Pietro Sternai, Ph.D.

Born 19/09/1984, Milan, Italy

Department of Earth and Environmental Sciences - DISAT,
University of Milano-Bicocca
Piazza della Scienza 4, I-20126 Milano, Italy
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EDUCATION

· **Swiss Federal Institute of Technology Zürich (ETH-Zürich),**
Ph.D. in Geology 9.2008-7.2012

· **State University of Milan, Institute of Earth Sciences, Italy**
Master Science degree in Geology and Geophysics *(cum laude)* 9.2006-7.2008

· **University Paris VI and École Normale Supérieure, Paris, France**
Erasmus exchange 9.2007-2.2008

· **State University of Milan, Institute of Earth Sciences, Italy**
Bachelor Science degree in Geology and Geophysics *(cum laude)* 9.2003-2.2007

RESEARCH AND PROFESSORIAL EXPERIENCE

· **University of Milano-Bicocca,**
Assistant Professor 1.3.2019 - present
Coupled Systems (CoSy) Research Group: Linking deep Earth processes and surface dynamics.

· **University of Geneva,**
Ambizione Research Fellow, Swiss NSF personal research grant (∼500k$) 11.2016-28.2.2019
Principal Investigator: Pietro Sternai
Project: Linking deep Earth processes and surface dynamics: the effects of erosion on magmatism.

· **California Institute of Technology & University of Cambridge,**
Post-doctoral Research Associate 10.2014-10.2016
Principal collaborators: Jean-Philippe Avouac, Laurent Jolivet, Taras Gerya, Luca Caricchi and Sébastian Castelltort
Project: Numerical modeling of the relationships between surface processes, lithospheric strain and magmatism.

· **Institut des Sciences de la Terre d'Orléans (ISTO), University of Orléans,**
Post-doctoral research Associate 9.2012-8.2014
Principal collaborators: Laurent Jolivet, Evgenii Burov and Taras Gerya

Project: Numerical modeling of the relationships between surface processes and lithospheric strain.

· **Swiss Federal Institute of Technology Zürich (ETH-Zürich),**
Ph.D. 9.2008-7.2012
Advisors: Frédéric Herman and Sean D. Willett
Project: Constraining glacial reshaping of the European Alps: insights from morphometric analyses, paleo-topographic reconstructions and numerical modeling of glacial erosion.

· **State University of Milan, Institute of Earth Science, Italy**
Master Science degree 9.2006-7.2008
Advisors: Bruno Crippa
Project: Analysis of the surface displacements of Gemona del Friuli, Italy, using advanced differential interferometric techniques (A-DInSAR).

PUBLICATIONS

◇◇◇ **Sternai P.**, Caricchi L., Pasquero C., Garzanti E., van Hinsbergen D., Castelltort S., Magmatic forcing of Cenozoic climate? *Journal of Geophysical Research: Solid Earth, Special issue "Grand Challenges in Earth Sciences" for the AGU's 100 years anniversary*, doi 10.1029/2018JB016460.

◇◇◇ **Sternai P.**, Sue C., Husson L., Serpelloni E., Walpersdorf A., Becker T., Willett S., Faccenna C., di Giulio A., Spada G., Jolivet L., Valla P., Petit C., Nocquet J.-M., Castelltort S. (2019), Present-day uplift of the European Alps: evaluating mechanisms and models of their relative contributions. *Earth Science Reviews*, 190, 589-604, doi 10.1016/j.earscirev.2019.01.005 .

◇◇◇ Jolivet L., Pik R., Gorini C., **Sternai P.**, Menant A., Faccenna C., Stab M., Leroy S., Bellahsen N., Clerc C. (2018), Extensional crustal tectonics and crust-mantle coupling, a view from the geological record. *Earth Science Reviews*, doi 10.1016/j.earscirev.2018.09.010.

◇◇◇ Jolivet L., Faccenna C., Becker T., Tesauro M., **Sternai P.**, Bouilhol P. (2018), Mantle flow and deforming continents: From India-Asia convergence to Pacific subduction. *Tectonics* 37-9, 2887-2914, doi 10.1029/2018tc005036 .

◇◇◇ Amadori C., Garcia-Castellanos D., Toscani G., **Sternai P.**, Fantoni R, Ghielmi M. and Di Giulio A. (2018), Restored topography of the Po Plain-Northern Adriatic region during the Messinian base-level drop - implications for the physiography and compartmentalisation of the paleo-Mediterranean basin. *Basin Research*, 30-6, 1247-1263, doi 10.1111/bre.12302 .

◇◇◇ Roche V., **Sternai P.**, Guillou-Frottier L., Menant A., Jolivet L., Bouchot V., Gerya T. (2018), Emplacement of metamorphic core complexes and associated geothermal systems controlled by slab rollback. *Earth and Planetary Science Letters*, 498, 322-333, doi 10.1016/j.epsl.2018.06.043 .

