

SYLVAIN MICHEL

Curriculum Vitae

CONTACT INFORMATION

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Date of birth: 24/03/1987
Lyon - FRANCE
Nationality: French
Language: French (mother tongue) /
English (fluent) / Academic German (A2)

EDUCATION / POSITION

Since 2024 Nov	<u>Postdoctoral researcher</u> University of Côte d'Azur / Géoazur Funded by Chaire IDEX Université Côte d'Azur and European Research Council (ERC; 2025-Present).	Sophia-Antipolis – FRANCE
2023 Sep to 2024 Oct	Institut de Radioprotection et de Sûreté Nucléaire (IRSN) Funded by ANR	Fontenay-aux-Roses FRANCE
2018 Sep to 2023 Aug	Ecole Normale Supérieure (ENS) Funded by European Research Council (ERC; 2020-2023), Centre National d'Etudes Spatiales (CNES; 2018-2020), and co-funded by <u>Commissariat à l'Energie Atomique et aux énergies alternatives</u> (CEA) in 2021-2022.	Paris – FRANCE
2015 Jan to 2018 Mai	<u>Ph.D.</u> University of Cambridge – Main affiliation (Diploma) California Institute of Technology (Caltech) – Visitor	Cambridge – UK Pasadena – USA
2014 Oct to 2014 Dec	<u>Internship</u> California Institute of Technology (Caltech)	Pasadena – USA
2012 Jan to 2013 May	<u>Professional Experience:</u> Exploration Geologist Geologist in BM Geological Services Pty. Ltd.	Kalgoorlie – AUSTRALIA
2007 Sep to 2011 Sep	<u>Double Master Degree in Geophysics/Geology</u> Ecole et Observatoire des Sciences de la Terre (EOST) Ecole Nationale Supérieure de Géologie (ENSG)	Strasbourg – FRANCE Nancy – FRANCE

ACADEMIC EXPERIENCE

Since 2024 Nov	University of Côte d'Azur / Géoazur <u>Postdoctoral main project</u> : ♦ Analysis of very low frequency signals recorded by Distributed Acoustic Sensing (DAS). Main Collaborator: D. Rivet ♦ Spatio-temporal probabilistic evaluation of the seismogenic potential of Chile's subduction zone based on fracture mechanics and energy budget. Main Collaborator: J.-P. Ampuero	Sophia-Antipolis – FRANCE
2023 Sep to 2024 Oct	Institut de Radioprotection et de Sûreté Nucléaire (IRSN) <u>Postdoctoral main project</u> : ♦ Evaluation of the probability of an earthquake to pass through geometrical complexities of faults using seismic cycle simulations. Main Collaborators: O. Scotti, S. Hok and H. Bhat	Fontenay-aux-Roses FRANCE

2018 Sep
to Present

Ecole Normale Supérieure (ENS)

Paris – FRANCE

Postdoctoral main projects :

- ♦ Integration of earthquake physics into probabilistic evaluation of the seismogenic potential of faults applied to the Himalayan arc, northern Chile and upper Rhine graben (in collaboration with CEA).

Main Collaborators: R. Jolivet, C. Rollins, C. Duverger, L. Bollinger

- ♦ Spatio-temporal evolution of seismic and aseismic slip on the Parkfield segment of the San Andreas Fault (US) from geodetic and seismological data.

Main Collaborators: R. Jolivet, O. Lengliné

- ♦ Detection and statistics of slow slip events of the Hikurangi subduction zone (New Zealand) from geodetic data.

Main Collaborators: R. Jolivet, E. Klein

2015 Jan
to 2018 Mai

**University of Cambridge &
California Institute of Technology (Caltech)**

Cambridge – UK
Pasadena – USA

Supervisor: Jean-Philippe Avouac

Ph.D. main projects :

- ♦ Detection and statistics of slow slip events in Cascadia (US, Canada) from geodetic data.

Main Collaborators: J.-P. Avouac, A. Gualandi

- ♦ Seismic hazard assessment on to the Parkfield Segment of the San Andreas.

Main Collaborators: J.-P. Avouac, R. Jolivet

- ♦ Partial and full rupture dynamics using numerical modelling of the seismic cycle - a comparison with the 2015 Gorkha earthquake.

Main Collaborators: J.-P. Avouac, N. Lapusta

- ♦ Comparing dune migration from remote sensing with sand flux prediction based on weather data and model – a test case in Qatar. Included field work in Qatar (photogrammetry from UAV images)

Main Collaborators: J.-P. Avouac, F. Ayoub

2014 Oct
to 2014 Dec

California Institute of Technology (Caltech)

Pasadena – USA

Intern geophysicist project (3 months internship):

- ♦ Dune tracking in Oman from optical satellite images

Main Collaborators: J.-P. Avouac, F. Ayoub

2009 Jul
to 2009 Dec

Institut des Sciences de la Terre (ISTerre)

Grenoble – FRANCE

Intern geophysicist project (6 months internship):

- ♦ Could land subsidence be used as a proxy to site effect?

