F., Hess, K. U., Eitel, M., Döblinger, M., McCartney, K. N., **Colombier, M.**, ... & Dingwell, D. B. (2024). Oxide nanolitisation-induced melt iron extraction causes viscosity jumps and enhanced explosivity in silicic magma. *Nature Communications*, 15(1), 604.
- 20 Weller, D., **Colombier, M.**, Cáceres, F., Vasseur, J., Dingwell, D. B., & Scheu, B. (2024). Confocal Scanning Laser Microscopic (CSLM) characterization of volcanic rocks. *Journal of Volcanology and Geothermal Research*, 446, 107992.
- 19 **Colombier, M.**, Manga, M., Wright, H., Bernard, B., Degraffenried, R., Cáceres, F., ... & Dingwell, D. B. (2023). Pre-Eruptive Outgassing and Pressurization, and Post-Fragmentation Bubble Nucleation, Recorded by Vesicles in Breadcrust Bombs From Vulcanian Activity at Guagua Pichincha Volcano, Ecuador. *Journal of Geophysical Research: Solid Earth*, 128(9), e2023JB026775.
- 18 **Colombier, M.**, Ukstins, I. A., Tegtmeier, S., Scheu, B., Cronin, S. J., Thivet, S., ... & Dingwell, D. B. (2023). Atmosphere injection of sea salts during large explosive submarine volcanic eruptions. *Scientific Reports*, 13(1), 14435.
- 17 **Colombier, M.**, Bernard, B., Wright, H., Le Pennec, J. L., Cáceres, F., Cimarelli, C., ... & Dingwell, D. B. (2022). Conduit processes in crystal-rich dacitic magma and implications for eruptive cycles at Guagua Pichincha volcano, Ecuador. *Bulletin of Volcanology*, 84(12), 105.
- 16 Cáceres, F., Scheu, B., **Colombier, M.**, Hess, K. U., Feisel, Y., Ruthensteiner, B., & Dingwell, D. B. (2022). The roles of microlites and phenocrysts during degassing of silicic magma. *Earth and Planetary Science Letters*, 577, 117264.
- 15 **Colombier, M.**, Vasseur, J., Houghton, B. F., Cáceres, F., Scheu, B., Kueppers, U., ... & Dingwell, D. B. (2021). Degassing and gas percolation in basaltic magmas. *Earth and Planetary Science Letters*, 573, 117134.
- 14 Collombet, M., Burgisser, A., **Colombier, M.**, & Gaunt, E. (2021). Evidence for deep gas loss in open volcanic systems. *Bulletin of Volcanology*, 83(2), 1-16.
- 13 **Colombier, M.**, Shea, T., Burgisser, A., Druitt, T.H., Gurioli, L., Müller, D., Cáceres, F., Hess, K-U., Dingwell, D.B., (2020). Rheological change and degassing during a trachytic Vulcanian eruption at Kilian Volcano, Chaîne des Puys, France. DOI: 10.1007/s00445-020-01420-5.
- 12 Burgisser, A., Arbaret, L., Martel, C., Forien, M. and **Colombier, M.**, 2020. The role of oxides in the shallow vesiculation of ascending magmas. *Journal of Volcanology and Geothermal Research*, 406, p.107072.
- 11 Cáceres, F., Wadsworth, F.B., Scheu, B., **Colombier, M.**, Madonna, C.,