◇◇◇ **Sternai P.**, Caricchi L., Garcia-Castellanos D., Jolivet L., Sheldrake T., Castelltort S. (2017), Magmatic pulse driven by sea level changes associated with the Messinian salinity crisis. *Nature Geoscience*, doi 10.1038/NGEO3032.

◇◇◇ Pirouz M., Acouac J.-P., Gualandi A., Hassanzadeh J., and **Sternai P.** (2017), Flexural bending of the Zagros foreland basin. *Geophysical Journal International*, 210, 3, 1659-1680, doi 10.1093/gji/ggx252 .

◇ ◇ ◇ **Sternai P.**, Avouac J.-P., Jolivet L., Faccenna C., Gerya T.V., Becker T., Menant, A. (2016a), On the influence of the asthenospheric flow on the tectonics and topography at collision-subduction transition zones: comparison with the eastern Tibetan margin. *Journal of Geodynamics*, 100, 18-194, doi 10.1016/j.jog.2016.02.009.

◇ ◇ ◇ **Sternai P.**, Caricchi L., Castelltort S., Champagnac J-.D. (2016b), Deglaciation and glacial erosion: a joint control on the magma productivity by continental unloading. *Geophysical Research Letters*, doi 10.1002/2015GL067285.

◇ ◇ ◇ Menant A., **Sternai P.**, Jolivet L., Guillou-Frottier L., Gerya T. (2016), 3D numerical modeling of mantle flow, crustal dynamics and magma genesis associated with slab roll-back and tearing: The eastern Mediterranean case. *Earth and Planetary Science Letters*, 442, 93-107, doi 10.1016/j.epsl.2016.03.002.

◇ ◇ ◇ Jolivet L., Faccenna C., Agard P., Frizon de Lamotte D., Menant A., **Sternai P.**, Guillocheau F. (2015), Neo-Tethys geodynamics and mantle convection: A conceptual model for obduction. *Canadian Journal of Earth Sciences, ja*, doi 10.1139/cjes-2015-0118.

◇◇◇ Lei, C., Ren J., **Sternai P.**, Willett S., Fox M., Xie X., Clift P., Liao J., Wang Z. (2015), Structure and Sediment Budget of Yinggehai-Song Hong Basin, South China Sea: Implications for Cenozoic Tectonics and River Basins Reorganization in Southeast Asia. *Tectonophysics*, 655, 177-190, doi 10.1016/j.tecto.2015.05.024.

◇ ◇ ◇ Jolivet, L., Menant A., **Sternai P.**, Rabillard A., Arbaret L., Augier R., Laurent V., Beaudoin A., Graseman B. (2015), The geological signature of a slab tear below the Aegean. *Tectonophysics*, doi: 10.1016/j.tecto.2015.08.004.

◇ ◇ ◇ **Sternai P.**, Jolivet L., Menant A., Gerya T.V. (2014), Driving the upper plate surface deformation by slab roll-back and mantle flow. *Earth and Planetary Science Letters*, 405, 110-118, doi 10.1016/j.epsl.2014.08.023.

◇ ◇ ◇ Fox M., Reverman R., Fellin G., Herman F., **Sternai P.**, Willett S. D. (2014), Rock uplift and erosion history of the Bergell Intrusion from the inversion of low temperature thermochronometry. *Geochemistry, Geophysics, Geosystems*, 15, 4, 1235-1257, doi 10.1002/2013gc005224.

◇ ◇ ◇ **Sternai P.**, Herman F., Valla P. G., Champagnac J.-D. (2013), Spatial and temporal variation of glacial erosion in the Rhône valley: insights from numerical modelling. *Earth and Planetary Science Letters*, 368, 119-131, doi 10.1016/j.epsl.2013.02.039.

◇ ◇ ◇ **Sternai P.**, Herman F., Champagnac J.-D., Fox M. R., Salcher B., Willett S. D. (2012), Pre-glacial topography of the European Alps. *Geology*, doi: 10.1130/G33540.1.

◇ ◇ ◇ Herman F., Beaud F., Champagnac J.-D., Lemieux J.-M., **Sternai P.** (2011), Glacial hydrology and erosion patterns: a mechanism for carving glacial valleys, *Earth and Planetary Science Letters*, 310, 3-4, 498-508, doi 10.1016/j.epsl.2011.08.022.

◇ ◇ ◇ **Sternai P.**, Herman F., Fox M. R., Castélltort S. (2011), Hypsometric analysis to identify spatially variable glacial erosion, *Journal of Geophysical Research, Earth Surface*, 116, F03001, doi 10.1029/2010JF001823.

