Clément Estève

PhD
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Research interest

Geophysics, Seismology, Geodynamics: structure and evolution of the lithosphere and asthenosphere; structure and dynamics of convergent margins; tectonic deformation associated with continent-marine interactions; continental deformation zones; seismicity and seismic hazard; seismic anisotropy; heterogeneity of the upper mantle; mantle dynamics; surface wave tomography; body wave tomography; receiver function analysis; numerical methods; observational seismology and field campaigns.

Employment and Education

September 2022 to August 2026	**Postdoctoral Research Fellow**, University of Vienna, Austria *Supervisor*: Götz Bokelmann
October 2020 to August 2022	**Wares Postdoctoral Research Fellow**, McGill University, Canada *Supervisor*: Yajing Liu
September 2016 to August 2020	**PhD Earth Sciences (Seismology)**, University of Ottawa, Canada *Thesis* : Evolution and dynamics of the lithosphere in western Canada *Supervisor:* Pascal Audet
September 2014 to June 2016	**M.Sc. Earth Dynamics and Natural Hazards**, University of Montpellier, France *Thesis* : Impact of scaling laws on the quantification of maximum magnitude : Key parameter in seismic hazard studies *Supervisors:* Christophe Martin and Kristel Le Dortz
September 2011 to June 2014	**B.Sc. Geology**, University of Montpellier, France

Awards

2021	Jack Henderson Award for best PhD thesis
2020	BMO Financial Group Graduate Bursaries
2019	CGU Solid Earth Section Best Student Presentation Award at IUGG 2019
2019	GSC Geophysical Pioneers Scholarship
2018	Brian Rust Memorial Graduate Scholarship
2018	Travel award – University of Ottawa, Canada
2016 to 2020	International Admission Scholarship – University of Ottawa, Canada

Professional experience

Reviewer activities

2021- Geophysical Research Letters [1], Physics of the Earth and Planetary Interiors [1], Journal of Geophysical Research [2]

Conference chairing and Convening

2022 CGU Session convener: *General Solid Earth Session*

2021 CGU Session convener: *Studying the Earth's lithosphere using seismic imaging*

Seismic Array Deployment and Operation

Summer 2019 *Banks Island Seismic Network (BISN).* Seismic network consisting of 3-component broadband seismic instruments installed on Banks Island, NWT, in the Canadian Arctic over summer 2015 by Andrew J. Schaeffer at the Geological Survey of Canada, Pacific Division, Sidney, BC. I was involved in the servicing and maintenance of these remote sites

2016 to 2018 *Yukon Northwest Seismograph Network (YNSN).* Seismic network consisting of seven 3-component broadband seismic instruments installed in remote regions of the Yukon and Northwest territories by P. Audet at the University of Ottawa. All instruments stream data in real time via Libra satellite communications with several operating purely on solar energy. I was involved in the servicing and maintenance of these remote sites

Internships

January 2016 to July 2016 GEOTER S.A.S FUGRO – *Geologist intern*: Development of seismotectonic models (areas, fault systems) considering uncertainties in the quantification of seismic hazard
Supervisor: Christophe Martin

Apr 2015 to June 2015 GEOTER S.A.S FUGRO – *Geologist intern*: Geological and geotechnical monitoring of well and gallery drillings on the working site of underground Meuse/Haute-Marne Laboratory, France
Supervisor: Philippe Combes

Others

March 2021 to July 2021 Parental leave

Student Co-supervision

2019 *University of Ottawa Undergraduate Research Intern:* Co-supervised (primary P.Audet) and mentored a final year undergraduate student (Y. Wang) carrying out summer research projects at University of Ottawa. I provided instruction in seismological data retrieval and specialized seismological data analysis software, day-to-day supervision and guidance in the analysis and presentation of the results.

