

## Curriculum Vitae

### Research positions

**October 2022 - October 2025:** Postdoctoral fellow in the Earth Surface and Interior team at the NASA Jet Propulsion Laboratory (JPL). Co-investigator of a project within the NASA Surface Topography and Vegetation incubator. The objective of the post-doctoral fellowship is to estimate the topographic data requirements for measuring surface deformation associated with active faults. Supervisor: Zhen Liu.

**December 2021 - June 2022:** Postdoctoral fellow in the Tectonics and Mechanics of the Lithosphere team at the Institut de Physique du Globe de Paris (IPGP). Supervisor: Yann Klinger.

### Education

**September 2018 - December 2021:** PhD thesis from the University of Paris Cité, mention Earth and Environmental Sciences, entitled "Measurement of surface deformation associated with large continental earthquakes by high-resolution optical satellite image correlation method. Application to the Baluchistan (Pakistan, 2013) and Ridgecrest (California, 2019) earthquakes". Thesis performed in the Tectonics and Mechanics of the Lithosphere team of IPGP, under the supervision of Yann Klinger.

**2016 - 2019:** Master's degree in Geoscience from the École Normale Supérieure (ENS) Paris. This diploma includes a Master's degree in Geosciences, specializing in natural hazards (M2 completed at IPGP), as well as 74 additional ECTS (equivalent to one year of university studies) in geosciences, languages (English, Spanish) and geopolitics of the environment, risks and natural disasters.

**2016 - 2018:** Master's degree in Geophysics, specialization in natural telluric hazards, IPGP. This master includes two research internships of five months each:

- M2 internship at IPGP, supervised by Yann Klinger: correlation of high-resolution satellite images for the measurement of the surface displacement associated with the Baluchistan earthquake (Pakistan, 2013, Mw7.7)
- M1 internship at the Earth Observatory of Singapore (EOS), supervised by Sylvain Barbot (now at the University of Southern California, USC): numerical modeling of the seismic cycle of the Gorkha segment of the Main Himalayan Thrust (MHT)

**2013 - 2016:** Bachelor's degree in Geology from the University of Lille 1 Sciences et Technologies. The Bachelor includes three research internships for a total of 5 months:

- L3 internship at the Magmas and Volcanoes Laboratory (LMV, Clermont-Ferrand)
- Optional internship (in L3) at the Centre Clermontois de recherche pour le Volcanisme (ClerVolc, publication of the internship work with J.-C. Thouret in Earth-Science Reviews)
- Optional internship (in L2) at the Laboratory of Oceanology and Geosciences (LOG, Lille)

**2013:** Scientific baccalaureate, specialty in Life and Earth Sciences, European English option. Louis Thuillier high-school, Amiens.

### Teaching

**2018-2021:** Teaching cartography and sedimentary petrology, and supervising field courses in Geology for bachelor students of the Université de Paris Cité (64 hours per year). In addition, once a year, I lead a 4-hours lab on photogrammetry and image correlation methods for IPGP Master students.

### Publications

**Antoine, S. L.** et al., 2021. Diffuse deformation and surface faulting distribution from submetric image correlation along the 2019 Ridgecrest, California, ruptures. *Bulletin of the Seismological Society of America*; 111 (5): 2275–2302. doi: <https://doi.org/10.1785/0120210036>.

Jara, J., Bruhat, L., Thomas, M. Y., **Antoine, S. L.** et al., 2021. Signature of transition to supershear rupture speed in coseismic off-fault damage zone. *Proceedings of the Royal Society A*, 477: 20210364. <https://doi.org/10.1098/rspa.2021.0364>.

Thouret, J.-C., **Antoine, S. L.**, et al., 2019. Lahars and debris flows: Characteristics and impacts. *Earth-Science Reviews*. 201 (103003):1-42. doi: <https://doi.org/10.1016/j.earscirev.2019.103003>.

**Antoine, S. L.** et al., Off-fault deformation in regions of complex fault geometries: the 2013, Mw7.7, Baluchistan rupture (Pakistan). *Accepted at Journal of Geophysical Research: Solid Earth*.

Visage, S., Souloumiac, P., Cubas, N., Maillot, B., **Antoine, S. L.** et al., Evolution of off-fault deformation of strike-slip fault in a sand-box experiment. *In revision at Tectonophysics*.

Benjelloun, Y., Klinger, Y., Bollinger, L., Landgraff, A., Choi, J.-H., Cheon, Y., Forman, S., **Antoine, S. L.**, et al. Repeatability of the 20<sup>th</sup> Century Earthquake cluster in Mongolia: Paleoseismology along the Tsetserleg Fault (Mongolia). *Submitted to JGR: Solid Earth*.

**Antoine, S. L.** et al., Surface diffuse deformation in regions of coseismic shallow slip deficit. *In preparation*.

### **Awards and Fellowships**

**2022:** NASA Decadal Study Incubator Program (2021) to accelerate the preparation of high priority surface topography and vegetation observables. Project Title: "Assessing the Sensitivity and Measurement Needs of Surface Topography Towards the Study of Earthquake and Fault Creep Processes". Principal Investigator: Zhen Liu (JPL), co-investigator: Solene L. Antoine. Funded over 3 years.

**2020:** AGU 2020 Outstanding Student Poster Award (OSPA) in the session "Modeling and Imaging complex Earthquake Ruptures" (presentation video: <https://www.youtube.com/watch?v=1O-r8qyybFE>).

**2018:** Thesis grant from the French Ministry of Research and Higher Education to carry out three years of research in the Tectonics and Mechanics of the Lithosphere team of IGP, under the supervision of Yann Klinger.

### **Conferences, workshops, and summer-schools**

**2022:** American Geophysical Union (AGU), Chicago, United States of America (USA) - invited oral presentation, and poster

Workshop Failles Actives, Paris, France - poster

European Geosciences Union (EGU), Vienna, Austria - oral presentation

Clouds2022 Summer School (Point clouds and change detection in geoscience), Rennes, France, 4 days - theoretical courses on LiDAR (Light Detection And Ranging) data processing, practical work, and lectures

**2021:** AGU, online - invited poster, and oral presentation

**2020:** AGU, online - oral presentation that received the OSPA (Outstanding Student Presentation Award)

**2019:** EGU, Vienna, Austria - poster

Workshop Fault2SHA (from observations on faults to seismic hazard assessment), Barcelona, Spain, oral presentation

Workshop RESIF (Réseau Sismologique et Géodésique Français), Montpellier, France

### **Technical expertise**

High resolution optical image correlation (MicMac, COSI-Corr, Ames Stereo Pipeline)

ENVI image analysis software (L3 Harris)

Numerical modeling and inversion methods (MATLAB, Python, Fortran, Bash)

LiDAR data processing

Field geology, drone operation and stereo image capture (Mongolia experience, 2019)

Mapping and drawing tools (QGIS, Canvas X)

Petrology and geochemistry (undergraduate internship)

### **Other skills**

Native French

Fluent English

Basic Spanish

Competitive sports since high school: horseback riding and volleyball

Car driving license (2016)