

CURRICULUM VITAE

Professor Fidel Costa Rodriguez
Institut de Physique du Globe de Paris
Université de Paris Cité
1 rue Jussieu, 75238 Paris Cedex 0
Office ++33 0183957419
costa@ipgp.fr
<http://www.ipgp.fr/fr/costa-fidel>

Academic Qualifications

2000: Ph.D. in Earth Sciences, Department of Mineralogy, University of Geneva, Switzerland.

1994: Bachelor degree in Earth Sciences. University of Barcelona (Spain).

Summary of Working Experience

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|-------------------|---|
| 1/1/23- present | Research Team Leader of Volcanic Systems Group. Institut de Physique du Globe de Paris (Université de Paris Cité) |
| 31/12/21- present | Professor C1, (Chaire d'Excellence), Institut de Physique du Globe de Paris (Université de Paris Cité) |
| 09/2020- 30/12/21 | Professor, Asian School of the Environment. NTU, Singapore. |
| 07/2020- 30/12/21 | Chair of Asian School of the Environment. NTU, Singapore. |
| 04/2019-30/12/21 | Provost Chair in Earth Sciences, NTU, Singapore. |
| 04/2019-06/2020. | Interim Director, Earth Observatory of Singapore, NTU, Singapore. |
| 08/2018-08/2019. | Associate Chair (Faculty) of Asian School of the Environment. NTU, Singapore. |
| 01/2017-07/2018. | Acting Chair of Asian School of the Environment. NTU, Singapore. |
| 09/2015-12/2016. | Associate Chair (Faculty) of Asian School of the Environment. NTU, Singapore. |
| 09/2015-08/2020. | Associate professor and Principal Investigator at the Earth Observatory of Singapore. NTU, Singapore. |

- 02/2010-08/2015. Assistant professor and Principal Investigator at the Earth Observatory of Singapore. NTU, Singapore.
- 10/2006-01/2010. Ramon y Cajal Research Fellowship at the CSIC, Institut de Ciències de la Terra 'Jaume Almera', Barcelona, Spain.
- 12/2002-09/2006. Post-doctoral position at the Institut für Geologie, Mineralogie und Geophysik, Ruhr-Universität, Bochum, Germany.
- 11/2000-11/2002. Marie-Curie Research Fellowship at the Institut des Sciences de la Terre d'Orléans-CNRS, France.
- 12/1999-10/2000. Post-doctoral position at the Department of Mineralogy of the University of Geneva, Switzerland.
- 03/1995-11/1999: Ph.D. thesis research funded by the Swiss National Science Foundation.
- 1994-1995: Employee of the Spanish Geological Survey. Detailed mapping and characterization of mineral deposits. Metallogenetic map, sheet 25 (Figueres), 1:200,000.

Academic Honours and Awards

Year	Academic Honour / Award
2025	Bowen Award and Lecture by the American Geophysical Union
2022	Chaire d'Excellence, Université Paris Cité, France
2019	Provost's Chair in Earth Sciences, NTU, Singapore
2017	National Research Foundation Investigator (Singapore)
2015	Fellow of the University Scholars Program (NTU)
2013	Wager Medal by the International Association of Volcanology and Chemistry of the Earth's Interior

RESEARCH SUMMARY

Key Areas of Research

- Volcanology, Petrology, Mineralogy, Geochemistry
- Natural hazards

Invited and keynote Presentations

2025

- Invited speaker at AGU December 2025, Bowen Lecture.
- Invited speaker at the China Earthquake Administration (Beijing, China), July 30th
- Invited presentation at the IAVCEI conference June 2025

-Invited presentation at the EGU conference April 2025.

-Invited seminar speaker. L'origine des volcans et leur impact sur l'environnement. Université Auguste Rodin, 3rd of February 2025.

-Invited seminar speaker at University of Leeds (UK), Institute of Earth Sciences, January 23rd, 2025.

2024

-Invited speaker at the EGU conference April 2024.

2023

-Invited speaker at the AGU conference December 2023.

-Invited speaker at the IUGG conference, July 2023, Berlin, Germany.

-Invited seminar speaker at University of Lausanne, Institute of Earth Sciences, May 22nd, 2023.

-Keynote speaker at the 100th year anniversary of IPGP, April 21st, 2023.

-Invited seminar speaker at Université Paul Sabatier, Laboratoires Géosciences Environnement, Toulouse. April 6th, 2023.

2022-2019

- Invited speaker at the 100 year anniversary of CVGHM (via Zoom). April 2021.

-Invited speaker at American Geophysical Union Fall meeting, December 2019 (San Francisco, USA).

-Invited seminar speaker at Sorbonne Université (Paris, France), on November 27th, 2019.

-Keynote presentation Asian Consortium of Volcanology, November, Academia Sinica (Taiwan) on November 2th, 2019.

-Invited seminar speaker at Maine University (Maine, USA) on October 27th, 2019.

-Invited seminar speaker at Institut Physique du Globe de Paris (CNRS, Université de Paris, France), on May 27th, 2019.

-Invited speaker at European Geophysical Union (Vienna, Austria) on April 10th, 2019.

-Invited seminar speaker at Institut Sciences de la Terre d'Orléans-CNRS (France) on April 5th, 2019.

-Invited seminar speaker at Yamagata University (Japan) on March 4th, 2019.

2018 and older

-Invited speaker at Tohoku University (Japan) on May 29th, 2018.

- Keynote presentation at Merging Geophysical, Petrochronologic, and Modeling Perspectives of Large Silicic Magma Systems. Chapman conference, American Geophysical Union. Chile, January 2018.

-Invited speaker at Cambridge University (UK), 1st December 2017.