◇ ◇ ◇ Rossi G., Calcagni L., **Sternai P.**, Crippa B. (2008), Primi risultati nell'analisi degli spostamenti verticali nella zona di Gemona mediante tecnica DInSAR. *Rendiconti Online Societá geologica Italiana*, 2, 1-3.

In revision/preparation:

◇◇◇ **Sternai P.**, Surface processes forcing on extensional rock melting. In revision *Scientific Reports*.

◇◇◇ Garzanti E., **Sternai P.**, Against Steady State. In revision *Reviews of Geophysics*.

◇◇◇ Muller V. A. P., Caldéron M., Cury L., Fosdick J. C., Ghiglione M., Massonne H.-J., Fanning C. M., Warren C., Ramirez de Arellano C., **Sternai P.**, The closure of the Rocas Verdes Basin and early evolution of the Magallanes Fold-and-Thrust Belt in the Patagonian Andes (52-54S). In revision *Tectonophysics*.

SCHOLARSHIPS, GRANTS, AWARDS & HONORS

· **"Premio Giovani Talenti 2019"**of the University of Milano-Bicocca and Academia dei Lincei - second prize, personal funding (∼2'200 $), 10.2019
· Partner of the European "Marie Skłodowska-Curie Actions" Innovative Training Networks (ITN) - P.I. François Guillocheau, Cécile Robin, Sébastien Castelltort, Co-P.I. Pietro Sternai et al., 5.2019
· **Italian habilitation for Assocaite Professorships**, "Abilitazione Scientifica Nazionale, 04/A2: Geologia Strutturale, Geologia Stratigrafica, Sedimentologia e Paleontologia", 5.2019-5.2025
· **Italian "Rita Levi Montalcini 2017" grant - P.I. Sternai Pietro - personal funding (∼80'000 $)**:
Magmatic forcing of Cenozoic climate cooling?, 3.2019
· **French "Ecole Doctorale Environments-Santé" project:** *Interactions between mantle, crustal, and ice dynamics in the southern Andes: a numerical approach* - P.I. Christian Sue, Co-P.I. Pietro Sternai - funding (∼145'000 $), 2019-2022
· **French "Referentiel Geologique de la France" project:** *Recent Quaternary in the Southern European Alps: modeling the evolution of topographic relief* - P.I. Carole Petit, Co-P.I. Pietro Sternai - funding (∼145'000 $), 2019-2022
· **French habilitation for Assistant Professorships**, "Qualification aux fonctions de maître de conférences, Section 36 - Terre solide: géodynamique des enveloppes supérieures, paléobiosphère", 9.2017-9.2022
· **Italian "Rita Levi Montalcini 2015" grant - P.I. Sternai Pietro - personal funding (∼37'500 $)**:
Numerical modeling of the interactions between surface and deep Earth process, 7.2018
· **Swiss NSF "Ambizione" Fellowship - P.I. Sternai Pietro - personal funding (∼500'000 $)**:
Linking deep Earth processes and surface dynamics: the effects of erosion on magmatism, 10.2016-10.2019
· **Caltech and University of Cambridge**, postdoctoral grant (∼87'000 $), 11.2014-10.2016
· **Utrecht University Faculty grant**, Faculty grant for joint research proposals (∼15'000 $), 9.2014-10.2014
· **Laboratoire d'Excellence Voltaire, Orléans**, post-doctoral grant (∼62'000 $), 9.2012-8.2014
· **TOPO-Alps Scholarship (Ph.D.)**, European fellowship awarded to international students, 9.2008-8.2012
· **Socrates Erasmus**, fellowship awarded to undergraduate students, 9.2007-2.2008

· **Italian Programma di Ricerche in Artico 2019** , "Abrupt climatic changes: new evidence from Arctic sedimentary proxies", **P.I. F. Talarico, co-P.I. Pietro Sternai** (requested ∼230'000 $)

SELECTED ACADEMIC RESPONSIBILITIES & OUTREACH

· Principal organizer of the MedMeet meeting about Alpine-Mediterranean Geodynamics at the University of Milano-Bicocca, 2020
· Convener at **SIMP-SGI-SOGEI Meeting session** Coupling deep mantle structures with surface processes and magmatism along the Tethyan margin, 2020
· Convener at **SIMP-SGI-SOGEI Meeting session** Analogue and numerical modelling of geological processes: linking observation, interpretation and prediction, 2019
· Convener at **EGU session GM4.2/CL4.33/GD11.5/GMPV1.3/SSP1.7./TS9.8**, Solid Earth and Fluid Earth Interactions: a holistic approach to the couplings between mantle dynamics, magmas, tectonics, climate, and earth surface processes, 2018
· Convener at **EGU session G3.1/CL4.18/CR5.8/GD3.4/GM10.8/TS8.7**, Glacial isostatic adjustment: Theory, modeling, observations and related effects, 2016, 2017, 2018
· Principal organizer of the **Steepest Descent Meeting**, 2017, 2018
· Co-organizer of the **Steepest Descent Meeting**, 2014, 2015, 2016, 2019
· Co-organizer of the **TopoEurope Meeting**, 2011, 2012

