

Olivier Galland

Dr. Earth Sciences



PGP

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Nationality: French
Age: 29, single

Academic Background

- **Nov. 2005 – present** **Postdoc.** PGP, University of Oslo.
 - Experimental and numerical modelling of saucer-shaped sill emplacement.
 - Experimental modelling of vent complexes in sedimentary basins.
- **2005** **Assistant researcher.** Géosciences Rennes. Teaching and research activity.
- **2001 – 2004** **PhD student in Earth Sciences**
University of Rennes1
PhD examination: 10th december 2004
Title: “*Mechanical interactions between magmatism and compressional tectonics: field studies and analogue modelling*”
Supervisors: *Jean de Bremond d’Ars, Peter R. Cobbold, Erwan Hallot*
- **2001** **Master’s degree in Earth Sciences (DEA)** *degree earned with honours, rank: 3/15*
University of Rennes1
Title: “*Analogue modelling of magmatic intrusion in a shortening brittle crust*”
Supervisors: *Jean de Bremond d’Ars, Peter R. Cobbold, Erwan Hallot*
- **2001 – 1998** **Magistère des Sciences de la Terre** *degree earned with honours*
Ecole Normale Supérieure de Lyon
Licence de géologie, géophysique et géochimie

Competences & Experience

- **Experimental Modelling**
 - Interactions between magma intrusion and tectonic deformation.** *Full development of a new experimental technique*, Rennes, 2001 – 2005. Collaboration project with *Total Austral* (“Dykes in Neuquén Basin”).
 - Experimental modelling of sill emplacement** in sedimentary basins, and associated doming. *Full development of an experimental setup*, Oslo, 2005-present.
 - Experimental modelling of vent complexes in sedimentary basins.** Simulation of porous fluid flow coupled with a deforming granular media, Oslo, 2007-present.
- **Field Work**
 - Tectonics.** Field study of the deformation in the Neuquén basin, and relations with pore fluid pressure in organic-rich formations.
 - Structural Geology – Tectonics – Petrology.** Structure and age of

deformation of Tromen Volcano, Neuquén, Argentina (3 months). Collaboration project with *Total Austral* (“Dykes in Neuquén Basin”).

Stratigraphy chemostratigraphy, and palaeoclimate. Logging and sampling of Toarcian black shale in the Neuquén basin to date the Toarcian isotopic climatic signal.

Micro tectonics. Acquisition and analysis of fault slip data, Dignes, Southeastern France, July 1999. Supervisors: *T. Dumont* (University of Grenoble1), *J.-C. Hippolyte* (University of Chambéry).

- **Numerical Modelling** **Finite difference – Finite element.** Emplacement of saucer-shaped sills in sedimentary basins, modelling of cooling of magmatic intrusions and associated thermal stresses. Dimensional analysis of physical problems.
- **Geophysics** **Seismology.** Analysis of micro seismicity of Karthala Volcano, Comoro Islands (localisation and application of seismic doublet method), April – August 2001. Supervisor: *P. Bachèlery* (Université de la Réunion).
- **Geochronology** **³⁹Ar – ⁴⁰Ar Method.** Age determination of 50 samples of volcanic rocks (2004). Work done with *Gilles Ruffet*. Collaboration project with *Total Austral* (“Dykes in Neuquén Basin”).

Teaching Experience

- **2007-present** **Supervision of two PhD students.**
C. Galerne: petrology and geochemistry of saucer-shaped sill complexes.
A. Nermoen: modelling of vent complexes in sedimentary basins.
- **2005** **Supervision of a Master student.** Dyke emplacement in extensional tectonics.
- **2002 – present** **Geophysics and Geology,** teaching assistant at University of Rennes (64 h/yr during 3 years)
 - *Practical work at postgraduate level:* Geological mapping, Hydrogeology, Geophysics.
 - *Short Courses at postgraduate level:* 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

