VOLCANO GEOLOGY COMMISSION: CANDIDATURE FOR THE NEW LEADERSHIP

Natalia Pardo: Universidad de los Andes (Colombia)
Matteo Roverato: Università di Bologna (Italia)

GENERAL PLAN:

- **COMMUNITY ENGAGEMENT:** We would recontact and connect the members mentioned in the annual report to verify who still interested and motivated to work in the commission plans. This would also help us to seek for potential leaders of working groups to address the main goals of the commission.

- **VISIBILITY AND IMPACT:** We'd like to activate the website as an interactive platform with a toolkit for volcano geology field techniques and examples. We believe this would be very useful as a reference for current and future generations needing guidelines to work in the field, face mapping challenges, and establish a robust stratigraphic and sedimentological framework. This strategy could be accompanied by the activation of social media accounts for easier and faster communications.

- **CO-WORKING:** we'd also like to follow up with encouraging active participation of the members in proposing sessions during scientific meetings and training workshops. To start, we have a few ideas that we already discussed with other members,
    - The next COV in Guatemala in February 2024 offers an excellent scenario to promote the commission through posters and flyers.
    - Also, we already submitted a Volcano Geology session for Guatemala-2024, which could be followed by a debriefing meeting to summarize lessons learned from the study cases presented there and discuss future plans.
    - We'd like to follow with the workshops for fieldwork training, planning to develop one in northern Andes (Colombia/Ecuador) in early 2025 (or, depending of logistics issues, in early 2026)

- **MULTIDISCIPLINARITY:** We'd encourage active interaction with other commissions and working teams to strengthen the value of fieldwork in volcano environments as a key tool for applied research such as: geoarchaeology, soil sciences, ecology and palaeocology, palaeogeography, experimental petrology, modelling and geomatics, climate and paleoclimate, geohazards, and geoheritage.

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Academic qualifications

2009-2012: Massey University, Palmerston North, New Zealand
PhD Earth Science: Andesitic Plinian eruptions at Mt. Ruapehu, New Zealand: from lithofacies to eruption dynamics. Introduced within the Massey University Dean's list of exceptional doctoral theses.

2005-2008: Universidad Nacional Autónoma de México (UNAM)
Master of Science-Volcanology (Honoured distinction)
Volcanic Stratigraphy and eruptive history of Asososca maar, Managua, Nicaragua.

1998-2004: Universidad Nacional de Colombia (UNAL)-Bogotá campus
BSc - Geology (Honoured Distinction)
Thesis: Volcanic stratigraphy of Paipa volcano, Paipa and Tuta municipalities, Boyacá, Colombia.

Focus:

A. **Physical volcanology, explosive volcanism, magma degassing and fragmentation, eruptive style transitions:** techniques include volcanic stratigraphy and field mapping, lithofacies analysis and sedimentology of pyroclastic successions, quantification of eruptive parameters (column heights, eruptive volumes, rates of discharge and decompression), analysis of micro-textures and very fine ash morphology in 2D and 3D (scanning electron microscope-SEM; X-ray synchrotron and micro-computed tomography), electron probe microanalysis (EMPA) and Fourier transform infrared spectroscopy (FTIR). These approaches are fused with questions and techniques of petrological and geochronological research questions in collaboration with national (Colombian Geological Service, National University, EAFIT University) and international collaborators in Italy, New Zealand, Switzerland, Mexico, Germany, Chile, Spain, Argentina and the USA.

B. **Resilience and heritage in volcanic territories, seen as socio-ecological systems:** development and application of participatory research techniques to co-create knowledge between multidisciplinary and interdisciplinary researchers with rural and indigenous communities living in volcanoes. I co-funded a research and creative collective named Historical Ecology and Social Memory (EHMS) at the University of Los Andes (Bogotá, Colombia). The EHMS portfolio is a group of researchers from the Faculties of Arts and Humanities, Sciences, Social Sciences, Design and Architecture and Engineering, with the aim of building a learning community with inhabitants of active volcanoes. We are interested in examining the interactions between human and non-human environments from multidimensional perspectives that integrate geological, paleoclimatic, ecological, social and cultural memories. We seek to enhance socio-ecological resilience in active volcanoes, strengthening participatory initiatives in geo-eco-cultural heritage and design of mitigation strategies. The objective of the research group is to consolidate a knowledge dialogue around resilience processes in environments subject to extreme natural disturbances. This includes arts-science dialogues and the generation of creative products for the appropriation of knowledge in different formats.

Professional positions held

August 2022-Current: Head of the Department of Geosciences at Universidad de Los Andes, Bogotá (Colombia)
May 2021-Current: Associate Professor at the Department of Geosciences at Universidad de Los Andes. Activities involve: (i) teaching and developing new undergraduate courses (Introduction to

Geosciences, Geochemistry, Natural hazards and disasters, and Physical volcanology), as well as supervising and co-supervising BSc thesis; (ii). Administrative duties; (iii) research in physical volcanology, social geology, and trans disciplinary projects. (iv) Coordination of laboratories

May 2016-Apr 2021: Assistant Professor at the Department of Geosciences of Los Andes University (Universidad de Los Andes), Bogotá (Colombia).

