

Brief Biography

Eric Calais is Professor of Geophysics at the Ecole Normale Supérieure in Paris, France. He studied Earth Sciences in France at the École Normale Supérieure (St Cloud), at the University of Paris 6, and at the University of Bretagne Occidentale (Brest). He received a PhD in Earth Sciences from the University of Nice (France) in 1991, then was postdoctoral researcher at Scripps Institution of Oceanography (U.C. San Diego) from 1992 to 1995. He was researcher at the CNRS (Nice, France) until 2001, then became professor at Purdue University (Indiana, USA) until 2012. Prof. Calais was nominated University Faculty Scholar at Purdue University in 2005. He received the Jacob-Fallot-Jérémine award from the French Academy of Sciences in 2008 and the Frank Press award from the Seismological Society of America in 2012. He was invited Professor at the Institut de Physique du Globe in Paris in 2009 and at the University of Brest (France) in 2008.

Prof. Calais' research interests concern the kinematics and dynamics of active tectonic processes. His main tools are space geodesy, in particular the Global Positioning System (GPS), and mechanical modeling of lithospheric deformation. He initiated and led many field experiments worldwide to study active deformation processes at spatial and temporal scales ranging from individual earthquakes or volcanic events to the deformation of plate margins or the motion of tectonic plates. He also uses GPS as an atmospheric remote sensing tool for tropospheric water vapor with applications to meteorology and climate. He pioneered the use of GPS to detect ionospheric perturbations triggered by earthquakes, volcanoes, and man-made explosions.

Prof. Calais has co-authored more than 120 publications in top-tier peer-reviewed journals (h-index=35, 3500 citations), has given over 60 invited lectures and seminars, and contributed to more than 150 presentations at national and international meetings. He has supervised 21 graduate students and teaches geodesy and geophysics at the undergraduate and graduate level

Prof. Calais was appointed Director of the "Yves Rocard Research Laboratory"¹. He has been Chief Editor for Geophysical Research Letters² since 2009, after serving as Editor from 2004 to 2008. He currently chairs the Scientific Council of the European Institute for Marine Studies³. Prof. Calais chaired the UNAVCO⁴ Board of Directors from 2005 to 2008, obtaining the renewal of the organisation from its funding agencies. He has been serving on a number of national and international committees and review panels. He has been convener, organizer, or program committee member for more than 20 international scientific meetings.

Prof. Calais has served as expert-consultant in seismic hazard and risk reduction for the World Bank, the International Development Bank, the United Nations Development Program, and the European Union. Prof. Calais co-chaired the United Nations Haiti Earthquake Task Force after the devastating January 2010 earthquake. He served as scientific advisor to the United Nations in Haiti from 2010 to 2012.

¹Joint research venture partnering ENS Paris, the CNRS, and the French Atomic Energy Commission (CEA) for collaborative research on of the earthquake deformation cycle and rock-fluids interactions.

²Impact factor = 3.982, ranks #9 among 129 titles in Multidisciplinary Geosciences.

³Federation of 8 research units at the forefront of research in marine geophysics, physical oceanography, marine biogeochemistry, microbiology, marine chemistry, biology, and law and economy.

⁴University-based corporation aimed at promoting Earth Science by advancing high-precision techniques for the measurement of crustal deformation – www.unavco.org

I. Personal Data

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Born September 15, 1964, Paris, France.
French citizen

II. Education

- Ph.D., 1991, University of Nice, France, in Earth Sciences.
- M.Sc., 1988, University of Brest, France, in Earth Sciences (DEA).
- 1987, Agrégation (French high-level general education diploma) in Earth Sciences, Valedictorian.
- B.S., 1986, Ecole Normale Supérieure (St Cloud) and Paris VI University, in Earth Sciences.

III. Appointments

- 2012 – Present: Professor of Geophysics, Ecole Normale Supérieure, Paris, France.
- 2010 – 2012: Scientific Advisor for the United Nations, Haiti (under UNDP), working for the government of Haiti to integrate seismic risk reduction in the country's post-earthquake reconstruction.
- 2007 – 2012: Professor of Geophysics, Purdue University, West Lafayette, IN, USA (on leave of absence 2010-2012).
- 2001 – 2007: Associate Professor of Geophysics (tenure obtained in 2004), Purdue University, West Lafayette, IN, USA.
- 1995 – 2001: Research Scientist (*“Chargé de Recherche”*), CNRS, Nice, France.
- 1994 – 1995: Research Fellow, Scripps Inst. of Oceanography, San Diego, CA, USA.
- 1992 – 1994: Post-doctoral Fellow, Scripps Inst. of Oceanography, San Diego, CA, USA.
- 1991 – 1992: Military service, French air force.
- 1988 – 1991: Research Assistant (*“Assistant Normalien Doctorant”*), University of Nice, Nice, France.

