

# Olivier Galland

Dr. Earth Sciences

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## Physics of Geological Processes

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Nationality: French  
Age: 35

## Academic Background

- **From Nov. 2009**     **Senior Researcher.** PGP, University of Oslo. **Group coordinator** of the “Fluid Earth Group” since February 2011.
- **2008 – 2009**     **The Andean Geotrail.** Popular science project based on a 9-month bike journey in the Andes (labelled by the IYPE).  
[www.georouteandine.fr](http://www.georouteandine.fr), <http://georouteandine.blogspot.com>
- **2005 – 2008**     **Postdoctoral researcher.** Physics of Geological Processes (PGP), University of Oslo.
- **2005**     **Assistant researcher.** Géosciences Rennes. Teaching and research activity.
- **2001 – 2004**     **PhD student in Earth Sciences,** University of Rennes1, France  
Title: “*Mechanical interactions between magmatism and compressional tectonics: field studies and analogue modelling*”. Disputation: 10<sup>th</sup> December 2004  
Supervisors: P.R. Cobbold, J. de Bremond d’Ars, E. Hallot
- **1998 – 2001**     **Magistère des Sciences de la Terre – MsC Earth Sciences**  
ENS Lyon, élève normalien – University of Rennes1

## Academic Awards

### International

- **2011**     **Arne Richter Prize** for Outstanding Young Scientists (EGU, nominated).
- **2010**     **Student Poster Award** at Kongsberg seminar, awarded to PhD student A. Nermoen.
- **2012**     **Finalist of EGU photo contest** (10 selected photographs)

### National

- **2009**     **Outreach award,** internal award for Andean Geotrail project.
- **2008**     **Teambuilding Award,** internal award for multidisciplinary activities.
- **2003**     **Best student presentation award,** Western France teaching PhD student meeting, out of 120 participants.

## Projects and funding

- **MeMoVolc, 2014**     2-week visiting grant to Reykjavik to learn geodetic modelling (1500€), PI
- **MeMoVolc 2014**     Host research for 4-week visiting grant to C. Breitreutz, Germany (3000€).
- **MN Faculty, 2014**     *Laboratory Volcano Geodesy*, 4-year, PhD grant, PI.
- **YPF-CONICET 2013**     *Igneous systems in Neuquén Basin*, 5-year PhD student, Univ. La Plata, Argentina (co-PI)
- **Småforsk, 2013**     Internal grant from Department of Geosciences, Univ. Oslo (40 kNOK)
- **MeMoVolc 2013**     Host researcher for 2-week visiting grant for S. Burchardt, U. Uppsala (2000€)
- **MeMoVolc, 2012**     Grant from the ESF network MeMoVolc for organizing a workshop in Oslo (11000€)
- **Aurora Grant, 2012**     Grant promoting collaboration between Norway and France. Grant nb: 221616 (60 kNOK)
- **Yggdrasil Grant, 2010**     Mobility grant for visiting young researchers in Norway. The grant was obtained for F. Martinez, Universidad de Chile (98 000 NOK)
- **The Andean Geotrail**     **Sponsoring** for sport equipment (bikes, camping gear, etc...) and grants (16 000 €).  
2008-2009

## Competences & Experience

- **Experimental Modelling**      **Full development of several experimental protocols on:**  
Interactions between magma intrusion and tectonic deformation.  
Sill emplacement in sedimentary basins  
Vent complexes in sedimentary basins  
Primary migration processes  
Explosive volcanism and fragmentation  
Mechanics of sheath folds formation. Collaboration with the laboratory in Rennes.
- **Fieldwork**                      Structural mapping, Andean geology, Tectonics, Stratigraphy, chemostratigraphy and palaeoclimate.
- **Modelling**                      Finite difference modelling, Finite element modelling, Theoretical modelling

