

Cécile Prigent - Assistant Professor (MCF), Université Paris Cité / IPGP

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PROFESSIONAL EXPERIENCE

- Since 2020 **Assistant Professor**, IPGP, Université Paris Cité (France)
Position: Maîtresse de Conférences
- 2017-2020 **Postdoctoral Researcher**, Dept. of Geological Sciences, University of Delaware (USA)
Advisor: Jessica Warren
- 2013-2017 **Graduate Research Assistant**, ISTerre, Université Grenoble-Alpes (France), and ISTeP, Université Paris VI (France)
Advisors: Stéphane Guillot, Philippe Agard
- 2013-2016 **Teaching assistant**, Université Grenoble-Alpes

EDUCATION

- 2017 **Ph.D.** in Earth and Environmental Sciences, Grenoble-Alpes University (France)
Thesis: 'Mantle wedge (de)formation during subduction infancy: evidence from the basal part of the Semail (Oman - UAE) ophiolite' - Defended on January 23rd
- 2013 **M.S.** in Earth and Environmental Sciences, University of Grenoble 1
with highest honors, rank 1/16
- 2012 **ENS Lyon diploma**
After a 1-year research project, Monash and Sydney Universities (Australia)
- 2010 **B.S.** in Earth and Universe Sciences, University Lyon 1
with great honors, rank 1/8
- 2009 Admission at the ENS Lyon, as an 'Élève normalien'

PUBLICATIONS

- Wang, Z., Singh, S. C., **Prigent, C.**, Gregory, E. P., and Marjanović, M. (2022). Deep hydration and lithospheric thinning at oceanic transform plate boundaries. *Nature Geoscience*, 1-6, doi:10.1038/s41561-022-01003-3.
- Agard, P., Soret, M., Bonnet, G., Ninkabou, D., Plunder, A., **Prigent, C.**, and Yamato, P. (2022). Subduction and obduction processes: the fate of oceanic lithosphere revealed by blueschists, eclogites and ophiolites. *Compressional Tectonics: Plate Convergence to Mountain Building-Volume 2*.
- Kohli, A.H., Wolfson-Schwehr, M., **Prigent, C.** and Warren, J.M. (2021). Oceanic transform fault seismicity and slip mode influenced by seawater infiltration. *Nature Geoscience*, 14:606-611, doi:10.1038/s41561-021-00778-1.
- Patterson, S.N., Lynn, K.J., **Prigent, C.**, and Warren, J.M. (2021). High temperature hydrothermal alteration and amphibole formation in Gakkel Ridge abyssal peridotites. *Lithos*, 392-393:106107, doi:10.1016/j.lithos.2021.106107.
- Agard, P., **Prigent, C.**, Soret, M., Guillot S., Dubacq, B., and Deldicque, D. (2020). Slabification: Mechanisms controlling subduction development and viscous coupling. *Earth-Science Reviews*, 103259, doi:10.1016/j.earscirev.2020.103259.
- Prigent, C.**, Warren, J.M., Kohli, A.H., and Teyssier, C. (2020). Fracture-mediated deep seawater