IV. Research Interests

- Current plate motions, measurements and observations of active deformation at plate boundaries and in plate interiors.
- Dynamics of lithospheric deformation, role of gravitational forces, stress transfer at plate boundaries, and viscous coupling between mantle flow and the lithosphere.
- Earthquake deformation cycle, tectono-magmatic processes at active continental rifts, stress transfer (faults and magma reservoirs).
- Earthquake hazard and risk.

- Space geodesy, in particular GNSS (Global Navigation Satellite Systems) geodesy, geodetic reference frames, error budgets.
- Atmospheric remote sensing (ionospheric electron content and tropospheric water vapor) from GNSS data.
- Detection of atmospheric acoustic and gravity waves through GPS measurements of ionospheric electron content.

V. Awards, Honors, Recognitions

- Holmes Lecturer, Syracuse University (2013).
- Frank Press award, Seismological Society of America (2012).
- Co-chair of the United Nations “Haiti Seismic Task Force” (2010).
- Member of the U.S. National Committee for Geodesy and Geophysics, National Academy of Sciences.
- Congressional briefing on the Haiti earthquake (01/12/2010) to the U.S congress.
- Invited Professor, “*Institut de Physique du Globe*”, Paris (2009).
- Invited Professor, the University of Brest, France (2008).
- Jacob-Fallot-Jérémime award, French Academy of Sciences (2008).
- Chief Editor for *Geophysical Research Letters* (since 2009).
- Chair of the UNAVCO board of director (2005-2008).
- University Faculty Scholar, Purdue University (2005).
- Most cited journal article for *Geophysical Journal International* in 2003.
- NATO Postdoctoral Fellow (1992-1993).

VI. Professional and Scholarly Associations

- American Geophysical Union
- European Geophysical Society
- International Association of Geodesy
- Seismological Society of America

VII. Graduate Students

- **Current Graduate Students:** R. Douilly, PhD, “*Dynamics of Fault Interactions*”; S. Symithe, PhD, “*Postseismic Deformation Following the January 12, 2010, Haiti Earthquake*”.
- **Ph.D. graduated:** O. Lesne (Univ. Nice, currently researcher at ACRI S.A., France), J.M. Nocquet (Univ. of Nice, currently researcher at CNRS, Nice, France), M. Vergnolle (Univ. of Nice, currently researcher at CNRS, Grenoble, France), J.Y. Han (Purdue University, currently faculty at National Taiwan University), T. Dauterman (Purdue University, currently researcher at the German Space Agency), S. Tabrez (co-advised with A. Freed, currently postdoc at Univ. Wisconsin), D.S. Stamps (Purdue University, currently postdoc at MIT), E. Saria (Purdue University, currently Professor at Ardhi University, Dar es Salaam, Tanzania).

- **M.S. graduated:** S. Hartig-Vey (Univ. Nice), L. Galisson (Univ. Strasbourg), Y. Mazabraud (Univ. Nice), A. Aufranc (Univ. Strasbourg), S. Menet (ENSAIS Strasbourg), F. Vincent (Univ. Nice), Y. Song (Purdue), A. Aryal (Purdue), L. Dong (Purdue), L. Bennati (Purdue), T. Bowling (Purdue).

VIII. Service (recent only)

- 2014 – present: Member, Committee for Scientific Programs (*“Comité des Programmes Scientifiques”*), French Space Agency (CNES).
- 2013 – present: Director, “Yves Rocard Joint Research Laboratory” (joint research venture between ENS Paris, CNRS, and the French Atomic Energy Commission).
- 2013 – present: French National Panel on the Response to Earthquake and Volcanic Events (INSU/CNRS), Member.
- 2011 – present: U.S. National Committee for Geodesy and Geophysics, National Academy of Sciences, Member.
- 2011 – present: Seismological Society of America, member of the Board of Directors.
- 2011 – present: Member of the COCONet science committee, “Enhancing geodetic infrastructure and international partnerships in the Caribbean”, U.S. National Science Foundation.
- 2009 – present: Editor-in-Chief for Geophysical Research Letters.
- 2010 – present: French geodetic and gravimetric observatories committee (Commission des Services Nationaux d’Observation (CNRS/INSU), Member.
- 2006 – Present: Chair, Scientific Council of the European Institute for Marine Studies, France (IUEM, www.univ-brest.fr/IUEM).
- 2011: Reviewer for NRC report on “International Science in the National Interest at the U.S. Geological Survey”.
- 2010 – Co-chair, United Nations Haiti Earthquake Risk Reduction Task Force.