January 2016-May 2016: Lecturer at Los Andes University (Universidad de Los Andes), Bogotá (Colombia).

October 2014-April 2016: Specialized Professional, Volcano-Geology Team of the Geological Survey of Colombia (SGC), focused on geological mapping and stratigraphy research of active volcanoes.

August 2014-December2015: Lecturer at the National University of Colombia, teaching undergraduate courses in Volcanology at the Department of Geosciences and supervising BSc thesis.

July 2 2012- June 21 2013: Postdoctoral fellow at Massey University (New Zealand)

2008: 8-month appointment - Geologist - Colombian Geology Survey (INGEOMINAS)

2004: 6-month appointment - Colombian Geology Survey (INGEOMINAS)

Invited positions

2019: Visitor Researcher, Dipartimento di Scienze della Terra, Universitá degli Studi di Bari Aldo Moro. June 3- August 3

Selected research publications

Pardo, N., Sulpizio, R., Lucchi, F., Giordano, G., Cronin, S.J., Pulgarín, B.A., Roverato, M., Correa-Tamayo, A.M., Camacho, R., Cabrera, M.A., 2023; Late Holocene volcanic stratigraphy and eruption chronology of the dacitic Young Doña Juana volcano, Colombia. *GSA Bulletin*, doi: https://doi.org/10.1130/B36557.1

Pardo, N., Espinosa, M.L., González-Arango, C., Cabrera, M.A., Salazar, S., Archila, S., Palacios, N., Prieto, D., Camacho, E., Parra-Agudelo, L (2021). Worlding resilience in the Doña Juana Volcano-Páramo, Northern Andes (Colombia): A transdisciplinary view. Natural Hazards 107; 1845-1880, https://doi.org/10.1007/s11069-021-04662-4

Castilla SC, Pulgarín BA, Palechor D, Tamayo M, **Pardo N**, Correa-Tamayo AM, Cruz Y, Rayo L, Zuluaga I, Ceballos J (2021) Guidelines for digital geological maps of Pliocene-Holocene composite volcanoes: a contribution from Colombia. Journal of South American Earth Sciences, 103110. https://doi.org/10.1016/j.jsames.2020.103110

Pardo N, Avellaneda JD, Rausch J, Jaramillo-Vogel D, Gutiérrez M, Foubert A (2020). Decrypting silicic magma/plug fragmentation at Azufral crater lake, Northern Andes: insights from fine to extremely fine ash morpho-chemistry. Bulletin of Volcanology 82 (12), https://doi.org/10.1007/s00445-020-01418-z

Heinrich M, Cronin SJ, 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. J. Volcanol. Geotherm. Res. 401: 106936

Heinrich M, Cronin SJ, **Pardo N**., 2020. Understanding multi-vent Plinian eruptions at Mt. Tongariro Volcanic Complex, New Zealand. Bulletin of Volcanology 82: 30, doi.org/10.1007/s00445-020-1369-7

Castilla, S.C., **Pardo, N.,** Larrea P., Zuluaga, C.A., Sarmiento, S., Noguera, D., Sarmiento, G.A., 2019. Pre-eruptive conditions and pyroclastic emplacement of the last known vulcanian eruption of Azufral Volcano, SW Colombia. Journal of South American Earth Sciences. In press. https://doi.org/10.1016/j.jsames.2018.08.007

Pardo, N., Pulgarín, B., Betancourt, V., Lucchi, F., Valencia, L.J., 2019. Facing geological mapping t low-latitude volcanoes: The Doña Juana volcanic Complex study-case, SW-Colombia. Journal of Volcanology and Geothermal Research, *In press.*
https://www.sciencedirect.com/science/article/pii/S0377027317302755

Pardo, N., 2018. K. Németh, G. Carrasco-Núñez, J.J. Aranda-Gómez, and I.E.M. Smith: Monogenetic Volcanism book review. Bulletin of Volcanology 80: 55. https://doi.org/10.1007/s00445-018-1226-0

Torres-Orozco, R., Cronin, S.J., **Pardo, N**., Palmer, A.S., 2018. Volcanic hazard scenarios for multiphase andesitic Plinian eruptions from lithostratigraphy: Insights into pyroclastic density current diversity at Mount Taranaki, New Zealand. GSA Bulletin 130 (9-10): 1645-1663. https://doi.org/10.1130/B31850.1

Torres-Orozco, R., Cronin, S.J., Damaschke, M., **Pardo, N**., 2017. Diverse dynamics of Holocene mafic-intermediate Plinian eruptions at Mt. Taranaki (Egmont), New Zealand. Bulletin of Volcanology 79: 76. DOI 10.1007/s00445-017-1162-4

Torres-Orozco, R., Cronin, S.J., **Pardo, N**., Palmer, A.S., 2017. New insights into Holocene eruption episodes from proximal deposit sequences at Mt. Taranaki (Egmont), New Zealand. Bull Volcanol (2017) 79: 3. https://doi.org/10.1007/s00445-016-1085-5