· Reviewer: Science, Nature Geoscience, Nature Communications, Scientific reports, EPSL, Gcube, Global Planetary Change, others

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TEACHING AND MENTORING EXPERIENCES

University of Milano-Bicocca
· Mentor of Veleda Astarte Paiva Muller, Ph.D. student, 2019, present
· lecturer for the BSc course: Structural Geology, geological mapping, spring sem. 2019-2020
· lecturer for the third year BSc field course: Structural Geology and Sedimentology, spring sem. 2020
University of Pavia
· Invited lecturer for the Doctoral course: Computational mechanics for scientific problems, fall sem. 2019
University of Geneva
· Lecturer for the MSc course: Earth Surface Processes and Tectonics, spring sem. 2018
University of Venice IUAV
· Invited lecturer: Geological and seismological context of Italy, fall sem. 2017
University of Lausanne
· Lecturer for the MSc course: Introduction to MATLAB, fall sem. 2017
Institut des Sciences de la Terre d'Orléans (ISTO), University of Orléans
· Assistant in MSc course: Geodynamics, fall sem. 2012, 2013
· Co-mentor of Vincent Roche, Ph.D. student, now postdoc at Sorbonne University, 2014, present
· Co-mentor of Armel Menant, Ph.D. student, now postdoc at IPGP , 2012-2015
· Co-mentor of Sarah Abecassis, undergraduate student, now thésard at University of Montpellier, 2013
Swiss Federal Institute of Technology Zürich (ETH-Zürich)
· Assistant in MSc course: Basin Analysis, spring sem. 2012
· Assistant in MSc course: Tectonic Geomorphology, spring sem. 2009, 2010, 2011
· Assistant in MSc course: Sedimentology, spring sem. 2010

· Assistant in BSc course: Geological Mapping, fall sem. 2008

FIELDWORK EXPERIENCES

· **European Alps** - Italy, France, Switzerland, Austria - countless field trips and mapping camps, 2003-present
· **Saint Gabriel Mountains**, CA, USA - Tectonic-geomorphology field-trip, 12.2014
· **Cyclades and continental Greece** - Structural geology and geodynamic field-course, 9.2012, 9.2013
· **Apennines** - Tectonic Geomorphology mapping field-course, 5.2009, 5.2010, 5.2011

COMMUNICATION AND CONGRESSES

Selected Invited talks:
· Freie Universität Berlin, Department Seminar, 1.2020
· SIMP-SGI-SOGEI Meeting, session "Quantifying Burial and Exhumation processes during continental lithosphere deformation: inferences from nature and models", 2019
· SUBITOP-TOPOEUROPE conference, 05.2019
· SIMP-SGI-SOGEI Meeting, session "The nature of the crust-mantle transition and its effects on the regional tectonic and magmatic evolution", 2018
· EGU, session TS7.10/GMPV9.3/SM 2.12/SSP2.17, 04.2018
· EGU, session GM4.1/SSP3.21./TS4.9, 04.2018
· EGU, session TS7.7/SM6.13, 04.2017
· University of Lausanne (Unil), Department Seminar, 9.2016
· Institute de Physique du Globe de Paris (IPGP), Department Seminar, 11.2015
· University of Oxford, Group Seminar, 11.2015
· Keynote speaker TOPO-EUROPE 2015 meeting, 10.2015
· UCLA, Group Seminar, 11.2014
· Utrecht University, Group Seminar, 2.2014
· Earth Observatory of Singapore, 5.2014
· University of Roma TRE, Department Seminar, 1.2014
· AGU Fall Meeting, session NH31C, 12.2013
· California Institute of Technology, Group Seminar, 12.2013
· University of Paris VI (UPMC), Department Seminar, 4.2013

Congresses:
· >25 Communications at international congresses

SUMMARY OF QUALIFICATIONS & HIGH-END PROFICIENCIES

· Structural geology, geodynamics, geomorphology, geophysics
· Surface process and geodynamic modeling
· Finite Differences and Finite Elements Methods
· Direct and inverse methods
· 3D visualization

· Programming: bash, Fortran, Matlab, GMT, C, C++
· Computer skills: Unix, Linux, OS-X, Window, MS Office, Adobe CS, LaTex, Matlab, ArcGis and many others
· Lidar differential GPS surveying
· Languages: Italian, English (fluent), French (fluent), Spanish (basic)