Ambient noise field work and data processing (3 weeks)

Main Collaborators: C. Cornou, E. Pathier

Beyrouth – LEBANON

2008 Jul
to 2008 Aug

Observatoire Volcanologique du Piton de la Fournaise

La Réunion – French
island in the Indian
Ocean – FRANCE

Intern geophysicist project (2 months internship):

- ♦ Field work - GPS and seismometer installation.

Main Collaborator: T. Staudacher

TEACHING EXPERIENCE

	Ecole Normale Supérieure (ENS)	Paris – FRANCE
2022 to 2025	Teaching (16h lecture M1 and M2 level) Course: A world of earthquakes	
2022	Co-supervision of Ph.D. students ♦ Seismogenic Potential of the Xianshuihe-Xiaojiang Fault System in Eastern Tibet ♦ Characterization of permafrost using InSAR data	
2020 Jun to 2020 Jul	Intern supervision (2 months L3 level) Research project: Slow slip event detection in Greece	
2023 & 2024	Corrector for ENS written entrance exams (BCPST section)	
2020 & 2023	M2 internship reporter (ENS & ITeP)	
	California Institute of Technology (Caltech)	Pasadena – USA
2017 Jul to 2017 Aug	Summer student supervision (2 months) Research project: Dune Migration in Saudi Arabia imaged from satellite image correlation	
2017 Jan to 2017 Mar	Teaching assistant (3h lecture + 20h practical work) Ge106: Introduction to Structural Geology	
2016 Jul to 2016 Aug	Summer student supervision (2 months) Research project: Dynamic modelling of rupture	

FIELD WORK

2019	Turkey : GNSS network installation
2016	Qatar : Photogrammetry of dunes based on UAV images
2015	Nepal : Seismometer data retrieval after the 2015 M7.8 earthquake
2012 - 2013	Western Australia : Drilling supervision
2011	French Guyana : Exploration and exploitation of a gold mine
2009	Lebanon : Resonance frequency evaluation from ambient noise data
2008	La Réunion : GNSS and seismometer installation

PROFESSIONNAL EXPERIENCE

2012 Jan to 2013 May	Geologist in BM Geological Services Pty. Ltd. Exploration Geologist. Gold and magnetite deposits exploration. Diamond/RC/AC drilling supervision	Kalgoorlie – AUSTRALIA
2011 Apr to 2011 Sep	Auplata Intern Geologist (5 months internship). Gold deposit exploration and exploitation in equatorial area.	Maripasoula – FRENCH GUIANA

FUNDING

- ♦ CNES post-doctoral fellowship (2 years ; 2018-2020)
- ♦ FLATSIM project on the Dead sea fault

SEMINARS and COLLECTIVE RESPONSABILITIES

Since 2015	Conferences (35 talks / 13 posters) AGU / EGU / ECS / SCEC / RST / MDIS / Cargèse / Journée Failles Actives / Earthquake Physics and Applications of Machine Learning to Tectonic Faulting / Slow Faults / FRENZ / Journées FLATSIM Invited Talks at AGU and ECS Seminars IRSN / ISTerre / GeoAzur / ITES / ENS / IPGP / ISTeP / ETH / GFZ / Utrecht / Cambridge	
Since 2022	Scientific leader of FLATSIM project on the Dead sea fault Systematic processing by CNES of interferograms from Sentinel-1 data, as well as displacement time series, over large geographic areas.	
2023-2024	Corrector for ENS entrance exam for BCPST section	
2022	Workshop co-organizer <i>Journée Failles Actives</i> at l'ISTeP	Paris – FRANCE
Since 2018	Reviewer for <i>Journal of Geophysical Research</i> , <i>Geophysical Research Letters</i> , <i>Seismological Research Letters</i> , and <i>Earth and Planetary Science Letters</i>	
Since 2019	Convener EGU since 2020 / Congrès des Doctorants 2019	
2010 - 2011	Géol'Explo Mines Assistant treasurer	Nancy – FRANCE
2008 - 2009	Strasbourg University Geophysical Society (SUGS) Vice-president	Strasbourg – FRANCE
2007 - 2008	In charge of internal communication	

OUTREACH

- ♦ Interview for *L'Humanité-Dimanche*
- ♦ Press release: *Studying small earthquakes to better understand large ones* (ENS / École Polytechnique / Caltech)

PUBLICATIONS

SUMMARY

15 articles + 1 book chapter (11 first author / 10 without PhD supervisor) + 4 articles in review

h-index : 10 (google scholar)

Journals: Nature, BSSA, JGR, GRL, NHESS, EPSL, PAGEoph, Science Advances, Nature Communications

PUBLISHED (* without PhD supervisor)

Silverii, F., E. Klein, R. Devoti, W. Szeliga, **S. Michel**, A. Gualandi, E. Trasatti, Asymmetric positioning errors in GNSS time series: a study from different world regions (Accepted) *

Chen, K., J. Wang, **S. Michel**, L. Dal Zilio, H. Zhu, L. Xia, J. Xie, and S. Hu (2025), Secondary acceleration of slip fronts driven by slow slip event coalescence in subduction zones, *Nature Communications*, <https://doi.org/10.1038/s41467-025-64616-3> *