- Cimarelli, C., Hess, K.U., Kaliwoda, M., Ruthensteiner, B. and Dingwell, D.B., 2020. Can nanolites enhance eruption explosivity?. *Geology*, 48(10), pp.997-1001.
- 10 Wadsworth, F. B., Vossen, C. E., Schmid, D., Colombier, M., Heap, M. J., Scheu, B., & Dingwell, D. B. (2020). Determination of permeability using a classic Darcy water column. *American Journal of Physics*, 88(1), 20-24.
- 9 Heinrich, M., Cronin, S. J., Torres-Orozco, R., **Colombier, M.**, Scheu, B., & Pardo, N. (2020). Micro-porous pyroclasts reflecting multi-vent basaltic-andesite Plinian eruptions at Mt. Tongariro, New Zealand. *Journal of Volcanology and Geothermal Research*, 106936.
- 8 **Colombier, M.**, Wadsworth, F.B., Scheu, B. et al. In situ observation of the percolation threshold in multiphase magma analogues. *Bull Volcanol* 82, 32 (2020). <https://doi.org/10.1007/s00445-020-1370-1>
- 7 **Colombier, M.**, Mueller, S.B., Kueppers, U., Scheu, B., Delmelle, P., Cimarelli C., Cronin, S.J., Brown, R.J., Tost, M., Dingwell, D.B., (2019) "Diversity of soluble salt concentrations on volcanic ash aggregates from a variety of eruption types and deposits" *Bulletin of Volcanology* 81 :39
- 6 Wadsworth, F. Ben, Wadsworth, F.B., Vasseur, J., Schaubert, J., Llewellyn, E.W., Dobson, K.J., Havard, T., Scheu, B., Aulock, F.W. Von, Gardner, J.E., Dingwell, D.B., Hess, K., **Colombier, M.**, Marone, F., Tuffen, H., Heap, M.J., 2019. A general model for welding of ash particles in volcanic systems validated using in situ X-ray tomography A general model for welding of ash particles in volcanic systems validated using in situ X-ray tomography. *Earth Planet. Sci. Lett.* 525, 115726.
- 5 **Colombier, M.**, Scheu, B., Kueppers, U., Cronin, S., Mueller, S.B., Hess, K-U, Wadsworth, F. B., et al. "In situ granulation by thermal stress during subaqueous volcanic eruptions." *Geology* 47, no. 2 (2019): 179-182.
- 4 **Colombier, M.**, Scheu, B., Wadsworth, F. B., Cronin, S., Vasseur, J., Dobson, K. J., et al. (2018). Vesiculation and quenching during Surtseyan eruptions at Hunga Tonga-Hunga Ha'apai volcano, Tonga. *Journal of Geophysical Research: Solid Earth*, 123, 3762–3779.
- 3 Wadsworth, F.B., Vasseur, J., Llewellyn, E.W., Dobson, K.J., **Colombier, M.**, von Aulock, F.W., Fife, J., Wiesmaier, S., Hess, K-U, Scheu, B., Lavallée, Y., Dingwell, D.B. (2017) Topological inversions in coalescing granular media control fluid-flow regimes. *Physical Review*, 96.
- 2 **Colombier, M.**, Wadsworth, F. B., Gurioli, L., Scheu, B., Kueppers, U., Di Muro, A., & Dingwell, D. B. (2017). The evolution of pore connectivity in volcanic rocks. *Earth and Planetary Science Letters*, 462, 99-109.
- 1 **Colombier, M.**, Gurioli, L., Druitt, T. H., Shea, T., Boivin, P., Miallier, D., & Cluzel, N. (2017). Textural evolution of magma during the 9.4-ka trachytic explosive eruption at Kilian Volcano, Chaîne des Puys, France. *Bulletin of Volcanology*, 79(2), 17.

International conferences and workshops

April 2024	EGU 2024, Vienna (Austria)
April 2024	Krafla Magma Testbed, Munich (Germany)
March 2024	Physics of Volcanoes, Munich (Germany)
February 2024	Cities on Volcanoes
October 2023	Training school on “Convective and Volcanic Clouds (CVC) detection, monitoring and modelling” in Nicolosi (Italy)
September 2023	Oceanic Volcanism Workshop at GEOMAR, Kiel (Germany)
April 2023	EGU 2023, Vienna (Austria).
September 2022	Rittmann conference in Catania (Italy)
January 2020	Goldschmidt 2020 (USA, Online).
April 2019	EGU 2019, Vienna (Austria).
April 2018	EGU 2018, Vienna (Austria).
April 2018	EGU 2018, Vienna (Austria).
August 2017	IAVCEI 2017, Portland (USA).
April 2017	EGU 2017, Vienna (Austria).
December 2016	AGU 2016, San Francisco (USA).
April 2016	EGU 2016, Vienna (Austria).

Teaching Experience

2018-2023 **Assistant Professor** (80% in German, 20% in English):

Thermodynamics (3rd semester B. Sc. Course)
Phase equilibria (3rd semester B. Sc. Course)
Petrology (4th semester B. Sc. Course)
Rock-forming minerals (3rd semester B. Sc. Course)
Geomaterials (1st semester B. Sc. Course)
Geomaterials (3rd semester B. Sc. Course)
Applied Physics and Chemistry of Melts (3rd semester M. Sc. Course)
Microscopy (1st semester B. Sc. Course)
Rocks (2nd semester B. Sc. Course)
Petrophysics (2nd semester M. Sc. Course)

Student Supervision

2023	Paul Herwergh (BSc Student at LMU). Topic: “Evolution of porosity with grain size in pyroclasts”
2022	Clara Nuszer (BSc Student at LMU). Topic: “Morphological analysis of pumice clasts from Guagua Pichincha volcano, Ecuador”

Laboratory Skills

Textural and petro-physical analysis: Scanning Electron Microscopy, X-ray microtomography, Helium pycnometry, Permeability, Morphology analysis of tephra, Grain size distribution, Componentry

Experimental volcanology: Optical dilatometry experiments, Synchrotron 4D vesiculation experiments, Fragmentation experiments

Chemical analysis: Leaching experiments, Microprobe analysis, Raman spectroscopy

Thermal analysis: Evolved gas analysis

Field Experience

2024	Mapping the distal ash fallout following the 06-07 January 2024 eruptive pulse of Sangay volcano (Ecuador)
2022-2023	Sampling of pyroclastic and effusive obsidian at Lipari volcano (Italy)
2021	Real-time sampling at Etna volcano during paroxysmal activity (Italy)
2020	Sampling of Plinian deposits at Guagua Pichincha volcano (Ecuador)
2017	Monitoring explosive activity at Stromboli volcano (Italy)

Citation Metrics

Google Scholar h-index 12, i10-index 14, citations 522

Languages

French: mother tongue

English: fluent

Spanish: bilingual

Italian: fluent

German: fluent