- flow and mantle hydration on oceanic transform faults. *Earth and Planetary Science Letters*, 532, doi:10.1016/j.epsl.2019.115988.
- Warren, J.M., Behn, M.D., Fan, W., Morrow, T., **Prigent, C.**, Schwartz, D.M., Andrys, J., Bahruth, M., Gong, J., Lin, K.-Y., Gardner, A.T., Kot, D., Rapa, M., Kelly, B., and A'Hearn, P. (2019). AT42-20 Cruise Report for the 2019-2021 Gofar Transform Fault Earthquake Prediction Experiment, Leg 1: OBS Deployment and Rock Dredging. *WHOI Technical Report*, 2019-12, doi:10.1575/1912/25464.
- Soret, M., Agard, P., Ildefonse, B., Dubacq, B., **Prigent, C.**, and Rosenberg, C. (2019). Deformation mechanisms in mafic amphibolites and granulites: record from the Semail metamorphic sole during subduction infancy. *Solid Earth*, 10(5):1733-1755, doi: 10.5194/se-2019-28.
- Prigent, C.**, Agard, P., Guillot, S., Godard, M., and Dubacq, B. (2018c). Mantle wedge (de)formation during subduction infancy: evidence from the base of the Semail ophiolitic mantle. *Journal of Petrology*, 59(11):2061-2092, doi: 10.1093/petrology/egy090.
- Prigent, C.**, Guillot, S., Agard, P., and Ildefonse, B. (2018b). Fluid-assisted deformation and strain localization in the cooling mantle wedge of a young subduction zone (Semail ophiolite). *Journal of Geophysical Research: Solid Earth*, 123(9):7529-7549, doi: 10.1029/2018JB015492.
- Prigent, C.**, Guillot, S., Agard, P., Lemarchand, D., and Ulrich, M. (2018a). Transfer of subduction fluids into the deforming mantle wedge during nascent subduction: Evidence from trace elements and boron isotopes (Semail ophiolite, Oman). *Earth and Planetary Science Letters*, 484:213-228, doi:10.1016/j.epsl.2017.12.008.
- Rey, P.F., Mondy, L., Duclaux, G., Whitney, D.L., Bocher, M., and **Prigent, C.** (2017). The origin of contractional structures in extensional gneiss domes: REPLY. *Geology*, 45(6):416, doi:10.1130/G39229Y.1.
- Préçigout, J., **Prigent, C.**, Palasse, L., and Pochon, A. (2017). Water pumping in mantle shear zones. *Nature Communications*, 8:15736, doi:10.1038/ncomms15736.
- Rey, P.F., Mondy, L., Duclaux, G., Whitney, D.L., Bocher, M., and **Prigent, C.** (2017). The origin of contractional structures in extensional gneiss domes. *Geology*, 45(3):263-266, doi:10.1130/G38595.1.
- Agard, P., Yamato, P., Soret, M., **Prigent, C.**, Guillot, S., Plunder, A., Dubacq, B., Chauvet, A. and Monié, P. (2016). Plate interface rheological switches during subduction infancy: Control on slab penetration and metamorphic sole formation. *Earth and Planetary Science Letters*, 451:208-220, doi:10.1016/j.epsl.2016.06.054.
- Guillot, S., Schwartz, S., Reynard, B., Agard, P., and **Prigent, C.** (2015). Tectonic significance of serpentinites. *Tectonophysics*, 646:1-19, doi:10.1016/j.tecto.2015.01.020.
- Braun, J., van der Beek, P., Valla, P., Robert, X., Herman, F., Goltzbačj, C., Pedersen, V., Perry, C., Simon-Labric, T., and **Prigent, C.** (2012). Quantifying rates of landscape evolution and tectonic processes by thermochronology and numerical modeling of crustal heat transport using PECUBE. *Tectonophysics*, 524-525:1-28, doi:10.1016/j.tecto.2011.12.035.

FELLOWSHIPS AND RESEARCH FUNDING

Research grants

As Principal Investigator

2023-2027 ANR JCJC "SOFT: Subduction of oceanic fracture zones", 299 289 euros

Other grants

- 2018 Gordon Research Seminar/Conference travel grant for speakers (885 US\$), GRS/GRC Rock Deformation committee
- 2018 Workshop travel grant (600 US\$), InterRidge working group on 'Oceanic Transform Faults'
- 2010 Invited instructor at the GSA/ExxonMobil Annual Field Seminar in the Bighorn Basin (Wyoming, USA), ExxonMobil

Fellowships

- 2013-2016 *ASN (Allocation Spécifique Normalien) doctoral fellowship* (~70,000 US\$), French ministry of Higher Education and Research
- 2009-2013 *Élève normalien scholarship* (~85,000 US\$), French Ministry of Higher Education and Research

TEACHING

Université Paris Cité / IGP (~192h/year since 2020)

Responsible for:

L3 SVT: *Tectonics* [24h/yr] - lectures; since 2021M2 STEP: *Advanced Petrology* [32h/yr] - lectures, labs; since 2021

Lecturing in:

L3 STEP: *Supervised projects in English* [30h/yr] - lectures/labs; since 2020M1 STEP: *From atoms to materials* [16.5h/yr] - lectures, labs; since 2021L1 STEP: *Initiation to statistics* [20h] - labs; 2021L2 STEP: *Informatics: Introduction to Python* [20h] - labs; 2021M1 STEP: *Tectonics* [10h] - lectures/labs; 2020M1/2 GEI: *Supervision of part-time apprentices* [3 students] - 2020**Université Grenoble-Alpes** (~64h/year in 2013-2016)

Lecturing in:

L1 STE: *Introduction to Earth Sciences* [34.5h] - lectures/labs, fieldtrips; 2014, 2015L1 STE: *Tectonics and Sedimentation* [12h] - lab; 2015L1 STE: *External Dynamics of the Earth* [54h] - lectures/labs, fieldtrips; 2014, 2015L2 STE: *Earth's Structure and Materials* [30h] - fieldtrip; 2013, 2015L2 STE: *Earth's Internal Processes* [6h] - lectures/labs; 2015L2 STE: *Paleontology and Structural Geology* [31h] - labs; 2014, 2015L2 STE: *Geological Structures* [20.5h] - lectures/labs, fieldtrips; 2015L3 SVT: *Deep Earth* [6h] - fieldtrip; 2014

ADVISING

PhD students

2022- Louise Mérit, Sorbonne Université (co-advised with P. Agard, B. Dubacq, L. Labrousse and M. Soret)

2022- Gina McGill, Université d'Orléans (co-advised with J. Précigout, L. Airaghi, L. Arbaret and H. Stunitz)

Master students

2018 Melinda Bahruth, University of Delaware (co-advised with J.M. Warren)

2016 Benjamin Lefeuvre, Paris VI University (co-advised with B. Dubacq, M. Soret and P. Agard)

Bachelor students

2019 Raphael Affinito, University of Delaware (co-advised with J.M. Warren)

2018 Sierra N. Patterson, University of Delaware (co-advised with K.J. Lynn and J.M. Warren)

2014 Training of Jokha Al Tanawi, Khalda Al Barwani and Said Al Abri from the Sultan Qaboos University and the German University of Technology in Oman (Muscat, Oman) in the installation and service of seismic stations [3 weeks in total]

SERVICE

At IPGP

- 2022- Scientific manager of the marine rock repository
- 2022- Jury member of the doctoral school STEP'UP
- 2021- Responsible of one of the 4 scientific themes of IPGP "Earth and planetary interiors" with J. Badro

Journal Editor

- 2020- Associate Editor for the Special Issue "*Fluids in the Earth's Lithosphere: from Petrology to Geodynamics*" in *Lithos* (editor-in-chief: S. Angiboust).
- 2020- Associate Editor for the Special Issue "*Mantle Strain localization - how minerals deform at deep plate interfaces?*" in *Minerals*. With J. Précigout and B. Almqvist.

Journal Reviewer

- 2017- Chemical Geology, Earth and Planetary Science Letters, Journal of Geophysical Research: Solid Earth, Journal of Structural Geology, Tectonics, Tectonophysics

Conference/workshop organizer

- 2021 CLEEDI workshop: Collaborative Exploration of Earth's Deep Interior (Foix, 21-28 Aug.), Co-organizer of the workshop with J.A. Olive, M. Marjanovic and C. Le Losq [PI: N. Fuji]
- 2015 ISTERre laboratory (Grenoble), Co-organizer of the annual 2-days PhD Student Scientific Congress

Session Convener

AGU Fall Meeting

- 2018 '*MR23A, MR24A, MR31B: An Integrated Approach for Observations, Experiments, and Models of Earth Deformation (PPEM) I, II, III*' with M. French, C. Thom and K. Kumamoto

Science outreach event organizer

- 2021 Foix and Mazères, Ariège, Co-organization of 2 conference-concert events "A journey into the interiors of the Earth and Mars" with N. Fuji, J.A. Olive, M. Marjanovic, L. Le Pourhiet, M. Bickert, S. Durand.
- 2014 Grenoble-Alpes University, Co-organization of the annual public event 'Les tribulations savantes' (1 day of conferences and educational experiences on Earth Sciences for highschool and undergraduate students, ~ 350 participants)