- Invited speaker at University of Wisconsin, Madison, February 2017.
- AGU Fall meeting, December 2014 (San Francisco, USA), Session: Accelerated and Punctuated: Using Geochronology, Diffusion Modeling, and Numerical Models to Understand Magmatic Processes II'
- Cities on Volcanoes 8, September 2014 (Jogjakarta, Indonesia), Plenary talk: What can geology and volcanology do to help anticipate and mitigate volcanic eruption".
- Goldschmidt Conference June 2014 (Sacramento, USA), session "'12a. Crystallization histories vs. eruption histories: what do geospeedometry and geochronology tell us?'".
- AGU Fall meeting 2013 (San Francisco, USA), session 'V44B. Innovations and Challenges in Microanalysis and Isotope Mass Spectrometry'.
- AGU Fall meeting 2012 (San Francisco, USA), session 'V041: Space, Time, and Transport in Petrology and Geochemistry'.
- AGU Fall meeting 2012 (San Francisco, USA), session 'V007: Combining petrological studies of volcanic systems with geophysical, gas, and other information sources'
- Asia-Oceania Geophysical Society, August 2012 (Singapore), session 'SE85 Time Scales of Magmatic Evolution and Eruption in Intermediate to Silicic Magmatic Systems'.
- Goldschmidt Conference June 2012 (Montreal, Canada), session 'SS25- Geochemical evolution of silicic magma systems'.
- IUGG-IAVCEI meeting 2011 (Melbourne, Australia), session 'V01 Magma Chambers and Their Dynamics: how big are they, their time scales of formation and longevity, how do we detect them, crystals and their stories'
- EGU meeting 2011 (Vienna, Austria), session, 'GMPV12-Measuring and modelling of volcano eruption dynamics: I. shallow magma storage and ascent'.
- AGU Fall meeting 2010 (San Francisco, USA), session 'V24C-Volatiles in Magmas: Breath of the Deep Earth'.
- EGU meeting 2009 (Vienna, Austria), session 'GMPV4- Unraveling magma generation and differentiation: Field, analytical, experimental and numerical investigation of magmatic and volcanic systems'.
- AGU Fall meeting 2008 (San Francisco, USA), session 'V43J- Thermobarometry and implications for magma storage and transport'.
- AGU Fall meeting 2008 (San Francisco, USA), session 'MR21C- Diffusion and related transport processes in Geomaterials'.
- AGU Fall meeting 2006 (San Francisco, USA), session 'V53E- From crystals to plutons: crystal-scale records of magmatic processes'.
- Goldschmidt Conference 2005 (Moscow, Idaho, USA), session 'SS25- Geochemical evolution of silicic magma systems'.
- AGU Fall meeting 2004 (San Francisco, USA), session 'V23C-Quantitative Constraints on Rates of Reaction, Deformation, and Mass Transfer: Crustal Processes'.
- AGU Fall meeting 2004 (San Francisco, USA), session 'V23D- Arenal Volcano: Magma Genesis, Volcanological Processes, and Societal Responses '

Research Funding

External Grants

Role	Year	Project Title	Amount	Source of Grant
PI	2025-2026	Study of the eruption dynamics at Changbaishan-Tianchi volcano	20,000 euro	China-France collaborative project (Embassy)
PI	2022-2025	New conceptual models for volcanic eruptions through statistical analysis of petrological information	400,000 euro	Université de Paris Cité
PI	2017 - 2022	Calibrating the lifetimes of magma reservoirs below active volcanoes	2,730,600 (S\$)	NRF investigator
PI	2017 - 2019	Assessing volcano hazards to megacities: Tokyo and Singapore	53,000 (S\$)	NRF-JSPS
PI	2015 - 2017	Causes, Processes, and Forecasts of Eruptions of Open Vent Volcanoes in SE Asia	559,731 (S\$)	MOE AcRF Tier 2
PI	2012 - 2013	Understanding the rates of magmatic processes and their relationship to volcanic unrest and monitoring signals	38,000 (S\$)	French Embassy-NRF (Merlion)

Internal Grants (EOS, Singapore)

Role	Year	Project Title	Amount	Source of Grant
Co-PI	2019-2021	A multi-disciplinary integrated approach to natural laboratory volcanoes	100,428 (S\$) (1,545,048)	RCE core funding
PI	2017-2020	The processes and rates of magma ascent	518,550 (S\$)	RCE core funding
PI	2014-2021	The World Observatories Volcano Organization database of volcanic unrest	2,456,298 (S\$)	RCE core funding

Co-Pi	2014-2018	Laboratory volcanoes: Mayon (Philippines), Marapi, Gede and Salak (Indonesia).	148,324 (S\$) (2,060,064)	RCE core funding
PI	2014-2016	The architecture of the system below active volcanoes	778,327 (S\$)	RCE core funding
PI	2012-2016	Statistical analysis of volcanic crystals	554,254 (S\$)	RCE core funding
PI	2011 - 2013	Plumbing systems and magmatic processes	172,811 (S\$)	RCE core funding
PI	2011 - 2012	The Rabaul caldera complex in Papua New Guinea	160,103 (S\$)	RCE core funding

Publications (in chronological order, starting with the most recent)

*PhD student I have advised; # Post-doctoral mentor

In review

Oggier, F., Widiwijayanti, C., Costa, F (in review) Exploring magma composition variability at various tectonic settings, using global volcanic rock composition data with the DashVolcano tool.

Bulletin of Volcanology

Costa, F., Bindeman, I., Morgan, D., Mutch, E., Myers, E., Petrone, C., Schmitt, A (in review)

Timescales of magma accumulation, evolution and ascent. *Encyclopedia of Volcanoes*, 3rd edition.

Journal Papers

2025

108-Hong, GT ., D #Benet, KL Wang, **F Costa**, LC Wang (2025). Decrypting the sediment record of very late stage volcanic activities in Tatun volcano group, Northern Taiwan: evidence from ash deposits. *Terrestrial, Atmospheric and Oceanic Sciences* 36 (1), 20

107- Li, W., and **Costa, F.** (2025) Leveraging radioisotope geochronology and diffusion chronometry to trace the thermal evolution of magmatic systems. *National Science Review* 12, nwaf141, <https://doi.org/10.1093/nsr/nwaf141>

106- Dupont de Dinechin, M., Ostorero, L., Balcone-Boissard, H., Boudon, G., Belousov, A., Belousova, M., **Costa, F.** (2025). A multi-crystal approach to decipher pre-eruptive magma dynamics: the 2010 eruption of Kizimen (Kamchatka, Russia).. *Contributions to Mineralogy and Petrology*.