Michel, S., R. Jolivet, E. Klein, and L. Maubant (2025), 14 Years of Slip on the Hikurangi Subduction Zone, *Journal of Geophysical Research: Solid Earth*, <https://doi.org/10.1029/2024JB030865> *

Michel, S., C. Duverger, L. Bollinger, R. Jolivet, and J. Jara (2024), Update of the seismogenic potential of the upper Rhine graben southern region, *Natural Hazards and Earth System Sciences*, <https://doi.org/10.5194/nhess-24-163-2024> *

Michel, S., R. Jolivet, J. Jara and C. Rollins, Seismogenic potential of the subduction zone in northern Chile (2023), *Bulletin of the Seismological Society of America*, <https://doi.org/10.1785/0120220142> *

Michel, S., V. Stevens, L. Dal Zilio and R. Jolivet (2023), Seismic Coupling and Hazard: From Geodetic and Seismological Data to Seismic Hazard Assessment of the Himalaya. Chapter in *Himalaya, dynamics of a giant*, <https://doi.org/10.1002/9781394228683.ch6> *

Michel, S., R. Jolivet, O. Lengliné, A. Gualandi, S. Larochelle and B. Gardonio (2022), Searching for Transient Slow Slips along the San Andreas Fault near Parkfield using Independent Component Analysis, *Journal of Geophysical Research: Solid Earth*, <https://doi.org/10.1029/2021JB023201> *

Michel, S., R. Jolivet, C. Rollins, J. Jara, and L. Dal Zilio (2021). Seismogenic potential of the Main Himalayan Thrust constrained by coupling segmentation and earthquake scaling. *Geophys. Res. Lett.*, <https://doi.org/10.1029/2021GL093106> *

Dalaison, M., R. Jolivet, E. van Rijnsingen and **S. Michel** (2021). The interplay between seismic and aseismic slip along the Chaman fault illuminated by InSAR, *Journal of Geophysical Research: Solid Earth*, <https://doi.org/10.1029/2021JB021935> *

Gualandi, A., J. P. Avouac, **S. Michel** and D. Faranda (2020). The Predictable Chaos of Slow Earthquakes. *Science Advances*, 6(27), <https://doi.org/10.1126/sciadv.aaz5548>

Michel, S., A. Gualandi and J.-P. Avouac (2019), Similar scaling laws for earthquakes and Cascadia slow-slip events, *Nature*, 574(7779), <https://doi.org/10.1038/s41586-019-1673-6>

Michel, S., A. Gualandi and J.-P. Avouac (2019), Interseismic coupling and slow slip events on the Cascadia megathrust, *Pure and Applied Geophysics*, 176(9), <https://doi.org/10.1007/s00024-018-1991-x>

Michel, S., J.-P. Avouac, F. Ayoub, R.C. Ewing, N. Vriend and E. Heggy (2018), Comparing dune migration measured from remote sensing with sand flux prediction based on weather data and model, a test case in Qatar, *Earth and Planetary Science Letters*, 497, <https://doi.org/10.1016/j.epsl.2018.05.037>

Yue H., Z.E. Ross, C. Liang, **S. Michel**, H. Fattahi, E. Fielding, A. Moore, Z. Liu and B. Jia (2018), The 2016 Kumamoto $M_w = 7.0$ earthquake: A significant event in a fault–volcano system, *Journal of Geophysical Research: Solid Earth*, 122, <https://doi.org/10.1002/2017JB014525> *

Michel, S., J.-P. Avouac, R. Jolivet, and L. Wang (2017), Seismic and Aseismic Moment Budget and Implication for the Seismic Potential of the Parkfield Segment of the San Andreas Fault, *Bulletin of the Seismological Society of America*, <https://doi.org/10.1785/0120160290>

Michel, S., J.-P. Avouac, N. Lapusta, and J. Jiang (2017), Pulse-like partial ruptures and high-frequency radiation at creeping-locked transition during megathrust earthquakes, *Geophys. Res. Lett.*, 44, <https://doi.org/10.1002/2017GL074725>

Michel, S., O. Scotti, S. Hok, H. Bhat, N. Kheirdast, P. Romanet, M. Almakari, J. Cheng, Probability of earthquake fault jumps from a new physics based criterion in the rate-and-state friction framework (Minor revision) *

Michel, S., D. Molina, J. P. Ampuero, R. Jolivet, and A. Tassara, Time-dependent forecast of large earthquakes through a physics-informed probabilistic approach (Major revision) *

Lu, Z., L. Wang, **S. Michel**, Y. Li, V. L. Stevens, The Seismogenic Potential of the Xianshuihe-Xiaojiang Fault System, Eastern Tibet (Moderate revision) *

Maubant, L., L. M. Wallace, C. A. Williams, **S. Michel**, E. Klein, W. B. Frank, Geodetic resolution of the interplay between earthquakes and slow slip in the Hikurangi margin (Major revision) *

Oryan, B., A. Gabriel, ... , **S. Michel**, ..., The Coupling Cloud: A community database of megathrust kinematic coupling models (In Prep.) *