

## Geodetic Analysis, Structural Geology and Numerical Modeling of the Seismic Cycle

### REFEREED PUBLICATIONS

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#### *Peer-reviewed:*

Y. Zhou, **M. Y. Thomas**, B. Parsons, R. T. Walker, 2017. Time-dependent postseismic slip following the 1978 Mw 7.3 Tabas-e-Golshan, Iran earthquake revealed by over 20 years of ESA InSAR observations, *Earth and Planetary Science Letters* (submitted).

**M. Y. Thomas**, and H. S. Bhat, 2017. Dynamic Evolution Of Off-Fault Medium During An Earthquake: A Micromechanics Based Model, *Geophysical Journal International* (submitted).

**M. Y. Thomas**, J.-P. Avouac, and N. Lapusta, 2017. Dynamic modeling of earthquake sequences on the Longitudinal Valley Fault: implications for friction properties, *Journal of Geophysical Research-solid Earth*, v. 122, p. 3115–3137.

**M. Y. Thomas**, T. Mitchell, and H. S. Bhat, 2016. Fault Zone Dynamic Processes: Evolution of Fault Properties During Seismic Rupture, an Introduction, *AGU monograph on "Fault Zone Dynamic Processes: Evolution of Fault Properties During Seismic Rupture"*, v. 227, p. xi-xii.

**M. Y. Thomas**, H. S. Bhat, and Y. Klinger, 2016. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics, *AGU monograph on "Fault Zone Dynamic Processes: Evolution of Fault Properties During Seismic Rupture"*, v. 227, p. 255-280.

**M. Y. Thomas**, J.-P. Avouac, J.-P. Gratier, and J.-C. Lee, 2014. Lithological control on the deformation mechanism and the mode of fault slip on the Longitudinal Valley Fault, Taiwan, *Tectonophysics*, v. 632, p. 48–63.

**M. Y. Thomas**, J.-P. Avouac, J. Champenois, J.-C. Lee, and L.-C. Kuo, 2014. Spatiotemporal evolution of seismic and aseismic slip on the Longitudinal Valley Fault, Taiwan, *Journal of Geophysical Research-solid Earth*, v. 119, p. 5114-5139.

**M. Y. Thomas**, N. Lapusta, H. Noda, H. and J.-P. Avouac, 2014. Quasi-dynamic versus fully-dynamic simulations of earthquakes and aseismic slip with and without enhanced coseismic weakening, *Journal of Geophysical Research-solid Earth*, v. 119, p. 1986-2004.

T. Ader, J.-P. Avouac, J. Liu-Zeng, H. Lyon-Caen, L. Bollinger, J. Galetzka, J. Genrich, **M. Thomas**, K. Chanard, S. N. Sapkota, P. L. Shrestha, S. Rajauri, D. Lin, and M. Flouzat, 2012. Convergence rate across the Nepal Himalaya and interseismic coupling on the Main Himalayan Thrust, implications for seismic hazard, *Journal of Geophysical Research-Solid Earth*, v 117, p. B04403.

C. Hamelin, L. Dosso, B. B. Hanan, M. Moreira, A. P. Kositsky, and **M. Y. Thomas**, 2011. Geochemical portrait of the Pacific Ridge: New isotopic data and statistical techniques, *Earth and Planetary Science Letters*, v. 302, p. 154-162.

#### *Books & Special volumes*

**M. Y. Thomas**, H. S. Bhat, and T. Mitchell (Eds.), in print (2016), *Fault Zone Dynamic Processes: Evolution of Fault Properties During Seismic Rupture*, AGU monograph

#### *Publications in advanced stages of preparation*

**M. Y. Thomas**, P. Romanet and H. S. Bhat. On short and long term dynamics of rough faults, in preparation.

M. Bernaudin, J.-P. Avouac, and **M. Y. Thomas**, Inversion of geodetic time series to constrain faults rheology : Example of seasonal creep on the Longitudinal Valley Fault, Taiwan, in preparation

### SELECTED CONFERENCE PRESENTATIONS

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#### *Orals:*

**M. Y. Thomas**, H. S. Bhat, and Y. Klinger, Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics. *EGU General Assembly: Earthquake source processes - Imaging methods, numerical modeling and scaling*, Austria, 2017.

H. S. Bhat, **M. Y. Thomas**, Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics. *AGU Fall Meeting: Physics of Earthquake Rupture Propagation IV*, USA, 2016.

**M. Y. Thomas**, J.-P. