

Dr. Nicolas LE CORVEC

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Date of Birth: 5th January 1980, FRANCE.

Current position: Postdoctoral Fellow, USRA, Lunar and Planetary Institute, Houston, TX.

EDUCATION

February 2013: **Doctor of Philosophy:** “*Physical and Structural Controls on Monogenetic Basaltic Volcanism and their implications on the evolution of the Auckland Volcanic Field*”, Supervisor: Dr. Julie Rowland, Advisors: Dr. Thierry Menand, Dr. Jan Lindsay, Dr. Denis Legrand, Prof. Colin Wilson. School of Environment, The University of Auckland, Auckland, New Zealand

July 2005: **Masters of Science:** Magma & Volcanoes (French DEA), Laboratory of Magma & Volcanoes, University of Blaise Pascal, Clermont-Ferrand, France.

Masters thesis: “*Socompa Volcano Destabilization (Chile) and Debris Avalanches*”; supervisors: Benjamin Van Wyk de Vries (University of Blaise Pascal, France), Stephen Self (Open University, UK); including one month at the Open University, United Kingdom.

2003 - 2004: Exchange student, MSc Earth Sciences: Lithosphere Tectonics, Petrology, and Isotope Geochemistry with Second Class Honors. ERASMUS (European program) at the Vrije Universiteit of Amsterdam, Netherlands.

June 2003: **Bachelor’s degree** (French Licence) in Earth and Life Sciences, University of Rennes1, France.

WORKING EXPERIENCE

February 2015: Research Associate, Pomona College, Claremont, CA, USA

Research Project: “*Development of 3D models combining flexural and extensional deformation using Finite Element Models*” in collaboration with Dr. Eric B. Grosfils.

Since April 2013: Postdoctoral Fellow, USRA, Lunar and Planetary Institute, Houston, TX, USA

Research Project: “*Mechanical interactions between intrusive and extrusive volcanic edifice growth, lithospheric flexural response, and magma ascent using Finite Element and Distinct Element Methods*”. Supervisor: Dr. Patrick McGovern

Advisor: Dr. Eric B. Grosfils at Geology Department, Pomona College, Claremont, CA, USA

February 2009 – February 2013: PhD Candidate, School of Environment, The University of Auckland, New Zealand.

Research Project: *“Physical Controls on Monogenetic Basaltic Volcanism, Auckland Volcanic Field”*, Supervisor: Dr. Julie Rowland, Advisors: Dr. Thierry Menand, Dr. Jan Lindsay, Dr. Denis Legrand, Prof. Colin Wilson.

July 2010 – December 2010: Research Associate, University of Bristol, United-Kingdom.

Research Project: *“Interaction of ascending magma with pre-existing crustal structures: Insights from analogue modeling”*, Supervisor: Dr. Thierry Menand (Laboratory of Magma and Volcanoes, France).

April 2008 – January 2009: Guest Researcher at the GFZ, Potsdam, Germany.

Research Project: *“Deformation patterns associated with an eruption at Mount Etna volcano: a combined study of the 2001 episode using geodesy and analogue modeling”*, Supervisor: Dr. Thomas R. Walter.

January 2008 - March 2008: Private Tutor (mathematics, physics, chemistry, geology, English), Paris, France.

July 2007 - November 2007: Volunteer at the University of Colima, Mexico.

Research Project: *“AVHRR Thermal Monitoring on Central America volcanoes”*. Supervisors: Dr. Ignacio Galindo Estrada (University of Colima) and Dr. Andrea Steffke (University of Hawai`i at Manoa, USA).

May 2007 - July 2007: Volunteer at the Centre of Exchange and Research in Volcanology, with Dr. N. Varley and Dr. J. Stevenson (University of Edinburgh, UK), Colima, Mexico.

October 2006 - May 2007: Guest Researcher at the GFZ, Potsdam, Germany.

Research Project: *“Internal deformation of large volcanic island: comparison between gravitational spreading and rift zone intrusion”*. Supervisor: Dr. Thomas R. Walter.

March - August 2006: Scientific illustrator at Vulcania, the European Park of Volcanism, Clermont-Ferrand, France.

September - November 2005: Geophysicist (seismic refraction, borehole micro-seismic analyses) at the French Public Works Research Laboratory, Clermont-Ferrand, France.

FIELDWORK EXPERIENCE

September 2009 – December 2010: Structural analysis of rift zones within the Taupo Volcanic Zone (New Zealand) with C. Scholz (PhD candidate at University of Auckland, New Zealand).

June 2007: Structural analysis of the regional tectonic and the activity of the volcanic complex of Colima with Dr. G. Norini, (UNAM, Mexico).

May 2007 - July 2007: Thermal and SO₂ gases monitoring of the Colima volcano, Dr. N. Varley (Centre of Exchange and Research in Volcanology, Mexico) and Dr. J. Stevenson (University of Edinburgh, UK).

April 2007: Geophysical fieldwork in Chile. Installation of two GPS and gravimeter networks with Dr J. Ruch (Roma Tre University, Italy) at the Isluga and Lastarria volcanoes (North Chile).

October 2004: Fieldwork in the Alps: “Birth and death of an ocean”; and Italian volcanoes (Vesuvio, Stromboli, Vulcano) with Prof. Dr. T. Druitt, Prof. Dr. J.-F. L  nat, Prof. Dr. C. Nicollet (Laboratory of Magma and Volcanoes, France).

June 2004: Mapping and structural analysis of the Carboneras fault zone in Andalucia, Spain, Dr. J.H.P. de Bresser, Dr. G. Postma, (University of Utrecht, The Netherlands).

June 2003: Mapping and structural analysis in the French Eastern Pyrenees with the University of Rennes1 (France).

September 2002: Structural, sedimentological and petrological analysis in the French Eastern Pyrenees: “Formation of a mountain range” with the University of Rennes1 (France).

PROFESSIONAL SERVICE

Convener of Topical Session “*Mechanisms of magma ascent, emplacement and extrusion*” at AGU Fall Meeting 2014

Co-convener of Topical Session “*Mechanisms of magma ascent and emplacement*” at AGU Fall Meeting 2013

Co-convener of Topical Session “*Physics and dynamics of magma ascent, emplacement, eruption and deposition in volcanic systems*” at EGU General Assembly 2012

Reviewer: Journal of Volcanology and Geothermal Research; Journal of Geophysical Research – Solid Earth, National Science Foundation grant proposal.

TEACHING and MENTORING

Teaching:

2009-2010: Teaching Assistant for undergraduates at the University of Auckland; GEOLOGY 305 Tectonics and Crustal Evolution

Postgraduate Research Projects Co-Supervised while at GFZ German Research Center for Geosciences:

- Katja Muller (postgraduate - 2008): “Elongated caldera structures in Iceland investigated through remote sensing and laboratory models - can they be used as strain markers?”

- Celine Dumais (postgraduate - 2007): “Experimental dike intrusion analyzed with pixel correlation PIV”

INVITED PRESENTATIONS

Pomona College – Geology Department, Claremont – CA, February 2015: “*Magma Propagation in Volcanic Systems*”.

University of South Florida – Department of Geology, Tampa – FL, January 2014: “*Physical and Structural Controls on Monogenetic Basaltic Volcanism*”.

University of Idaho – Geological Sciences, Moscow – ID, September 2013: “*Physical and Structural Controls on Monogenetic Basaltic Volcanism*”.

USRA – Lunar and Planetary Institute, Houston - TX, November 2012: “*Physical and Structural Controls on Basaltic Volcanism*”.

SKILLS

Analogue and Numerical Modeling, Mapping, GIS, Spatial analysis, Remote sensing analysis, Sequence Stratigraphy, Stereography, DEM generation (aerial photography), Ortho-Photography, SO₂ measurements (Flyspec), Thermal monitoring (thermal camera, AVHRR satellite image), Picking (volcano-tectonic events).