IX. Other Professional Activities (recent only)

- **Editor of Scientific Journals:** Editor in Chief for Geophysical Research Letters, 2009-present; Editor for Geophysical Research Letters, 2004-2008; Associate Editor for Geophysical Research Letters, 2002-2004.
- **Journal Reviewer:** Nature, Science, J. Geophys. Res., Geophys. Res. Letters, Earth and Planetary Sci. Lett., Tectonophysics, Bull. Geol. Soc. America, Pure and Applied Geophysics, Geophysical Journal International, J. of Geodesy, Annales Geophysicae.
- **Proposal reviewer:** National Science Foundation (Geophysics, Tectonics, Continental Dynamics), NASA, Geol. Society of America, Swedish Research Council, CNES (French Space Agency), CNRS (French National Science Foundation), French Ministry for Research (ANR).
- **Expert-consultant** for the Interamerican Development Bank (IDB), the European Union, The World Bank, the United Nations Development Program (UNDP), Lettis & Associates, Inc. (seismic source characterization for hazard analysis), South African Council for Geosciences.

- **Session Organizer at International Conferences:** EGS meeting 1998, AGU Fall meeting 2000, AGU Spring meeting 2002, AGU/Western Pacific conference 2004, AGU Fall meeting 2004, AGU Fall meeting 2005, IUGG meeting 2007, AGU Spring meeting 2009, EGU General Assembly 2009, AGU Fall meeting 2009, 2010, 2012.
- Co-organizer, Advanced Workshop on “Evaluating, Monitoring and Communicating Volcanic and Seismic Hazards in East Africa”, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, August 17-28, 2009.
- **Panel Member** for the NASA Solid Earth and Interior program (proposals), the USGS Earthquake Hazards Program (proposals), the Institut Européen Universitaire de la Mer (IUEM, France – external review), Georgia Tech School of Earth and Atmospheric Sciences (external review), French Institute for Marine Research (IFREMER, external review).

X. Selected Recent Publications

Total number of publications = 120, 3500 citations, average citations per article = 26, h-index = 35 (source ISI Web of Knowledge, March 2014). For a complete publication list, see <http://www.geologie.ens.fr/>

- Déverchère, J., B. Mercier de Lépinay, A. Cattaneo, P. Strzeczynski, E. Calais, A. Domzig, and R. Bracene (2010), Comment on “Zemmouri earthquake rupture zone (Mw 6.8, Algeria): Aftershocks sequence relocation and 3D velocity model” by A. Ayadi et al., **J. Geophys. Res.**, **115**, B04320, doi: 10.1029/2008JB006190, 2010.
- Frankel, A., S. Harmsen, C. Mueller, E. Calais, and J. Haase, Documentation for Initial Seismic Hazard Maps for Haiti, **U.S. Geological Survey Open-File Report 2010-1067**, 2010.
- Calais, E., A.M. Freed, R. Van Arsdale, and S. Stein, Triggering of New Madrid Seismicity by Late Pleistocene Erosion, **Nature**, 466, doi: 10.1038/nature09258, 2010.
- Stamps, D.S., L.M. Flesch, and E. Calais, Lithospheric Buoyancy Stresses in Africa from a Thin Sheet Approach, **International Journal of Earth Sciences**, doi 10.1007/s00531-010-0533-2, 2010.
- Hamling, I.J., T.J. Wright, E. Calais, L. Bennati, and E. Lewi, Stress transfer between thirteen successive dyke intrusions in Ethiopia, **Nature Geosciences**, doi 10.1038/NGEO967, 2010.
- Calais, E., A. Freed, G. Mattioli, F. Amelung, S. Jónsson, P. Jansma, S.H. Hong, T. Dixon, C. Prépetit, and R. Momplaisir The January 12, 2010, Mw 7.0 earthquake in Haiti: context and mechanism from an integrated geodetic study, **Nature Geosciences**, doi 10.1038/NGEO992, 2010.
- Haase, J., T. Dautermann, M. Taylor, N. Chapagain, E. Calais, and D. Pautet, Propagation of Plasma Bubbles Observed in Brazil from GPS and Airglow Data, **Advances in Space Research**, **47**, 1758-1776, 2011.
- Frankel, A., S. Harmsen, C. Mueller, E. Calais, and J. Haase, Seismic Hazard Maps For Haiti, **Earthquake Spectra**, 27, pp. S23-S41 (2011); doi:10.1193/1.3631016, 2011.
- Wright, T.J., F. Sigmundsson, C. Pagli, M. Belachew, I. Hamling, B. Brandsdottir, D. Keir, R. Pedersen, A. Ayele, C. Ebinger, P. Einarsson, E. Lewi, E. Calais, Geophysical constraints on the dynamics of spreading centres from rifting episodes on land, **Nature Geosciences**, **5**, 242-250, doi: 10.1038/NGEO1428, 2012.
- Courboux, F., J-L Berenguer, A. Tocheport M.P. Bouin, E. Calais, Y. Esnault, C. Larroque, G. Nolet, and J. Virieux, Sismos à l’Ecole: a worldwide network of real-time seismometers in schools, **Seismological Research Letters**, **83**, 870-873, doi: 10.1785/0220110139, 2012.