## Teaching and Supervision Experience

- **2010**                              **Course leader** in Master and PhD program: “Methods in Physics of Geological Processes”. Physics, numerical modelling, theoretical and experimental physics (2010).
- **2007 – 2010**                      **Supervision of PhD students.**  
*C. Galerne*: petrology and geochemistry of saucer-shaped sill complexes.  
*A. Nermoen*: experimental modelling of vent complexes in sedimentary basins.  
*M. Kobchenko*: experimental modelling of fluid migration in tight rocks.  
*J. Reber*: experimental modelling of sheath fold formation.  
*P. Silkose*: Dynamics of hydrothermal vents and breccia pipes.  
*J. Spacapan* (starting, Argentina): Igneous plumbing systems in the Neuquén Basin.
- **2005 – 2010**                      **Supervision of Master students.**  
*G. Delavaud*: experimental modelling of dyke emplacement in rifts.  
*Ø. Haug*: experimental modelling of fragmentation during volcanic explosions.  
*D. Gürer*: Magma emplacement in fold-and-thrust belt (fieldwork, Argentina).  
*H. Bertelsen*: experimental models of magma flow in viscoelastic matrix  
*R. Johannessen*: Ground deformation induced by shallow intrusions  
*G. Saunders*: 3D mapping of landslides using Unmanned Aerial Vehicle
- **2002 – 2005**                      **Geophysics and Geology**, teaching assistant at University of Rennes (64 h/yr during 3 years)
  - Geological mapping, Hydrogeology, Geophysics.
  - Geomorphology and geology in the Pyrenees, Geology of Brittany.
- **2001 – 2005**                      **Geology**, Short Courses at high-school level in the Alps (1 trip per year).

## Publications

- Galland, O., Johannessen, R., Gulstrand, F., Bjugger, F., Burchardt, S., Girod, L., Mair, K., *Laboratory volcano geodesy*, in preparation for GRL.
- Gürer, M.D., Galland, O., Corfu, F., Leanza, H.A., *Structure and evolution of intrusive complex system in fold-and-thrust belt: the case study of Cerro Negro de Tricao Malal, Argentina*, Submitted, GSA Bulletin.
- Kobchenko, M., Hafver, A., Jettstuen, E., Galland, O., Renard, F., Meakin, P., Jamtveit, B., Dysthe, D.K., submitted, Physical Review Letters.
- Galland, O., Holohan, E., van Wyk de Vries, B., Burchardt, S., *Laboratory modelling of volcanic plumbing systems*, textbook chapter, submitted. Eds.: Breikreutz, C., Rocchi, S., *The Physical Geology of Shallow Magmatic Systems*, Springer.
- Neumann, E.-R., Galland, O., Svensen, H., Mazzini, A., *Compositional variations among Jurassic ignimbrites and tuffs from Arroyo Serrucho and Chacay Melehue, Neuquén Basin, Argentina*, in revision for Int. J. Earth Sci.
- Galland, O., Burchardt, S., Hallot, E., Mourgues, R., *Towards a unified model for dikes versus cone sheets in volcanic systems*, in revision, JGR.
- Gisler, G. R., Galland, O., Haug, Ø. T., Morphology and dynamics of piercement structures, in revision, JGR.
- Haug, Ø. T., Galland, O., Gisler, G. R., *Experimental modelling of fragmentation applied to volcanic eruptions*, EPSL, v. 384, no. 0, p. 188-197.
- Kobchenko, M., Hafver, A., Jettstuen, E., Galland, O., Renard, F., Meakin, P., Jamtveit, B., Dysthe, D.K., *Drainage fracture networks in elastic solids with internal fluid generation*, Europhysics Letters, 102 (2013) 66002.
- Reber, J., Dabrowski, M., Galland, O., Schmid, D., *Mechanics of sheath folds in shear zones*, J. Struct. Geol., 53, 15–26.
- Galland, O., Scheibert, J., 2013, *Axi-symmetric formulation of surface uplift above flat-lying intrusions: implications for sill emplacement and geodesy*, J. Volcanol. Geotherm. Res., 253, 114–130.