IT & PROGRAMMING SKILLS

COMSOL, DaVis (Particle Image Velocimetry), MATLAB, ArcGIS, ERDAS IMAGINE, Surfer, R (notions), GIAS, GeOrient, IRBIS (Thermal data), Minitab, GMT, Python (notions), Adobe Illustrator - Photoshop, Word Office.

PUBLICATIONS

Publications in preparation

Le Corvec, N.; McGovern, P. J. Volcanic Spreading on Mars: Role of a Basal Decollement on Faulting and Magma Propagation. Intend to submit to Journal of Geophysical Research: Planets.

Le Corvec, N., and P. J. McGovern. Effects of an ocean on the internal stress of a growing basaltic shield volcano and the mechanical response of the lithosphere. Intend to submit to Journal of Geophysical Research: Solid Earth.

Galgana, G.A., P.J. McGovern, E.B. Grosfils, and **N. Le Corvec**. The formation of giant radiating dike systems on Venus: Insights from elastoplastic flexural models. Intend to submit to Journal of Geophysical Research: Solid Earth.

Peer-reviewed publications

Muirhead, J.D., S.A. Kattenhorn, and **N. Le Corvec**. Varying styles of magmatic strain accommodation across the East African Rift. Submitted to *G³*.

- Mazzarini, F., **N. Le Corvec**, I. Isola, and M. Favalli. Volcanic field elongation, vent distribution and tectonic evolution of continental rift: The Main Ethiopian Rift example. Submitted to *Geosphere*.
- Le Corvec, N.**, P. J. McGovern, E. B. Grosfils and G. Galgana. Effects of mechanical layering on magmatic reservoir failure and magma propagation within the Venusian lithosphere. Accepted. *JGR - Planets*.
- Le Corvec, N.**, T. R. Walter, J. Ruch, A. Bonforte, and G. Puglisi (2014), Experimental study of the interplay between magmatic rift intrusion and flank instability with application to the 2001 Mount Etna eruption, *Journal of Geophysical Research: Solid Earth*, *119*(7), 2014JB011224
- Germa, A., L. J. Connor, E. Cañon-Tapia, and **N. Le Corvec** (2013), Tectonic and magmatic controls on the location of post-subduction monogenetic volcanoes in Baja California, Mexico, revealed through spatial analysis of eruptive vents, *Bull Volcanol*, *75*(12), 1-14.
- Le Corvec, N.**, M. S. Bebbington, J. M. Lindsay, and L. E. McGee (2013), Age, distance, and geochemical evolution within a monogenetic volcanic field: Analyzing patterns in the Auckland Volcanic Field eruption sequence, *Geochemistry, Geophysics, Geosystems*, *14*(9), 3648-3665.
- Le Corvec, N.**, K. B. Spörli, J. Rowland, and J. Lindsay (2013), Spatial distribution and alignments of volcanic centers: Clues to the formation of monogenetic volcanic fields, *Earth-Science Reviews*, *124*(0), 96-114.
- Le Corvec, N.**, T. Menand, and J. Lindsay (2013), Interaction of ascending magma with pre-existing crustal fractures in monogenetic basaltic volcanism: an experimental approach, *Journal of Geophysical Research: Solid Earth*, *118*(3), 968-984.
- Guilbaud, M.-N., C. Siebe, P. Layer, S. Salinas, R. Castro-Govea, V. H. Garduño-Monroy, and **N. Le Corvec** (2011), Geology, geochronology, and tectonic setting of the Jorullo Volcano region, Michoacán, México, *Journal of Volcanology and Geothermal Research*, *201*(1-4), 97-112.
- Le Corvec, N.**; Walter, T.R. Volcano spreading and fault interaction influenced by rift-zone dike intrusion: Insights from analogue experiments analyzed with digital image correlation. *Journal of Volcanology and Geothermal Research* (2009), 183, 170-182, doi: 10.1016/j.jvolgeores.2009.02.006.