105- #Benet, D., **Costa, F.**, Migadel, K. et al. A repository-hosted dataset of volcanic ash particle images and features. *Sci Data* 12, 681 (2025). <https://doi.org/10.1038/s41597-025-04942-9>.

2024:

104-#Bernard, O., **Costa, F.** (2024) Coupling magma ascent models with volatile diffusion chronometry. *Earth and Planetary Science Letters* 648, doi:10.1016/j.epsl.2024.119099.

103-*Benet, D., **Costa, F.**, Widiwijayanti, C., Pallister, J., Pedreros, G., Allard, P., Humaida, H., Aoki, Y., Maeno, F. (2024) Volcanic ash DataBase (VolcashDB), particle images, features, and classification. *Bulletin of Volcanology* 86, doi: 10.1007/s00445-023-01695-4.

102-*Benet, D., Costa, F., Widiwijayanti, C (2024) Volcanic ash classification through Machine Learning. *Geochemistry, Geophysics, Geosystems*. 25, doi: 10.1029/2023GC011224.

101-#Cheng, L., Yang, Z., **Costa., F** (2024) Insights on Source Lithology and Pressure-Temperature Conditions of Basalt Generation Using Machine Learning. *Earth and Space Science*, <https://doi.org/10.1029/2024EA003732>

100-*Didonna, R., Handley, H., **Costa, F.**, Albert, H. (2024) Pre-eruptive magmatic system feeding Waitomokia Volcano (Auckland Volcanic Field, New Zealand) as revealed by olivine diffusion chronometry. *Journal of Volcanology and Geothermal Research*, 451, 108094

99-Mourey, A.J., Carrara, A., Shea, T., **Costa, F.**, Longpré, M.-A. (2024) The influence of olivine settling on the formation of basaltic cumulates revealed by micro-tomography and numerical simulations. *Journal of Volcanology and Geothermal Research*, 2024, 449, 108051

98-*Utami, S., **Costa, F.**, Humaida, H. (2024) The role of magma ascent rates and viscosity in the explosive and dome eruptions (Kelud volcano, Indonesia). *Bulletin of Volcanology* 86, doi: 10.1007/s00445-023-01698-1.

97-Verolino, A., Wee, S.F., Jenkins, S., Costa, F., Switzer, A.D. (2024) SEATANI: hazards from seamounts in SouthEast Asia, Taiwan, and Andaman and Nicobar Islands (eastern India). *Natural Hazards and Earth System Sciences*, 24, doi: 10.5194/nhess-24-1203-2024.

96-Widiwijayanti, C., Thin Zar Win, N., Espinosa-Ortega, T., **Costa, F.**, Taisne, B. (2024) The global volcano monitoring infrastructure database (GVMID). *Frontiers in Earth Science*, 2024, 12, 1284889.

2023:

95-*Barrington, C. , Taisne, B., **Costa, F.** (2023) Using Wavelet Coherence to Aid the Retrieval of Volcanic SO₂ from UV spectra. *Remote Sensing*. 15(18), 4532. doi.org/10.3390/rs15184532

94-Budi-Santoso, A., Beauducel, F., Nandaka, I.G.M.A., ...Rizal, M.H., Dahamna, N. (2023) The Merapi Volcano Monitoring System. *Active Volcanoes of the World*, 2023, pp. 409–436

93-*Li, W., **Costa, F.**, Oppenheimer, C., Nagashima, K. (2023) Volatile and trace element partitioning between apatite and alkaline melts. *Contributions to Mineralogy and Petrology*. <https://doi.org/10.1007/s00410-022-01985-8>.

92-Mourey, A.J., Shea, T., **Costa, F.**, Shiro, B., Longman, R. (2023) Years of magma intrusion primed Kīlauea Volcano (Hawai'i) for the 2018 eruption: evidence from olivine diffusion chronometry and monitoring data. *Bulletin of Volcanology* 85:18.

- 91-Mulder, J., Hagen-Peter, G., Ubide, T., .../... **Costa, F.** (2023) New reference materials, analytical procedures, and data reduction strategies for Sr isotope measurements in geological materials by LA-MC-ICP-MS. *Geostandards and Geoanalytical Research*. <https://doi.org/10.1111/ggr.12480>
- 90-Oggier, F., Widiwijayanti, C., **Costa, F.** (2023) Global volcanic rock classification of Holocene volcanoes. *Scientific Data*. 10:422. <https://doi.org/10.1038/s41597-023-02324-7>
- 89-Oggier, F., Widiwijayanti, C., **Costa, F.** (2023) Integrating global geochemical volcano rock composition with eruption history datasets. *Frontiers in Earth Sciences*. doi.org/10.3389/feart.2023.1108056.
- 88-Shane, P., **Costa, F.**, Cronin, S., Stirling, C., Reid, M. (2023) Priming and eruption of andesite magmas at Taranaki volcano recorded in plagioclase phenocrysts. *Bulletin of Volcanology*, 2023, 85(9), 47
- 87-Andrews, B.J., **Costa, F.**, Venzke, E., Widiwijayanti, C. (2022) Databases in Volcanology. *Bulletin of Volcanology*, 84(10), 92.
- 86-*Barrington, C., Taisne, B., **Costa, F.**, Arellano, S. (2022) Wind Speed as a Dominant Source of Periodicities in Reported Emission Rates of Volcanic SO₂. *Journal of Geophysical Research* 127, DOI: 10.1029/2022JB025380
- 85-#Bernard, O., Li, W., **Costa, F.**, Saunders, S., Itikarai, I., Sindang, M., Bouvet de Maisonneuve, C. (2022) Explosive-effusive-explosive: The role of magma ascent rates and paths in modulating caldera eruptions. *Geology* . <https://doi.org/10.1130/G50023.1>
- 84-*Didonna, R., Costa, F., Handley, H., Turner, S., Barclay, J. (2022) Dynamics and timescales of mafic–silicic magma interactions at Soufrière Hills Volcano, Montserrat. *Contributions to Mineralogy and Petrology* 177 (2), 1-172022.
- 83-#Espinosa-Ortega, T., Budi-Santoso, A., Sulistiyani, Win, N.-T.-Z. Widiwijayanti C., **Costa, F.** (2022) Probabilistic analysis to correlate seismic data with lava extrusion phases at Merapi volcano (Indonesia). *Journal of Volcanology and Geothermal Research* 426(3–4):107537.
- 82-Marzoli, A, Renne, PR, Andreasen, R, Spiess, R., Chiaradia, M, Ruth, DCS, Tholt, AJ, Pande, K., **Costa, F.** (2022) The Shallow Magmatic Plumbing System of the Deccan Traps, Evidence from Plagioclase Megacrysts and Their Host Lavas. *Journal of Petrology*, 2022, 63, 1–32. [.doi.org/10.1093/petrology/egac075](https://doi.org/10.1093/petrology/egac075)
- 81-Mourey, A.J., Shea, T., Lynn, K.J., **Costa, F.**, Lee, R.L., Gansecki, C. (2022) Trace elements in olivine fingerprint the source of 2018 magmas and shed light on explosive-effusive eruption cycles at Kilauea Volcano. *Earth and Planetary Science Letters*, 595, 117769.
- 80-*Utami, S.B., Andújar, J., **Costa, F.**, Scaillet, B., Humaida, H., Carn, S. (2022) Pre-eruptive excess volatiles and their relationship to effusive and explosive eruption styles in semi-plugged volcanoes. *Frontiers in Earth Science*, 10, 882097.