- Leanza, H. A., Mazzini, A., Corfu, F., Llambías, E. J., Svensen, H., Planke, S., **Galland, O.**, 2013, *The Chachil Limestone (Pliensbachian-earliest Toarcian) Neuquén Basin, Argentina: U-Pb age calibration and its significance on the Early Jurassic evolution of southwestern Gondwana*, J. South Am. Earth Sci., 42, 171–185.
- Reber, J., **Galland, O.**, Cobbold, P. R., 2012, *Experimental study of sheath folds development in a mechanically layered matrix*, Tectonophysics, 586 (2012) 130–144.
- Abdelmalak, M., Mourgues, R., **Galland, O.**, Bureau, D., 2012, *Fracture mode analysis and related surface deformation during dyke intrusion: Results from 2D experimental modelling*, EPSL, 359–360, 93–105.
- Ferré, E., **Galland, O.**, Montanari, M., Kalakay, T., 2012, *Granite magma migration and emplacement in flats-and-ramps*, Int. J. Earth Sci., doi:10.1007/s00531-012-0747-6.
- Galland, O.**, 2012, *Experimental modelling of ground deformation associated with shallow magma intrusions*, EPSL, 317–318, p.145–156, doi:10.1016/j.epsl.2011.10.017.
- Galerne, C. Y., **Galland, O.**, Neumann, E.-R., Planke, S., 2011, *3D relationships between sills and their feeders: Evidence from the Golden Valley Sill Complex (Karoo Basin) and experimental modelling*, JVGR, 202, p. 189–199.
- Sassier, C., **Galland, O.**, Mair, K., 2011, *The Andean Geotrail: A geological adventure for public outreach*, EOS – Transactions, AGU, 92, p1-2.
- Nermoen, A., **Galland, O.**, Fristad, K., Podladchikov, Y. Y., Málthe-Sørenssen, A., Svensen, H., 2010, *Experimental and analytical modeling of piercement structures*, JGR, 115, doi:10.1029/2010JB007583.
- Gressier, J.-B., Mourgues, R., Bodet, L., Matthieu, J.-Y., **Galland, O.**, Cobbold, P. R., 2010, *Control of pore fluid pressure on depth of emplacement of magmatic sills: An experimental approach*, Tectonophysics, 489, p. 1–13.
- Galland, O.**, Planke, S., Málthe-Sørenssen, A., Neumann, E.-R., 2009, *Experimental modelling of shallow magma emplacement: application to saucer-shaped intrusions*, EPSL, 277, p. 373–383.
- Sassier, C., Leloup, P.-H., Rubatto, D., **Galland, O.**, Yue, Y., Ding, L., 2009, *Direct measurement of strain rates in ductile shear zones: A new method based on syntectonic dykes*, JGR, 114, B01406, doi: 10.1029/2008JB005597.
- Galland, O.**, Cobbold, P. R., Hallot, E., de Bremond d’Ars, J., 2008, *Magma-controlled tectonics in compressional settings: insights from geological examples and experimental modelling*, Boll. Soc. Geol. Ital., 127, p. 205–208.
- Polteau, S., Mazzini, A., **Galland, O.**, Planke, S., A. Málthe-Sørenssen, 2008, *Saucer-shaped intrusions: occurrences, emplacement and implications*, EPSL, 266, p. 195–204.
- Galland, O.**, Cobbold, P.R., de Bremond d’Ars, J., Hallot, E., 2007, *Rise and emplacement of magma during horizontal shortening of the brittle crust: Insights from experimental modeling*, JGR, 112, doi:10.1029/2006JB004604.
- Galland, O.**, Hallot, E., Cobbold, P.R., Ruffet, G., de Bremond d’Ars, J., 2007, *Volcanism in a compressional Andean setting: A structural and geochronological study of Tromen volcano (Neuquén province, Argentina)*, Tectonics, 26, doi:10.1029/2006TC002011.
- Galland, O.**, Cobbold, P.R., Hallot, E., de Bremond d’Ars, J., 2006, *Use of vegetable oil and silica powder for scale modelling of magmatic intrusion in a deforming brittle crust*, EPSL, 243, p. 786–804.
- Galland, O.**, (2004), *Interactions mécaniques entre la tectonique compressive et le magmatisme : expériences analogiques et exemple naturel*, PhD thesis, Université de Rennes1, Mémoire de Géosciences n° 116, 423 p.
- Galland, O.**, de Bremond d’Ars, J., Cobbold, P.R. and Hallot, E., 2003, *Physical models of magmatic intrusion during thrusting*, Terra Nova, Vol. 15, p. 405–409.