Other

- 2015 ISTERre laboratory (Grenoble), PhD student representative

FIELD WORK ON LAND AND AT SEA

- 2022 **Newfoundland Ophiolites** [10 days]: Geological mapping, structural geology and sampling
- 2021 **Mayotte**, Indian ocean [2 weeks]: Sediment coring (monitoring mission, MAYOBS19)
- 2019 **Gofar oceanic transform fault**, Pacific ocean [4 weeks]: Bathymetric mapping, dredging and gravity coring of the fault zone, deployment of 51 ocean bottom seismometers
First cruise of the NSF project: "*Capturing 4D Variations in Stress, Slip, and Fault-Zone Material Properties: The 2019-2021 Gofar Transform Fault Earthquake Prediction Experiment*"
- 2018 **Trinity Ophiolite** in California and **Josephine Peridotite** in Oregon [2 weeks]: Structural geology and sampling
- 2015 **Oman Ophiolite** [2 weeks]: 2nd service of the seismic station network
- 2014 **Oman-UAE Ophiolite** [2 weeks]: Geological mapping, structural geology and sampling of the base of the ophiolite (mantle and metamorphic sole) and HP units
- 2014 **Oman Ophiolite** [2 weeks]: 1st service of the seismic station network

- 2013 **Oman Ophiolite** [3 weeks]: Installation of a 40 broadband seismic station network along the ophiolite
- 2013 **Oman-UAE Ophiolite** [2 weeks]: Geological mapping, structural geology and sampling of the metamorphic sole and the ophiolite mantle
- 2011 **Ronda peridotite orogenic massif** in Spain [2 weeks]: Geological mapping, structural geology and sampling of ultramylonitic shear zones

INVITED SEMINARS / KEYNOTE TALKS

- 2021 *CLEEDI workshop keynote talk*. The rheology of the oceanic lithospheric mantle. With M. Bickert.
- 2020 *The Deformation and Tectonics Talk Series (virtual)*. 4D variations in mantle rheology and slip dynamics at plate interface: An integration of geological and geophysical data from oceanic transform faults.
- 2019 *Lamont-Doherty Earth Observatory, Geodynamic Seminar*. Deformation and fluid flow across a warm subduction interface what we learn from the Oman ophiolite.
Ecole Normale Supérieure (ENS) Paris, Geology Department Seminar. Mantle hydration, deformation and seismicity on oceanic transform faults.
- 2018 *Université d'Orléans, ISTO Department Seminar*. Hydratation, déformation et sismicité du manteau le long des failles transformantes océaniques.

CONFERENCE ABSTRACTS († Oral presentation)

- 2021 Bahruth, M., Warren, J., **Prigent, C.**, Schwartz, D., Andrys, A., Lin, K.-Y., Behn, M., Morrow, T., Fan, W., Gong, J., Roland, E., Boettcher, M., McGuire, J., Liu, Y., German, C., and Collins, J. Aseismic movement of Gofar Transform Fault may be aided by formation of hydrous basaltic breccias. *AGU Fall Meeting,*
- Morrow, T., Roland, E., Warren, J., Behn, M., Collins, J., Fan, W., Gong, J., **Prigent, C.**, Schwartz, D., Bahruth, M., Andrys, J., Lin, K.-Y., Boettcher, M., German, C., McGuire, J., and Liu, Y. 4CAST Gofar: New Observations of Structure, Tectonics, Magmatism, and Hydrothermal Activity within the Gofar Transform Fault. *AGU Fall Meeting,*
- Schwartz, D., Andrys, J., Warren, J., Behn, M., Bahruth, M., Lin, K.-Y., **Prigent, C.**, Morrow, T., Schmitz, M., and Boettcher, M. Insights into 3 Ma of Mid-Ocean Ridge Mantle Source Heterogeneity from the Gofar Transform Fault, East Pacific Rise. *AGU Fall Meeting,*
- 2019 †Precigout, J., **Prigent, C.**, Stünitz, H., Palasse, L., Pochon, A., and Villeneuve, J. Water pumping in mantle shear zones: from field observations to experimental evidence. *AGU Fall Meeting, T42A-05*.
- †Agard, P., **Prigent, C.**, Soret, M., Dubacq, B., and Guillot, S. Metamorphic reactions, deformation and fluid migration during early subduction. *AGU Fall Meeting, V51B-01*.
- Kohli, A.H, **Prigent, C.**, Wolfson-Schwehr, M., Boettcher, M.S., and Warren, J.M. Rheological implications of a deep hydrologic cycle on oceanic transform faults. *AGU Fall Meeting, T43H-0417*.
- Affinito, R., **Prigent, C.**, and Warren, J.M. Feedbacks between focused melt and localized deformation in the Josephine Peridotite. *AGU Fall Meeting, AGU Virtual Poster Showcase*.
- †Boettcher, M., Moyer, P., Warren, J.M., **Prigent, C.**, and Kohli, A.H. Integrating Evidence from Peridotite Mylonites and Earthquake Stress Drops to Understand Slip on Oceanic Transform Faults. *TIGER Meeting*.