79-Arellano, S., Galle, B., Apaza, F., ...**Costa, F.**,...Vita, F., Yalire, M. (2021) Synoptic analysis of a decade of daily measurements of SO₂ emission in the troposphere from volcanoes of the global ground-based Network for Observation of Volcanic and Atmospheric Change. *Earth System Science Data* 13, 1167 – 1188.

78-*Benet, D., **Costa, F.**, Pedreros, G., Cardona, C. (2021) The volcanic ash record of shallow magma intrusion and dome emplacement at Nevados de Chillán Volcanic complex, Chile. *Journal of Volcanology and Geothermal Research* 417, 107308.

77-**Costa, F.** (2021) Clocks in Magmatic rocks. *Annual Reviews of Earth and Planetary Sciences*. 49:231–52. doi.org/10.1146/annurev-earth-080320-060708.

76-Larrea, P., Albert, H., Ubide, T., **Costa, F.**, Colás, V., Widom, E., Siebe, C. (2021) From explosive vent opening to effusive outpouring: mineral micro-analytical constraints on magma dynamics and timescales at Parícutin monogenetic volcano. *Journal of Petrology*. doi.org/10.1093/petrology/egaa112.

75-*Li, W., **Costa, F.**, Nagashima, K. (2021). Apatite reveals melt volatile budgets and magma storage depths at Merapi volcano, Indonesia. *Journal of Petrology*. doi.org/10.1093/petrology/egaa100.

74-#Ruth, D.S.C. and **Costa, F.**, (2021) A petrological and conceptual model of Mayon volcano (Philippines) as an example of an open-vent volcano. *Bulletin of Volcanology* 83 (10), 1-28.

73-*Utami, S. B., **Costa, F.**, Lesage, P., Allard, P., Humaida, H. (2021) Fluid fluxing and accumulation drive decadal and short-lived explosive basaltic andesite eruptions preceded by limited volcanic unrest. *Journal of Petrology* 62 (11), egab08612021.

72-#Albert, H., Larrea, P., **Costa, F.**, Widom, E., Siebe, C. (2020): Crystals reveal magma convection and melt transport in dyke-fed eruptions. *Scientific Reports* 10 (1),11632.

71-#Cheng, L., **Costa, F.**, Bergantz, G. (2020) Linking fluid dynamics and olivine crystal scale zoning during simulated magma intrusion. *Contributions to Mineralogy and Petrology* 175:53

70-**Costa, F.**, Shea, T., Ubide, T (2020) Diffusion Chronometry and the Times scales of magmatic processes. *Nature Reviews on Earth and Environmental Sciences*. doi.10.1038/s43017-020-0038-x

69-*Li, W. and **Costa, F.** (2020) A thermodynamic model of F-Cl-OH partitioning between silicate melts and apatite including non-ideal mixing with applications to constraining melt volatile budgets. *Geochimica Cosmochimica Acta* 269: 203–222.

68-*Li, W., Chakraborty, S., Nagashima K., and **Costa, F.** (2020) Multicomponent diffusion of F, Cl and OH in apatite with application to magma ascent rates. *Earth and Planetary Science Letters* 550: 116545.

67-Salman, R., Lindsey, E.O., Lythgoe, K.H., Bradley, K., Muzli, M., Yun, S.-H., Chin, S.T., Tay, C.W., **Costa, F.**, Wei, S., Hill, E.M. (2020) Cascading partial rupture of the Flores thrust

during the 2018 lombok earthquake sequence, Indonesia. *Seismological Research Letters* 91: 2141-2151.

66-#Albert, H., **Costa, F.**, DiMuro, A., Herrin, J., Metrich, N., Deloule, E. (2019). Magma interactions, crystal mush formation, timescales, and unrest during caldera collapse and lateral eruption at ocean island basaltic volcanoes (Piton de la Fournaise, La Réunion). *Earth and Planetary Science Letters* 515: 187-199.

65-#Cheng, L., **Costa, F.** (2019) Statistical analysis of crystal populations and links to volcano deformation for more robust estimates of magma replenishment volumes: *Geology*, 47, 1171–1175.

64-**Costa, F.**, Widiwijayanti C, Humaida, H. (2019a) Data from Past Eruptions Could Reduce Future Volcano Hazards. *Eos*, 100, <https://doi.org/10.1029/2019EO118941>.