Gabrielsen, H., Procter, J., Rainforth, H., **Pardo, N**., 2017. Reflections from an Indigenous Community on Volcanic Event Management, Communications and Resilience. In: Advances in Volcanology. Springer, Berlin, Heidelberg. DOI10.1007/11157_2016_44

Pardo, N., Wilson, H., Procter, J.N., Lattughi, E., Black, T., 2015. Bridging Matauranga Maori and Geosciences through arts. Journal of Applied Volcanology 4:5, 20p. DOI 10.1186/s13617-014-0019-1

Cronin, S.J., Stewart, C., Zernack, A.V., Brenna, M., Procter, J.N., **Pardo, N.**, Christenson, B., Wilson, T., Stewart, R.B., Irwin, M., 2014. Volcanic ash leachate compositions and assessment of health and agricultural hazards from 2012 hydrothermal eruptions, Tongariro, New Zealand. Journal of Volcanology and Geothermal Research, Tongariro Eruption Special Issue. In Press. DOI: 10.1016/j.jvolgeores.2014.07.002

Crouch, J.F., **Pardo, N.,** Miller, C.A., 2014. Dual Polarisation C-Band Weather Radar Imagery of the 6 August 2012 Te Maari Eruption, Mount Tongariro, New Zealand. Journal of Volcanology and Geothermal Research, Tongariro Eruption Special Issue. In Press. DOI: http://dx.doi.org/10.1016/j.bbr.2011.03.031

Pardo, N., Cronin, S.J., Németh, K., Brenna, M., Schipper, C.I., Breard, E., White, J.D.L., Procter, J., Stewart, R.B., Agustín-Flores, J., Moebis, A., Zernack, A., Kereszturi, G., Lube, G., Auer, A., Neall, V., and Wallace, C., 2014. Perils in distinguishing phreatic from phreatomagmatic ash; insights into the eruption mechanisms of the 6 August 2012 Mt. Tongariro eruption, New Zealand. Journal of Volcanology and Geothermal Research, Tongariro Eruption Special Issue. In Press: DOI: 10.1016/j.jvolgeores.2014.05.001

Pardo, N., Cronin, S.J., Wright, H.M.N., Schipper, C.I., Smith, I., Stewart, R.B., 2014. Pyroclastic Textural variation as an indicator of eruption column steadiness in andesitic Plinian eruptions at Mt. Ruapehu. Bull Volcanol 76: 822. In Press. DOI: **10.1007/s00445-014-0822-x**

Pardo, N., Cronin, S.J., Palmer, A.S., Németh, K. 2012a: Reconstructing the largest explosive eruptions of Mt. Ruapehu, New Zealand: lithostratigraphic tools to understand subplinian-Plinian eruptions at andesitic volcanoes, Bulletin of Volcanology 74: 617-640.

Pardo N., Cronin, S.J., Palmer, A.S., Procter, J., Smith, I.E.M., 2012b: Andesitic Plinian eruptions at Mt Ruapehu: quantifying the uppermost limits of eruptive parameters. Bulletin of Volcanology 74: 1161-1185.

Pardo, N., Macias, J.L., Giordano, G., Cianfarra, P., Avellán, D.R., Bellatreccia, F., 2009: The ~ 1245 yr BP Asososca maar eruption: The youngest event along the Nejapa-Miraflores volcanic fault, Western Managua, Nicaragua. Journal of Volcanology and Geothermal Research 184: 292-312.

Pardo, N., Avellán, D.R., Macías, J.L., Scolamacchia, T., Rodriguez, D., 2008. The ~1245 yr BP Asososca maar: new advances on recent volcanic stratigraphy of Managua (Nicaragua) and hazard implications. Journal of Volcanology and Geothermal Research 176 (4): 493-512.

Other

Associated editor of:

- Revista Mexicana de Ciencias Geológicas
- Bulletin of Volcanology

Outreach

- **Community-based radio program:** series of "Living with Mass movements on Doña Juana volcano": https://www.youtube.com/playlist?list=PL8D2ZlSM8G_e44qcpvSTmpM5PnHhMQamE
- **Workshops with local communities**
- **Media interviews:**
  - https://uniandes.edu.co/es/noticias/ciencia-tecnologia-y-salud/ambiente-y-sostenibilidad/colombia-verse-afectado-terremoto-mexico
  - https://www.eltiempo.com/vida/ciencia/una-geologa-explica-como-funcionan-los-volcanes-228720
  - https://www.eltiempo.com/vida/ciencia/causas-de-la-erupcion-del-volcan-de-fuego-de-guatemala-226846
  - https://caracol.com.co/radio/2018/06/05/ecologia/1528234403_788193.html
  - https://youtu.be/nJ4yZlMOW-I
- **Collaboration with artists:**
  - https://www.saloncomunal.co/bernardo-montoya?lightbox=dataItem-jmjdo534
  - https://www.santiago-reyes.com/en/2019-orbita/
  - https://youtu.be/H7U9gm9gw8E