- †**Prigent, C.**, Warren, J.M., and Kohli, A.H. The effect of fluids on the mechanical and seismic behavior of the ‘ductile’ lithospheric mantle. *EGU General Assembly*, EGU2019-10920-1.
- †**Prigent, C.**, Warren, J.M., Kohli, A.H., Wolfson-Schwehr, M., and Teyssier, C. Evidence for deep seawater percolation and mantle hydration on oceanic transform faults. *EGU General Assembly*, EGU2019-10542-2.
- 2018 Patterson, S.N., Lynn, K.J., **Prigent, C.**, and Warren, J.M. Analysis of hydrothermal alteration in abyssal peridotites from the Gakkel Ridge. *AGU Fall Meeting*, T33G-0508.
- Prigent, C.**, Warren, J.M., and Kohli, A.H. The influence of hydrothermal fluids/mantle interaction processes on oceanic transform fault rheology. *Gordon Research Conference*, Andover, NH.
- †**Prigent, C.**, Warren, J.M., and Kohli, A.H. The influence of hydrothermal fluids/mantle interaction processes on oceanic transform fault rheology. *Gordon Research Seminar*, Andover, NH.
- Prigent, C.**, Warren, J.M., and Kohli, A.H. The influence of hydrothermal fluids/mantle interaction processes on oceanic transform fault rheology. *InterRidge Workshop on Oceanic Transform Faults*, Brest, France.
- Prigent, C.**, Guillot, S., Agard, P., Lemarchand, D., Soret, M., and Ulrich, M. Transfer of subduction fluids and strain localization into the mantle wedge during nascent subduction. *EGU General Assembly*, EGU2018-16628.
- †Agard, P., **Prigent, C.**, Soret, M., Guillot, S., Dubacq, B. How subduction proceeds: Deformation and fluid migration across nascent, warm plate boundaries. *EGU General Assembly*, EGU2018-12958.
- †Soret, M., Agard, P., Ildfonse, B., Dubacq, B., **Prigent, C.**, and Rosenberg, C. Deformation mechanisms of amphibolites at lower crustal conditions during subduction initiation: a metamorphic sole’s viewpoint. *EGU General Assembly*, EGU2018-12382.
- 2017 †**Prigent, C.**, Warren, J.M., Kohli, A.H. and Teyssier, C. The semi-brittle to ductile transition in peridotites on oceanic transform faults: mechanisms and PT conditions. *AGU Fall Meeting*, MR31C-08.
- †Agard, P., **Prigent, C.**, Soret, M., Guillot, S., Dubacq, B. How subduction proceeds: Deformation and fluid migration across nascent, warm plate boundaries. *Goldschmidt Conference*, 26.
- Agard, P., **Prigent, C.**, Soret, M., Guillot, S., Dubacq, B. Interplay between deformation, fluid release and migration across a nascent subduction interface: evidence from Oman-UAE and implications for warm subduction zones. *EGU General Assembly*, EGU2017-10188.
- Soret, M., Agard, P., Dubacq, B., **Prigent, C.**, Plunder, A., Yamato, P., and Guillot, S. Subduction starts by stripping slabs. *EGU General Assembly*, EGU2017-14817.
- †Agard, P., **Prigent, C.**, Soret, M., Guillot, S., Dubacq, B. Deformation, fluid release and migration across a nascent subduction interface: what we learn from the Oman example. *Subduction Interface Processes Conference*, Barcelona, Spain.
- †Soret, M., Agard, P., Dubacq, B., **Prigent, C.**, Plunder, A., Yamato, P., and Guillot, S. Stripping slabs during subduction initiation: transient rheological switches witnessed by metamorphic sole accretion. *Subduction Interface Processes Conference*, Barcelona, Spain.
- 2016 †Agard, P., Yamato, P., Soret, M., **Prigent, C.**, Guillot, S., Plunder, A., Dubacq, B., Chauvet, A., and Monié, P. Subduction in fancy: stripping young slabs as a result of similar crust-mantle rheologies. *EGU General Assembly*, EGU2016-9077.
- 2015 **Prigent, C.**, Guillot, S., Agard, P., Godard, M., Lemarchand, D., and Ulrich, M. Mantle Wedge formation during Subduction Initiation: evidence from the refertilized base of the Oman ophiolitic mantle. *AGU Fall Meeting*, V11D-3089.
- Agard, P., Yamato, P., Soret, M., **Prigent, C.**, Guillot, S., Plunder, A., Dubacq, B., Chauvet, A., and Monié, P. Plate interface rheology, mechanical coupling and accretion during subduction infancy. *AGU Fall Meeting*, T21E-2897.
- Soret, M., Agard, P., Dubacq, B., Plunder, A., Yamato, P., **Prigent, C.**, Hirth, G., and Ildfonse, B. Metamorphic sole formation reveals plate interface rheology during early subduction. *AGU Fall Meeting*, T21E-2895.
- †**Prigent, C.**, Guillot, S., Agard, P., Godard, M., Lemarchand, D., and Ulrich, M. Mantle Wedge formation during Subduction Initiation: evidence from the refertilized base of the Oman ophiolitic mantle. *EGU General Assembly*, EGU2015-9558.