63-**Costa, F.**, Widiwijayanti C, Nang, T.W., Fajiculay, E., Espinosa-Ortega, T., Newhall, C. (2019b) WOVOdat – the global volcano unrest database aimed at improving eruption forecasts. *Disaster Prevention and Management: An International Journal* 28, 738.

62-#Schonwalder-Angel D.A., Albert, H., Lam, N.T., Phi, N.X., Utami, S.U., Li, W., Phung Minh Khanh, P.M., Widiwijayanti, C., **Costa, F.** (2019) PWD: A Petrological Workspace & Database tool. *Geochemistry, Geophysics, Geosystems*. 20. doi.org/10.1029/2019GC008710

61-Shea, T., Hammer, J., Hellebrand, E., Mourey, A., **Costa, F.**, First, E., Lynn, K., Melnik, O. (2019) Phosphorus and aluminium zoning in olivine: contrasting behaviour of two nominally incompatible trace elements. *Contributions to Mineralogy and Petrology*. 174, 85.

60-Andersen, N., Singer, **Costa, F.**, Fournelle, J., Herrin, J.S., Fabbro, G.N. (2018) Petrochronologic perspective on rhyolite volcano unrest at Laguna del Maule, Chile. *Earth and Planetary Science Letters* 493, 57-70.

59-Flaherty, T., Druitt, T., Tuffen, H., Higgins, M.D., **Costa, F.**, Cadoux, A. (2018): Multiple timescale constraints for high flux magma chamber assembly prior to the Late Bronze Age eruption of Santorini (Greece). *Contributions to Mineralogy and Petrology* 173, 75; doi.org/10.1007/s00410-018-1490-1.

58-*Liqing, J., Tapponnier, P., **Costa, F.**, Donze, F.-V., Scholtes, L., Taisne, B., Wei, S. (2018). Necking and fracturing may explain stationary seismicity and full degassing in volcanic silicic spine extrusion. *Earth and Planetary Science Letters* 503, 47-57.

57-Lynn, K., Shea, T., Garcia, M., **Costa, F.**, Norman, M.D. (2018) Lithium diffusion in olivine records priming of explosive basaltic eruptions. *Earth and Planetary Science Letters* 500, 127-135.

56-#Ruth, D., **Costa, F.**, Bouvet de Maisonneuve, C., Franco, L., Cortés J.A., Calder, E. S (2018) Crystal and melt inclusion timescales reveal the evolution of magma migration before eruption. *Nature Communications* 9 : 2657, doi.org/10.1038/s41467-018-05086-8.

- 55-#Zeng, L., Cheng, L., **Costa, F.**, Herrin, J. (2018) CEmin: A MATLAB-based software for computational phenocryst extraction and statistical petrology. *Geochemistry, Geophysics, Geosystems*. 19. <https://doi.org/10.1002/2017GC007346>.
- 54-Fabbro, G., Druitt, T., and **Costa, F.** (2017). Storage and Eruption of Silicic Magma across the Transition from Dominantly Effusive to Caldera-forming States at an Arc Volcano (Santorini, Greece). *Journal of Petrology*; doi: 10.1093/petrology/egy013.
- 53-Cooper, K.M., Till, C.B., Kent, A.J.R., **Costa, F.**, Rubin, A.E., Bose, M., Gravley, D., Deering, C., Cole J. (2017) Response to comment on "Rapid cooling and cold storage in a silicic magma reservoir recorded in individual crystals". *Science* 358, 10.1126/science.aap9145.
- 52-Rubin, A.E., Cooper, K.M., Till, C.B., Kent, A.J.R., **Costa, F.**, Bose, M., Gravley, D., Deering, C., Cole J. (2017) Rapid cooling and cold storage in a silicic magma reservoir recorded in individual crystals. *Science* 356, 1154–1156.
- 51-Lynn, K., Garcia, M., Shea, T., **Costa, F.**, Swanson D.A. (2017): Timescales of mixing and storage for Keanakāko'i Tephra magmas (1500-1823 C.E.), *Contributions to Mineralogy and Petrology* 172:76 DOI 10.1007/s00410-017-1395-4.
- 50-Newhall C., **Costa F.**, Ratdomopurbo A, Venezky D.Y., Widiwijayanti C, Nang Thin Zar Win, Tan K, Fajiculay E. (2017): WOVOdat – an online, growing library of worldwide volcanic unrest. *Journal of Volcanology and Geothermal Research* 345: 184-199.
- 49-Marchev, P., Arai., S., Orlando, V., **Costa F.**, Zanetti, A., Downes H. (2017) Metasomatic Reaction Phenomena from Entrainment to Surface Cooling: Evidence from Mantle Peridotite Xenoliths from Bulgaria. *Journal of Petrology* 58: 599–640.
- 48-#Cheng, L., Costa, F., and Carniel, R. (2017). Unraveling the presence of multiple plagioclase populations and identification of representative two dimensional sections using a statistical and numerical approach. *American Mineralogist* 102:1894-1905.
- 47-*Krimer, D. and **Costa F.** (2017) Evaluation of the effects of 3d diffusion, crystal geometry, and initial conditions on retrieved time-scales from Fe-Mg zoning in natural oriented orthopyroxene crystals. *Geochimica et Cosmochimica Acta*, 196: 271–288.
- 46-Singer, B., **Costa, F.**, Herrin, J.S., Hildreth, W., Fierstein, J. (2016) The timing of compositionally-zoned magma reservoirs and mafic 'priming' weeks before the 1912 Novarupta-Katmai rhyolite eruption. *Earth and Planetary Science Letters*. 451, 125-137.
- 45-#Bouvet de Maisonneuve, C., **Costa, F.**, Huber, C., Vonlanthen, P, Bachmann, O., Dungan. M. (2016) How do olivines record magmatic events? Insights from major and trace element zoning. *Contributions to Mineralogy and Petrology*, 171, 10.1007/s00410-016-1264-6.
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- 20-**Costa, F.** (2010) Residence times and magmatic evolution (translated from Spanish). *Macla* 12, 10-16.