Selected Abstracts

- Mazzarini, F., **Le Corvec, N.**, Isola, I., Favalli, M. Volcanic field elongation, vent distribution and tectonic evolution of continental rift: The Main Ethiopian Rift example. EGU General Assembly, 2015, GMPV5.5, EGU2015-15136. Poster presentation.
- Le Corvec, N.**; McGovern, P. J. Volcanic Spreading on Mars: Role of a Basal Decollement on Faulting and Magma Propagation. 46th LPSC, 2015, abstract #2891. Oral presentation.
- Le Corvec, N.**; McGovern, P. J. Influence of an ocean on the propagation of magmas within an oceanic basaltic shield volcano. AGU Fall Meeting, 2014, abstract #V51B-4743. Poster presentation.
- Klein, E.; **Le Corvec, N.**; Galgana, G. Comparison of numerical approaches for modeling gravitationally-induced horizontal deviatoric stresses within a Hawaiian basaltic shield volcano. AGU Fall Meeting, 2014, abstract #V11B-4704. Poster presentation.
- Le Corvec, N.**; McGovern, P. J; Grosfils, E B. Effects of crustal-scale mechanical layering on magmatic reservoir failure and magma propagation within the Venusian lithosphere. 45th LPSC, 2014, abstract #M154-2330. Oral presentation.

- Le Corvec, N.;** McGovern, P. J; Grosfils, E B. Effects of mechanical layering on magmatic reservoir failure and magma propagation within the Venusian lithosphere. AGU Fall Meeting, 2013, abstract #V13E-2659. Poster presentation.
- Germa, A.; Cañon-Tapia, E., Connor, L., **Le Corvec, N.** Statistical analysis of eruptive vent distribution from post-subduction monogenetic fields in Baja California, Mexico. EGU General Assembly, 2012, GMPV4.7, EGU2012-562. Oral presentation.
- Le Corvec, N.;** Rowland, J.V.; Lindsay, J.M. The Auckland Volcanic Field – a basaltic field showing random behavior? EGU General Assembly, 2012, GMPV4.7, EGU2012-12671. Poster.
- Le Corvec, N.;** Spörli, K.B.; Rowland, J.V.; Lindsay, J.M. Monogenetic volcanic fields: Spatial distribution and volcanic lineaments as indicators for crustal controls? EGU General Assembly, 2012, GMPV4.7, EGU2012-12970. Poster.
- Le Corvec, N.;** Menand, T.; Rowland, J.V. Interaction of ascending magma with pre-existing crustal structures: Insights from analogue modelling. AGU, Fall Meeting 2010, abstract #V51F-08. Oral presentation.
- Le Corvec, N.;** Rowland, J.; Lindsay, J.; Spörli, K.B. Structural controls on monogenetic volcanism. Geosciences '09, Symposium 03. Poster.
- Le Corvec, N.;** Walter, T.R.; Puglisi, G.; Bonforte, A. Deformation patterns associated with an eruption at Mount Etna volcano: a combined study of the 2001 episode using geodesy and analogue modelling. EGU General Assembly, 2009, GMPV3, EGU2009-9162. Poster.
- Le Corvec, N.;** Walter, T.R. Flank instability and internal deformation on volcanic islands: An experimental study of the coupling between gravitational spreading and rift-zone intrusion. EGU General Assembly, 2008, GMPV25, EGU2008-A-07766. **Invited oral presentation.**

Thesis

- Le Corvec, N.,** (2013), Physical and Structural Controls on Monogenetic Basaltic Volcanism, and their implications on the evolution of the Auckland Volcanic Field. PhD thesis, pp. 200. Submitted at the University of Auckland, Auckland, New Zealand.
- Le Corvec, N.,** (2005), Socompa volcano destabilization (Chile) and fragmentation of debris avalanches. Master thesis, pp 50. Submitted at the University of Blaise Pascal, Clermont-Ferrand, France.

LANGUAGES

French: Mother-tongue.

English: Fluent.

Spanish: High level.

German: Notions