Teaching

2016, 2018 *Introduction to Earth Materials*, University of Ottawa: Instructed the laboratory/excursion component of this 1st level course for undergraduate students

	Professor: Simone Dumas
2017 to 2019	*Structural Geology and Tectonics*, University of Ottawa: Instructed the laboratory component of this 2nd level course for undergraduate students *Professor*: Pascal Audet
Fall 2019	*Géophysique appliquée*, University of Ottawa: Instructed the Laboratory/excursion component of this 3rd level course for undergraduate students *Professor*: Maurice Lamontagne

Publications

In preparation

i. Schutt, D., Porritt, R., **Estève, C.,** Schaeffer, A.J., Gosselin, J.M., Aster, R.C., Audet, P., Freymueller, J.T., and Cubley, J.F., Large lithospheric velocity variations across the northern Canadian Cordillera imaged by ambient noise tomography, (*submitted, Journal of Geophysical Research: Solid Earth*).

ii. Gosselin, J.M, Audet, P., Schaeffer, A.J., and **Estève, C.**, Circular statistics in Bayesian inversion for two-station phase-velocity dispersion estimation, (*submitted, Geophysical Journal International*).

iii. Liddell, M., Boyce, A., Pugh, S., Brown, J., McMurchie, E., Parsons, A., **Estève, C.,** Burdick, S., Darbyshire, F., Cottaar, S., Bastow, I., Schaeffer, A.J., Audet, P., Schutt, D., and Aster, R.C., The Mantle Seismic Structure below Canada and Alaska Constrained by a New Absolute P-wavespeed Tomographic Model, (*in preparation, Earth Planetary and Science Letters*).

Published

9. **Estève, C.,** Liu, Y., Koulakov, I., Schaeffer, A.J, and Audet, P., Seismic evidence for crustal thickening controlling aseismic deformation at the Beaufort Sea continental margin, *Geophysical Research Letters*, 49, e2022GL100158, https://doi.org/10.1029/2022GL100158.

8. Bolton, A.R., Schutt, D. L., Aster, R.C., Audet, P., Schaeffer, A.J., **Estève C.,** Freymueller, J.T., and Cubley, J.K., 2021, Evidence for asthenospheric flow rotation in northwest Canada: insights from shear wave splitting, *Geophysical Journal International*, ggab396, https://doi.org/10.1093/gji/ggab396.

7. **Estève C.,** Gosselin, J.M., Audet, P., Schaeffer, A.J., Schutt, D., and Aster, R.C., 2021, Surface-wave tomography of the northern Canadian Cordillera using earthquake Rayleigh-wave group velocity measurements, *Journal of Geophysical Research: Solid Earth*, v. 126, p, 1– 22, https://doi.org/10.1029/2021JB021960.

6. Gosselin, J.M., Audet, P., Schaeffer, A.J., Darbyshire, F.A., and **Estève, C.,** 2020, Azimuthal anisotropy in Bayesian surface-wave tomography: application to northern Cascadia and Haida Gwaii, *Geophysical Journal International*, v. 224(3), p. 1724 – 174, https://doi.org/10.1093/gji/ggaa561.

5. Audet, P., Schutt, D.L., Schaeffer, A.J., **Estève, C.,** Aster, R.C., and Cubley J.F., 2020, Moho variations across the northern Canadian Cordillera, *Seismological Research Letters*, v. 91(6), p. 3076 – 3085, https://doi.org/10.1785/0220200166.

4. **Estève, C.,** Audet, P., Schaeffer, A.J., Schutt, D., Aster, R.C., Cubley, J., 2020, Seismic evidence for craton chiseling and displacement of lithospheric mantle by the Tintina Fault in the Northern Canadian Cordillera, *Geology*, v. 48(11), p. 1120 – 1125, https://doi.org/10.1130/G47688.1.

3. **Estève, C.,** Audet, P., Schaeffer, A.J., Schutt, D., Aster, R.C., Cubley, J., 2020, The upper mantle structure of northwestern Canada from teleseismic body wave tomography, *Journal of Geophysical Research: Solid Earth*, v. 125, p. 1–18, https://doi.org/10.1029/2019JB018837.

2. Gosselin, J. M., Audet, P., **Estève, C.,** McLellan, M., Mosher, S.G., Schaeffer, A.J., 2020, Seismic evidence for megathrust fault-valve behavior during episodic tremor and slip*, Science Advances*, v.6, 4, p. 1–6, https://doi.org/10.1126/sciadv.aay5174.