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- 15-Martí, J., Geyer, A., Andujar, J., Teixidó, F., and **Costa, F.** (2008): Assessing the potential for future explosive activity from Teide–Pico Viejo stratovolcanoes (Tenerife, Canary Islands). *Journal of Volcanology and Geothermal Research*, 178, 529-542.
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- 12-**Costa F.**, and Dungan M (2005) Short time scales of magmatic assimilation from diffusion modeling of multiple elements in olivine. *Geology* 33, 837-840.
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- 9-Camprubí, A., Melgarejo, J.C., Proenza, J., **Costa, F.**, Bosch, J., Yushkin, N. and Andreichev, V. (2003). Mining techniques and geological knowledge during the Neolithic: the case of the variscite mines at Gavà, Catalonia. *Episodes* 26, 295-301.
- 8-**Costa, F.**, Chakraborty, S. and Dohmen, R. (2003). Diffusion coupling between trace and major elements and a model for calculation of magma residence times using plagioclase. *Geochimica et Cosmochimica Acta* 67, 2189-2200.

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5-**Costa, F.**, Dungan, M. and Singer, B. (2002). Hornblende and phlogopite-bearing gabbroic crustal xenoliths from Volcán San Pedro (36° S), Chilean Andes: evidence for melt and fluid migration and reactions in subduction-related plutons. *Journal of Petrology* 43, 219-241.

4-**Costa, F.**, Dungan, M. and Singer, B. (2001). Magmatic Na-rich phlogopite in a suite of gabbroic crustal xenoliths from Volcán San Pedro, Chilean Andes: Evidence for a solvus relation between phlogopite and aspidolite. *American Mineralogist* 86, 29-35.

3-Moscariello, A. and **Costa, F.** (1997). The Upper Laacher See Tephra in Lake Geneva sediments: paleoenvironmental and paleoclimatological implications. *Schweizerische Mineralogische und Petrographische Mitteilungen* 77, 175-185.

2-Costa, F., Camprubí, A. and Melgarejo, J.C. (1994). Geology of the Neolithic mines of Gavà (Spain) (translated from Spanish). *Boletín Geológico y Minero de España* 105, 436-443.

1-Camprubí, A., **Costa, F.** and Melgarejo, J.C. (1994). Characterization of the phosphate deposits from Gavà (Spain) (translated from Spanish). *Boletín Geológico y Minero de España* 105, 444-453.

Book Chapters

Costa, F. and Morgan D, (2010) Time constraints from chemical equilibration in magmatic crystals. In: (Eds: A. Dosseto, S.P. Turner, and J.A. Van Orman), *Timescales of magmatic processes: from core to atmosphere*, 125-159 pp.

Dosseto, A., Turner, S.P., **Costa, F.**, and Van Orman, J.A (2010) Introduction to the Timescales of Magmatic Processes; In: (Eds: A. Dosseto, S.P. Turner, and J.A. Van Orman), *Timescales of magmatic processes: from core to atmosphere*, 1-8 pp.

Costa, F., (2008) Residence times of silicic magmas associated with calderas. In: Caldera Volcanism: Analysis, Modelling and Response. Gottsmann, J., Martí, J., (eds) *Developments in Volcanology* 10: 1-55.

TEACHING SUMMARY

Courses Taught (in U. Paris Cité)

Course Code	Course Title	Academic Year	Course Level
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	Thermodynamique Physique L1	AY21-AY22	UG
	Geologie de terrain L1	AY21-AY22	UG
	Geologie de terrain L2	AY21-AY22	UG
	Thermodynamique Physique L1	AY22-AY23	UG
	Geologie de terrain L1	AY22-AY23	UG
	Master de Geochimie	AY23-AY24	PG
	Geologie de terrain L1	AY23-AY24	UG
	Master de Geologie	AY24-AY25	PG

Courses Taught (in NTU)

Course Code	Course Title	Academic Year	Course Level
ES7005	Foundations of Earth Sciences (DES)	AY10-AY11	PG
ES7005	Foundations of Earth Sciences (DES)	AY11- AY12	PG
SP004	Planet Earth (USP)	AY13-AY14	UG
SP004	Planet Earth (USP)	AY14-AY15	UG
ES7007	Volcanology	AY14-AY15	PG
ES2002	Earth Materials	AY15-AY16	UG
ES3003	Introduction to Geochemistry	AY16-AY17	UG
ES2002	Earth Materials	AY16-AY17	UG
ES3005	Advanced Field Geology	AY16-AY17	UG
ES7015	Independent Studies	AY16-AY17	PG
ES3003	Introduction to Geochemistry	AY17-AY18	UG
ES7015	Independent Studies	AY18-AY19	PG
ES3003	Introduction to Geochemistry	AY18-AY19	UG
ES7007	Volcanology	AY18-AY19	UG
ES3003	Introduction to Geochemistry	AY19-AY20	UG

Short Courses taught at international workshops/schools

Venue	Course Title	Academic Year	Course Level
Asian Consortium of Volcanology (Academia Sinica, Taiwan)	All you want to know about volcanoes but were afraid to ask	October 2019	UG-PG
Asian Consortium of Volcanology (Academia Sinica, Taiwan)	Introduction to phreatic eruptions	October 2019	UG-PG

GRANITES II: A summer school on Magmatic Differentiation (Brest, France)	Time scales of magmatic and volcanic differentiation	July 2019	UG-PG
International Workshop on Pre-eruptive Magmatic Processes (Tokyo, Japan)	Nanometer-scale observations in volcanic minerals	May 2018	UG-PG
Asian Consortium of Volcanology (Kagoshima, Japan)	Introduction to volcanic Processes	April 2017	UG-PG
Asian Consortium of Volcanology (Kagoshima, Japan)	Introduction to Event trees in volcanic crises	April 2017	UG-PG
MemoVolc European Summer School (Santorini, Greece)	Time scales of volcanic processes	October 2015	UG-PG

Academic Supervision and Mentoring

International PhD student internships at NTU (*Funded by the East Asia Pacific Summer Institute Program*)