- Nermoen, A., **Galland O.**, Fristad, K., Podladchikov, Y. Y., Malthe-Sørenssen, A., Svensen, H., *Experimental modeling of the formation of piercement structures in sedimentary basins*, to be submitted to Journal of Geophysical Research.
- Ferre, E., **Galland, O.**, Kalakay, T., Montanari, D., *Granite emplacement in thrust flats and ramps*, to be submitted to Geology.
- Galerie, C. Y., **Galland, O.**, Neumann, E.-R., Planke, S., *What are the feeders of sills? Insights from field observations, geochemistry and experimental modeling*, submitted to Geology.
- Galland, O.**, Planke, S., Malthe-Sørenssen, A., Neumann, E.-R., *Experimental modelling of shallow magma emplacement: application to saucer-shaped intrusions*, submitted to Earth and Planetary Science Letters.

- Galland, O.**, Cobbold, P. R., Hallot, E., de Bremond d'Ars, J., in press, *Magma-controlled tectonics in compressional settings: insights from geological examples and experimental modelling*, Bollettino Della Società Geologica Italiana.
- Sassier, C., Leloup, P-H, Rubatto, D., **Galland, O.**, Yue, Y, Ding, L., *Measuring local strain rates in ductile shear zones: a new method based on syntectonic dykes deformation*, submitted to Journal of Geophysical Research.
- Polteau, S., Mazzini, A., **Galland, O.**, Planke, S., A. Malthe-Sørenssen, *Saucer-shaped intrusions: occurrences, emplacement and implications*, Earth and Planetary Science Letters, 266, 195-204.
- Galland, O.**, Cobbold, P.R., de Bremond d'Ars, J., Hallot, E., 2007, *Mechanical interactions between compressional tectonics and magmatism: constraints by analogue modelling*, Journal of Geophysical Research, 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*, Earth and Planetary Science Letters, 243, 786-804.
- Galland, O.**, (2004), *Interactions mécaniques entre la tectonique compressive et le magmatisme : expériences analogiques et exemple naturel*, Thèse de doctorat de l'Université de Rennes1, Mémoire de Géosciences n° 116, 423 p., <http://www.geosciences.univ-rennes1.fr/biblio/edition/MGR-Galland.htm>.
- Galland O.**, Hallot E., Cobbold P.R., Ruffet G., de Bremond d'Ars J., *Contemporaneous volcanic activity and compressional deformation at Tromen volcano, Neuquén province, Argentina*, extended abstract, pp. 293-296, ISAG 2005, Barcelona.
- 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, pp. 405-409.

Conferences

Keynotes

- Galland, O.**, Planke, S., Malthe-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.**, 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 Convener

- 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, 33rd International Geological Congress, Oslo, 6th-14th August 2008.

Including these two keynote lectures, I presented about 25 contributions in various international conferences dealing with tectonics, structural geology, volcanology and physical magmatology.

Commercial Reports

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.

Seminars

University of Oslo, December 2004 (English), invitation Anders Malthe-Sørenssen.

Universidad de Chile, Santiago, April 2005 (Spanish).

University of Bristol, June 2005 (English), invitation Steve Sparks.

Université Paul Sabatier, Toulouse, October 2005 (French), invitation Joseph Martinod.

Ecole Normale Supérieure de Lyon, October 2005 (French).

Université Blaise Pascal, Clermont-Ferrand, October 2006 (French).

University of Stockholm, January 2007 (English), invitation George Morris.

GeoForschungsZentrum Potsdam, April 2007 (English), invitation Onno Oncken.

Université de Chambéry, October 2007 (French).

PGP, University of Oslo, several internal seminars (English).

GeoForschungsZentrum Potsdam, May 2008 (English), invitation Onno Oncken.

Others

- **Languages** **French** (mother tongue), **English** (proficient), **Spanish** (fluent but not rigorous), **German** (basics), **Norwegian** (basics).

- **Administrative** PhD student representative on Géosciences Rennes advisory committee (2004 – present); PhD student representative at the “Science de la Matière” Doctoral School committee (2003 – 2004).