1. **Estève, C.,** Schaeffer, A.J., Audet, P., 2019, Upper mantle structure underlying the diamondiferous Slave craton from teleseismic body-wave tomography, *Tectonophysics*, v. 757, p. 187–202, https://doi.org/10.1016/j.tecto.2019.01.012

Selected Conference Presentations

Oral presentation unless otherwise indicated. Complete list provided upon request.

Audet, P., Schaeffer, A.J., **Estève, C.**, Schutt, D., Aster, R.C., Cubley, J., Constraints on crust and upper mantle structure of the northern Canadian Cordillera from a compilation of recent broadband seismic studies, *AGU Fall Meeting*, New Orleans, USA. December 2021.

Liddell, M., Boyce, A., Pugh, S., Brown, J., McMurchie, E., Parsons, A., **Estève, C.,** Burdick, S., Darbyshire, F., Cottaar, S., Bastow, I., Schaeffer, A.J., Audet, P., Schutt, D., and Aster, R.C., The Mantle Seismic Structure below Canada and Alaska Constrained by a New Absolute P-wavespeed Tomographic Model, *AGU Fall Meeting*. New Orleans, USA. December 2021 (Poster).

Schutt, D., Porritt, R., **Estève, C.,** Schaeffer, A.J., Gosselin, J.M., Aster, R.C., Audet, P., Freymueller, J.T., and Cubley, J.F., Large lithospheric velocity variations across the northern Canadian Cordillera imaged by ambient noise tomography, *AGU Fall Meeting*. New Orleans, USA. December 2021 (Poster).

Estève C., Evolution and dynamics of the lithosphere in northwestern Canada using seismic data, *Canadian Tectonic Group seminars*, October 2021 *(invited talk)*.

Estève C., and Audet P., Structure and evolution of the lithosphere in northwestern Canada, Part 2: Upper mantle structure, *Alaska Earthscope and Beyond Seminars*, March 2021 *(invited talk)*.

Estève C., and Audet P., Evolution and dynamics of the lithosphere in northwestern Canada using seismic data, *Earth and Planetary science seminar*, January 2021 *(invited talk)*.

Estève C., Gosselin, J.M., Audet P., Schaeffer, A.J., Schutt, D., and Aster, R.C., Surface-wave tomography of the northern Canadian Cordillera using earthquake Rayleigh-wave group velocity measurements, *AGU Fall Meeting (virtual meeting)*, December 2020.

Schaeffer, A.J., Cairns, S., **Estève C.,** and others, Tectonics of the Beaufort Sea margin, western Canadian Arctic and Northern Canadian Cordillera, *AGU Fall Meeting (virtual meeting)*, December 2020.

Estève, C., Audet, P., Schaeffer, A.J., Schutt, D., Aster, R.C., Cubley, J., Seismic evidence for craton chiseling and displacement of lithospheric mantle by the Tintina Fault in the Northern Canadian Cordillera, *AGU Fall Meeting*, San Francisco, USA. December 2019.

Gosselin, J. M., Audet, P., **Estève, C.,** McLellan, M., Mosher, S.G., Schaeffer, A.J., Seismic evidence for megathrust fault-valve behavior during episodic tremor and slip, *AGU Fall Meeting*, San Francisco, USA. December 2019.

Estève, C., Audet, P., Schaeffer, A.J., Schutt, D., Aster, R., Freymueller, J., Cubley, J., New images of the upper mantle structure beneath northwestern Canada from teleseismic P- and S-wave tomography, *IUGG 2019*, Montreal, Canada. July 2019 (*Winner Best Student Presentation*).

Estève, C., Schaeffer, A.J., Audet, P., Upper mantle structure underlying the diamondiferous Slave craton from teleseismic body-wave tomography, *Ottawa Carleton Student Northern Research Symposium*, Ottawa, Canada. March 2019.

Estève C., Schaeffer A.J., Audet P., Murray-Bergquist L., Cairns S., Elliott B., Falck H. and Snyder D. A., Preliminary teleseismic investigation of the crust and mantle lithosphere obtained from BISN in the western Canadian Arctic. *CGU* Vancouver, Canada. June 2017 (Poster).

References

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