No.	PhD Student	Period	Role	Thesis/ Project Title	Current Status
1	Casey Tierney (Northern Arizona University)	June-August 2017	Mentor	Record of the youngest Toba tuff by diffusional relaxation of Ti and Al in Quartz	Defended his PhD
2	Taya Flaherty (Michigan Tech).	June-August 2016	Mentor	Trace element study of pyroxene crystals from the Minoan eruption of Santorini (Greece)	Continuing PhD at Clermont Ferrand
3	Kendra Lynn (University of Hawaii)	June-August 2015	Mentor	Magmatic processes and time scales from olivine zoning	RF at University of Delaware
4	Allison Rubin (University of	June-August 2014	Mentor	Understanding temporal and	Completed PhD

	California, Davis; USA),			spatial variations in thermal histories in volcanic centers	
5	Nathan Andersen (University of Wisconsin, Madison, USA)	June-August 2014	Mentor	Magma dynamics and ongoing unrest at a large caldera system, the Laguna del Maule Volcanic Field, Chile	Completed PhD. Research Scientist at USGS
6	Dawn Ruth (University of Buffalo, USA)	June-August 2013	Mentor	Modeling olivine zoning of eruptions from Llaima volcano (Chile)	Completed PhD. Research scientist at USGS

PhD students

No.	PhD Student	Period	Role	Thesis/ Project Title	Current Status
Current					
15	Arthur Hauck (IPGP)	2023-present	Co supervisor with R. Grandin	Aider à la surveillance de volcans en période co-éruptive depuis l'espace par imagerie SAR	In progress
14	Thomas Pereira (Univ. Lorraine, France)	2022 - present	Co supervisor with L. France	Time scales and processes leading to eruption of volcanoes from la Chaîne des Puys	In progress
Graduated					
13	Damia Benet(NTU)	2018 - 2023	Co supervisor w S. Jenkins	Unravelling the sources of volcanic ash and their use in anticipating major eruptions.	Now RF at IPGP

12	Charlotte Barrington (NTU)	2018 - 2023	Co supervisor with B.Taisne	Understanding volcanic degassing	Now RF at EOS
11	Sri Budhi Utami (NTU)	2016-2021	Sole supervisor	The magma plumbing system and unrest of Kelut volcano, Indonesia	Now RF at Universite de Liege
10	Sagar Murti (NTU)	2015-2020	Main supervisor	Understanding mantle rheology through modeling experimental and natural observations	RF at GFZ-Germany
9	Weiran Li (NTU)	2015 - 2020	Main Supervisor	Eruptive styles of subduction-zone volcanoes : investigation of magmatic volatile budgets and ascent rates using apatite	Assist. Prof at Hong Kong University
8	Rosa Didonna (Macquarie University, Australia)	2015-2019	Co-supervisor	A window into magmatic systems: mineralogical constraints on the nature and timing of magma interactions and ascent	RF Mineral Resources CSIRO Australia
7	Helena Albert (University of Barcelona, Spain)	2013-2016	Co-supervisor	Magmatic processes, time scales, and seismic unrest of monogenetic eruptions	Asst. Prof. at University of Barcelona (Spain)

6	Jiao Liqing (NTU)	2011-2016	Co-supervisor	Discrete Element Modelling of Continental Deformation and Volcanic Spine Extrusion'	RF at Institute Physique du Globe, Paris, France
5	Annie Winson (NTU)	2010-2016	Sole supervisor	Alert level Analysis and eruption forecasts at open vent volcanoes	Research Scientist at the British Geological Survey

4	Daniel Krimer (NTU)	2010-2015	Sole supervisor	Geochemistry and Petrology of Gede volcano, Indonesia'	Project manager at European Research funding for Hungary [Best PhD award by Springer]
3	Tarsilo Girona (NTU)	2010 - 2014	Sole Supervisor	Numerical modeling of permanent degassing volcanoes	Research Scientist at Jet Propulsion Laboratory NASA, USA [American Geophysical Union-Natural Hazards section award for best PhD]
2	Gareth Fabbro (Universite Blaise Pascal, France)	2010-2014	Co-supervisor	The timescales of magmatic processes prior to a caldera-forming eruption	Asst. Prof at University of Fiji

1	Maren Kahl (Ruhr- Universität Bochum, Germany)	2006-2011	Co-supervisor	Timescales of magma mixing and magma recharge. A case study from Mount Etna (Sicily, Italy)	Young Professor at University of Heidelberg (Germany)
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Post-doctoral fellows

No.	Post-doc Fellow	Appointment	Period	Thesis/ Project Title	Current Status
Current					
10	Damia Benet	Research Fellow	2023-present	Using machine Learning to classify particles ash	Research Fellow at IPGP
9	Olivier Bernard	Research Fellow	2022-present	Calibrating magma ascent rates	Research Fellow at IPGP
Past					
8	Tania Espinosa-	Research Fellow	2019-201	Forecasting volcanic eruptions	Research Fellow at EOS
7	Lilu Cheng	Senior Research Fellow	2017 - 2021	Statistical analysis of crystal zoning patterns as insights into magmatic processes	Data Analyst
6	Riko I Made	Senior Research Fellow	2017 - 2021	Exsolution lamellae in pyroxenes as a record of thermal histories of magmas	Senior Research Fellow at A-star (Singapore)
5	Christina Widiwijayanti	Senior Research Fellow	2014-2021	World Observatory Volcanoes Organization database of volcanic unrest	Senior Research Fellow EOS

4	Helena Albert	Research Fellow	2016 – 2019	Volcanic unrest and magmatic processes at Mt Fuji (Japan).	Asst. Prof. at University of Barcelona (Spain)
3	Dawn Ruth	Research Fellow	2014-2017	Understanding open vent volcanoes: the case of Mayon	Research Scientist at United States Geological Survey
2	Caroline Bouvet de Maisonneuve	Research Fellow	2012-2014	Understanding seismic and deformation unrest at Rabaul caldera	Asst. Prof. (NRF Fellow) at ASE, NTU
1	Joan Cabato	Research Fellow	2010-2012	'Unraveling the plumbing system of Mayon volcano and its relation to degassing and monitoring data'	Researcher at University of New Hampshire