See full publication list at: <http://folk.uio.no/oliviega/Website/Publications/Publications.html>

## Conferences and invited presentations

### Keynote lectures

- Galland, O.**, 2012, *Inferring volcanic plumbing systems from ground deformation: what we learn from laboratory experiments*, keynote lecture, Nordic Geological Winter Meeting, Reykjavik, 8–12 January.
- Galland, O.**, Planke, S., Málthe-Sørenssen, Neumann, E.-R., 2008, *Mechanical coupling between magma intrusion and deformation of country rock: application to dynamic emplacement of saucer-shaped sills*, keynote lecture, VMSG Meeting, Dublin, 4–5 January 2008.
- Galland, O.**, 2010, Invitation for Nordvulk Summer School: Magmatic Plumbing Systems and Intrusions, Eiðar, 10–20 August.
- Galland, O.**, Cobbold, P.R., Hallot, E., de Bremond d’Ars, J., 2007, *Magma-controlled tectonics in compressional settings: insights from experimental modelling and application to the Central Andes*, Keynote lecture, Deformation mechanisms, Rheology and Tectonics, Milan, 26–30 September.

### Session and meeting organiser

- Galland, O.**, Holohan, E., *Volcanism and volcanotectonics*, GEOMOD, Potsdam, Sep. 2014.
- Galland, O.**, Burchardt, S., Holohan, E., Kervin, M., Taisne, B., *Physics of volcano plumbing systems*, EGU 2014, EGU 2013, EGU 2012, Vienna.
- Leever, K., Rosenau, M., **Galland, O.**, Acocella, V., *Workshop on Advances in Quantitative Analogue Modeling (AiQAM)*, September 2013, Potsdam.
- Galland, O.**, Burchardt, S., Troll, V., *MeMoVolc meeting on “Magma emplacement and volcanotectonics”*, Oslo, 4–6 Feb. 2013.

**Galland, O.** and Holohan, E., *The construction/destruction of magmatic and volcanic systems: new insights into magma-tectonic and volcano-tectonic processes in the Earth's crust*, session MPV-06, 33<sup>rd</sup> International Geological Congress, Oslo, 6<sup>th</sup>-14<sup>th</sup> August 2008.

### Invited seminars

I gave a total of 20 invited seminars in prestigious universities, such as University of Oslo, Universidad de Chile (Santiago de Chile), University of Bristol, Université Paul Sabatier (Toulouse), Ecole Normale Supérieure de Lyon, Université Blaise Pascal (Clermont-Ferrand), University of Stockholm, GFZ Potsdam, NGU (Trondheim), University Joseph Fourier (Grenoble), ENS Paris, University of Uppsala, University of Bergen, University of Geneva.

### Administrative and collective responsibilities

- **2014**                      **Review editor** of Frontiers in Volcanology (Open Access Journal)
- **2011 – present**        **Scientific coordinator** of 'Fluid Earth' Group at PGP (20 researchers). **Norwegian member of the steering committee** of the ESF Network MeMoVolc. **Member of EGU committee** for the Outstanding Young Scientists Award.
- **2009 – present**        **Coordinator of External seminars** at PGP.
- **2003 – 2004**            **PhD student representative** in Géosciences Rennes advisory committee (2004 – 2005) and in the "Science de la Matière" Doctoral School advisory committee (2003 – 2004).

### Public outreach

- **The Andean Geotrail**            Scientific bike adventure in the Andean Cordillera of 9 months, sponsored by the International year of the Planet Earth. Web: [www.georouteandine.fr/English](http://www.georouteandine.fr/English). Participation to radio programs in France.
- **Public conferences**            Organisation of 11 public conferences on the Andean Geotrail in France and Norway:
- **Photograph exhibition**        Photograph exhibition of 20 geological pictures taken during the Andean Geotrail expedition. Exhibitions: Bourg-en-Bresse (France, 2010); EGU (Austria, 2013); Oslo Science Library (2014); New Discoveries meeting (Norway, 2014).
- **Newspaper articles**            Publication of outreach articles in the main Norwegian newspaper Aftenposten, equivalent of Le Monde in France.

### Commercial Reports

**Galland, O.**, Planke, S., Leanza, H.A., Field Guide of the geology of the Neuquén Basin, 2013.

**Galland, O.**, de Bremond d'Ars, J., Cobbold, P.R., Hallot, E. and Ruffet, G., 2004, *Mécanismes de mise en place d'intrusions magmatiques en bassin de Neuquén. Etude géologique du volcan Tromen, Neuquén, Argentine, et modélisation expérimentale*, Report for Total Austral, 169 p.

**Galland, O.**, 2004, *Mise en place des intrusions magmatiques dans un bassin sédimentaire. Synthèse bibliographique*, Report for Total Austral, 87 p.

### Others

- **Languages**                      **French** (mother tongue), **English** (proficient), **Spanish** (fluent), **Norwegian** (basics).