- 2014 Weidle, C., Agard, P., Ducassou, C., El-Hussain, I., **Prigent, C.**, and Meier, T. COOL: Crust of the Oman Ophiolite and its Lithosphere - a passive seismic experiment. *EGU General Assembly*, EGU2014-4997.
- Prigent, C.**, Guillot, S., Agard, P., Godard, M., Dubacq, B., Chauvet, A., Monié, P., and Yamato, P. The basal part of the Oman ophiolitic mantle: a fossil Mantle Wedge? *EGU General Assembly*, EGU2014-10266.
- Préçigout, J., **Prigent, C.**, Palasse, L., and Pochon, A. Phase mixing induced by granular fluid pump during mantle strain localization. *EGU General Assembly*, EGU2014-9805.

SKILLS

- Electron Backscatter Diffraction (EBSD)** – Proficiency using the Aztec EBSD system (Oxford Instruments) to collect point and map data, with assistance at Géosciences Montpellier and as an independant user at University of Delaware. Post-processing using the HKL CHANNEL 5 and MTeX softwares.
- Electron Probe Micro-analyses (EPMA)** – Proficiency using the JEOL JXA-8230 (ISerre, Grenoble) and JEOL JXA-8900 (Univ. of Minnesota) electron microprobes.
- Secondary Ion Mass Spectrometry (SIMS)** – Boron isotopic composition of minerals using the Cameca ims 1280 at Woods Hole Oceanographic Institution. Water concentration in nominally anhydrous minerals using the Cameca ims 7f-GEO at Washington University in St. Louis.
- Laser Ablation Inductively Coupled Mass Spectrometry (LA-ICP-MS)** – Trace element concentration in minerals using laser ablation system (Geolas Q+193 nm Excimer CompEx 102 laser) coupled to a ThermoFinnigan Element 2 XR ICPMS at Géosciences Montpellier.
- Boron chemistry** – Clean room boron extraction and purification from whole rock samples at the Univeristy of Strasbourg.
- Computer coding** – Use of Perple_X software for constructing phase diagrams and pseudosections. Writing and using codes in Matlab and Scilab. Basic skills in Unix commands, fortran and python languages, e.g. numerical modelling using the 3D Underworld, Cascade and Pecube softwares.