SERVICE SUMMARY

SERVICE

Period of appointment	Role
2024-present	President of Disciplinary Section of IPGP
2023- present	Member of Conseil Administration (IPGP), Universite Paris Cite, France
2023- present	Leader of Volcanic Systems Team (IPGP), Universite Paris Cite, France
08/2020-2022	Chair, Asian School of the Environment (NTU)
08/2019 – 07/2020	Interim Director, Earth Observatory of Singapore (NTU)
04/2019-08/2019	Designated Interim Director, Earth Observatory of Singapore (NTU)
01/2017-07/2018	Acting Chair, Asian School of the Environment (NTU)
2018-19	Review Panel Member of NRF and NRFi applications
2016	Member of the NTU Senate (Faculty Development committee)
2016-present	Captain of EOS/ASE/SCElse running team
2016	Member of Review panel of EP5 research proposals

Academic Community

Period of appointment	Role
2018 - 2020	Associate Editor, Frontiers in Earth Sciences (IF: 2.89)
2018 - 2023	Associate Editor, Journal of Volcanology and Geothermal Research (IF: 2.61)
2013 - 2017	Associate Editor, American Mineralogist (IF: 2.20)
2014 - 2014	Associate Editor, Geochemistry, Geophysics, Geosystems (IF: 2.95)
2009 - 2017	Associate Editor, Geologica Acta (IF: 1.15)

Other Service (Workshop/meeting organizer/convener/coordinator)

Period of service	Role
2022-23	Member of the Scientific Organizing Committee of the Goldschmidt Conference, Lyon, July 2023. Leading/co-leading 2 themes.
2020	Organizer of International Workshop on volcano monitoring infrastructure on the ground and in space (Cities on Volcanoes, Crete, Greece, May 2020)
2019	Theme coordinator (06: Magmas and Volcanoes) of 15 sessions at the Goldschmidt Geochemistry Conference 2019 August (Barcelona, Spain).
2019	Session Convener, SE18: Linking Numerical, Analytical and Experimental Modelling with Remote and Local Volcano Monitoring Data, Asia Oceania Geosciences Society, Singapore
2018	Organizer of International Workshop on: Optimizing the use of Volcano Monitoring Database to Anticipate Unrest (Yogyakarta, Indonesia)
2018	Session Convener S-VC39, Pre-eruptive magmatic processes: petrologic analyses, experimental simulations and dynamics modeling at the Japanese Geological Union, Chiba, Japan.
2018	Co-organizer of Chapman Conference (American Geophysical Union)
	Merging Geophysical, Petrochronologic, and Modeling Perspectives of Large Silicic Magma Systems. Chile,
2016	Session convener, V13F: Crystal Records of the Timescales and Thermal Evolution of Plutonic, Hydrothermal, and Volcanic System, American Geophysical Union Fall Meeting (San Francisco, USA).
2016	Session convener, Symposium 8e: Crystallization Histories and Degassing: From Melt Inclusions to Plumbing Systems. 26th Annual Goldschmidt Conference
2012	Session convener, V12B. Petrologic Insights on Magmatic Processes Controlling Shifts in Eruption Style, American Geophysical Union Fall Meeting, (San Francisco, USA).
2012	Session convener SE105-107 Magmatic Processes and Possible Links to Volcano Monitoring Data, Asia Oceania Geosciences Society, Singapore.
2011	Session convener SE52 Volatiles in Volcanic Processes, Asia Oceania Geosciences Society (Taipei, Taiwan).
2011	Session convener Time-scales of Magmatic Processes and Volcanological Implications, IUGG-IAVCEI Conference, (Melbourne, Australia)

2009	Convener, Symposium '5h Kinetics of Metamorphic and Igneous Processes', 19th Annual Goldschmidt Conference, (Davos, Switzerland).
2008	Convener, Symposium "V38: Minerals, Inclusions and Volcanic Processes: Crystal-scale records of magma dynamics", American Geophysical Union Fall Meeting (San Francisco, USA).
2007	Co-organizer, Geological Society of America Field Forum 'Assessing the state of our knowledge of continental arc volcanism: The Tatara-San Pedro complex, 36 oS, Andean Southern Volcanic Zone' Chile
2007	Convener Symposium 'Links between radioactive isotopes and diffusion modelling to constrain the timescales of magmatic processes' 17th Annual Goldschmidt Conference (Koln, Germany).
2005	Convener, Symposium 'Will the real phenocrysts please stand up?', American Geophysical Union Fall Meeting, (San Francisco, USA).

International committees/review panels

Period of appointment	Role
2024-present	Chair of the Science Advisory Committee of the Earth Observatory of Singapore (Nanyang Technological University)
2024-present	Vice-president of section Volcanology and Chemistry of the Earth's Interior of the Comité National Français de Géodésie et Géophysique
2023-present	Member of Evaluation panel of NERC 'Research Frontiers' grants (UK) .
2023-present	Member of Canvassing Committee of American Geophysical Union. Volcanology, Geochemistry, Petrology Section.
2014 - 2024	Member of Evaluation Panel for European Research Council "Starting Grants" and "Consolidator Grants". Earth System Science (PE10).
2020- present	Science Advisory Committee – Merapi Volcano (Java, Indonesia)
2020- present	Science Advisory Committee – Soufriere Hills Volcano (Montserrat, UK)
2019 – 2023	Member of Executive Committee of the International Association of Volcanology and Chemistry of the Earth's Interior
2018 - 2021	Scientific Review Panel for the EUROVOLC program of the European Union.
2016	Core founder of the "Asian Chapter" of the Marie Curie Association(EU).
2015-present	Steering committee member of the Global Volcano Model
2015	Core founder of the Asian Consortium of Volcanology
2012-2013	American Geophysical Union: Executive Committee of the Volcanology, Geochemistry, Petrology section. Chair of the Western Pacific Meeting.

Recent Media/outreach

-Interview for journal "Science et Vie" published August 2023 « Non, l'Etna n'a pas rejeté plus de CO₂ que toute l'humanité ».