- Benford, B., C. DeMets, and E. Calais, GPS estimates of microplate motions, northern Caribbean: Evidence for a Hispaniola microplate and implications for earthquake hazard, **Geophys. J. Int.**, **191**, 481-490, doi: 10.1111/j.1365-246X.2012.05662.x, 2012.
- Bowling, T., E. Calais, and J. Haase, Detection and Modeling of the Ionospheric Perturbation Caused by a Space Shuttle Launch from a Network of Ground-based Global Positioning System Stations, **Geophys. J. Int.**, **1-8**, doi:10.1093/gji/ggs101, 2013.
- Paultre, P., E. Calais, J. Proulx, C. Prepetit, S. Ambroise, Damage to engineered structures during the January 12, 2010, Haiti (Leogane) earthquake, **Journal of the Canadian Society of Civil Engineering**, in press, 2013.
- Karakhanyan, S., P. Vernant, E. Doerflinger, A. Avagyan, H. Philip, R. Aslanyan, C. Champollion, S. Arakelyan, P. Collard, H. Baghdasaryan, M. Peyret, V. Davtyan, E. Calais, and F. Masson, GPS constraints on continental deformation in the Armenian region and Lesser Caucasus, **Tectonophysics**, **592**, 39-45, 2013.
- Elifuraha, S., E. Calais, Z. Altamimi, P. Willis, and H. Farah, A new Velocity field for Africa from Combined GPS and DORIS Space Geodetic Solutions: Contribution to the Definition of the African Reference Frame (AFREF), **J. Geophys. Res.**, **118**, doi:10.1002/jgrb.50137, 2013.
- Boyd, O., E. Calais, J. Langbein, H. Magistrale, S. Stein, and M. Zoback, Workshop on New Madrid Geodesy and the Challenges of Understanding Intraplate Earthquakes, **U.S. Geological Survey Open-File Report 2013-0031**, 184 p., 2013.
- Douilly, R., J.S. Haase, W.L. Ellsworth, M.P. Bouin, E. Calais, S. Smithe, J.G. Armbruster, B. Mercier de Lépinay, A. Deschamps, S.L. Mildor, M. Meremonte, and S. Hough, Improving the resolution of the 2010 Haiti earthquake fault geometry using temporary seismometer deployments, **Bull. Seism. Soc. America**, **103**, 2305-2325, doi: 10.1785/0120120303, 2013.
- Smithe, S.J., E. Calais, J.S. Haase, A.M. Freed, and R. Douilly, Coseismic Slip Distribution of the 2010 M7.0 Haiti Earthquake and Resulting Stress Changes on Regional Faults, **Bull. Seism. Soc. America**, **103**, 2326-2343, doi: 10.1785/0120120306, 2013.
- Paultre, P., Calais, E., Proulx, J., Prépétit, C. and Ambroise, S., Damage to engineered structures during the January 12, 2010, Haiti (Léogâne) earthquake, **Can. J. of Civ. Eng.**, **40**, 1-14, dx.doi.org/10.1139/cjce-2012-0247, 2013.
- Hamling, I.J., T.J Wright, E. Calais, E. Lewi, and Y. Fukahata, InSAR observations of post-rifting deformation around the Dabbahu rift segment, Afar, Ethiopia, **Geophys. J. Int.**, in press, 2014.
- Saria, E., E. Calais, D.S. Stamps, D. Delvaux, and D.J.H. Hartnady, Present-day Kinematics of the East African Rift, **J. Geophys. Res.**, in press, 2014.

XI. Selected Recent Invited Lectures and Seminars

Invited Presentations at International Conferences

- U.S. State Department conference on “Rebuilding for Resilience: How Science and Engineering Can Inform Haiti’s Reconstruction”, *“The January 12, 2010 and future seismic hazards in Haiti”*, March 2010.
- UNAVCO Science Workshop, *“The January 12, 2010, Haiti earthquake and its tectonic context”*, March 2010.

