



Postdoctoral Research Position in Tectonic Modeling at ENS Paris

The [Laboratoire de Géologie](#) at [Ecole Normale Supérieure](#) is inviting applications for a 19-month postdoctoral position in the field of **tectonic modeling**, funded by the French [National Research Agency](#).

Off-fault deformation between and during large earthquakes appears primarily elastic, and thus reversible¹. Yet, a growing body of observations suggests that inelastic strain accumulates over hundreds of seismic cycles, and contributes to shaping the morphology of active margins²⁻⁵. This project seeks to model the accumulation of non-recoverable deformation in Earth's upper crust, one seismic cycle at a time. This will involve designing 2-D finite-element simulations in which a fault experiences cycles of locking and unlocking that load and unload the surrounding blocks, resulting in material fatigue⁶. The simulation results will be compared to a wide range of geodetic, geomorphological and geological observations to better understand how seismic cycles may leave a permanent footprint in tectonic landscapes.

The successful applicant will join a vibrant, welcoming and collaborative department located in the center of Paris, with world-class expertise in geodynamics, geodesy, and rock mechanics. A PhD is required by the start date. A background in computational geodynamics, seismology or solid mechanics is preferable.

Start date: between June 1st and October 31st, 2023.

How to apply: please email your application to [Jean-Arthur Olive \(olive@geologie.ens.fr\)](mailto:olive@geologie.ens.fr).

Application should include:

- CV including list of publications
- Brief cover letter on the applicant's research background and interests
- Contact information for at least one reference

Potential candidates should feel free to [reach out](#) ahead of sending their application materials if they have any question.

References:

- 1 - Savage, J.C., 1983, A Dislocation Model of Strain Accumulation and Release at a Subduction Zone: *Journal of Geophysical Research-Solid Earth and Planets*, v. 88, p. 4984–4996.
- 2 - Saillard, M., Audin, L., Rousset, B., Avouac, J.-P., Chlieh, M., Hall, S.R., Husson, L., and Farber, D.L., 2017, From the seismic cycle to long-term deformation: linking seismic coupling and Quaternary coastal geomorphology along the Andean megathrust: *Tectonics*, v. 36, p. 241–256.
- 3 - Malatesta, L., Bruhat, L., Finnegan, N. J., and Olive, J.-A., 2021, Co-location of the downdip end of seismic locking and the continental shelf break: *J. Geophys. Res.*, v. 126.
- 4 - Jolivet, R., Simons, M., Duputel, Z., Olive, J.-A., Bhat, H.S., and Bletery, Q., 2020, Interseismic loading of subduction megathrust drives long term uplift in northern Chile: *Geophys. Res. Lett.*, v. 47.
- 5 - Madella, A., Ehlers, T.A., 2021, Contribution of background seismicity to forearc uplift: *Nature Geoscience*, doi:10.1038/s41561-021-00779-0.
- 6 - Ashby, M. F., and Sammis, C. G., 1990, The damage mechanics of brittle solids in compression: *Pure Appl. Geophys.*, v. 133, p. 489–521.