- Understanding Risk, organized by the World Bank, Washington DC, “*The January 12, 2010, Haiti earthquake and its tectonic context*”, June 2010.
- U.S. Congressional Briefing on the 2010 Haiti earthquake, “*Chronicle of a Disaster Foretold*”, May 2010.
- American Geophysical Union Joint Assembly, “*The M7.0, 2010, Haiti earthquake: context and mechanism from an integrated geodetic study*”, Brazil, August 2010.
- Southern California Earthquake Center (SCEC) annual meeting, “*The M7.0, 2010, Haiti earthquake: context and mechanism from an integrated geodetic study*”, Palm Springs, Ca, September 2010.
- Incorporated Research Institutions for Seismology (IRIS) workshop, “*Lessons for seismic hazard and societal impact in the Caribbean*”, San Jose, Costa Rica, October 2010.
- American Geophysical Union fall meeting, “*The January 12, 2010, Mw 7.0, Haiti earthquake: Context and mechanism from an integrated geodetic study*”, San Francisco, December 2010.
- American Geophysical Union fall meeting, “*The January 12, 2010, Haiti earthquake: Science and Engineering for Earthquake Resilience*”, San Francisco, December 2010.
- Workshop on Seismic Risk Reduction, Oxford University, U.K., “*The 2010 Haiti earthquake: moving forward*”, February 2011.
- American Association for the Advancement of Science (AAAS) annual conference, “*The January 12, 2010, Haiti earthquake: a science diplomacy opportunity*”, January 2011.
- Multidisciplinary Center for Earthquake Engineering Research (MCEER) seminar series, “*Quantification of seismic hazard in Haiti*”, March 2011.
- Clinton-Bellerive Commission on the Reconstruction of Haiti, invited presentation on “*Seismic hazard and risk reduction in Haiti in the wake of the 2010 earthquake*”, July 2011.
- Asian Seismological Commission, 9th Assembly, Ulan Baatar (Mongolia), “*Kinematics and Dynamics of Present-Day Deformation in Asia*”, September 2012.
- UNESCO Expert Meeting on “*Earthquake and Tsunami Hazard in Northern Haiti: Historical Events and Potential Sources*”, July 2013.
- UNESCO Expert Meeting on “*Earthquake and Tsunami Hazard in Northern Haiti: Historical Events and Potential Sources*”, July 2013.
- Ecole Normale Supérieure, Paris, Center for Environment Studies, invited lecture on “*Earthquake Hazard, Societal Impacts*”, October 2013.
- Oxford University workshop on Earthquakes: from Mechanics to Mitigation, invited lecture on “*From hazard to mitigation in the wake of the 2012 Jaiti earthquake*”, February 2014.

Invited Academic Seminars

- Purdue University, College of Civil Engineering, February 2011.
- Northwestern University, Dept. of Earth Sciences, October 2011.
- Ecole Normale Supérieure, Paris, General Seminar, May 2012.
- Institut de Physique du Globe de Paris, General Seminar, May 2012.
- San Diego State University, Geophysics Seminar, October 2012.
- Institut de Radioprotection et de Sureté Nucléaire (IRSN), General Seminar, February 2013.
- Ecole Normale Supérieure, Paris, Geophysics Seminar, February 2013.
- Syracuse University Department of Earth Sciences, Annual Holmes Distinguished Lecture, April 2013.

- University of Leeds, Institute of Geophysics and Tectonics Seminar, May 2013.
- Ecole Normale Supérieure, Paris, Center for Environment Studies, October 2013.
- Oxford University, United Kingdom, Dept. of Earth Sciences Seminar Series, February 2014.
- University Pierre and Marie Curie (Paris 6), Geosciences Department Seminar Series, February 2014.

XII. Teaching

My pre-2001 position at the CNRS, France, was fully research and did not involve teaching. I however taught several classes on a voluntary basis at the graduate or senior undergraduate level. Topics included: Strain and Stress in the Lithosphere, Tectonics of Active Plate Boundaries, Space Geodesy and its Application to Geophysics.

At Purdue University (2001-2012), I taught the following classes:

- Physics and Chemistry of the Earth, undergraduate.
- Geodetic Measurements of Active Crustal Motions, graduate.
- Kinematic Modeling of Active Crustal Motions, graduate.
- Active Tectonics, graduate.
- Seminars in Tectonics, graduate.
- Tectonics of the Western US, field course, undergraduate.
- Marine Geophysics, study abroad course in collaboration with Univ. of Brest, France, undergraduate and graduate.
- Guest lectures in other classes on Plate Tectonics, GPS Geodesy, Earthquakes and Volcanoes, undergraduate.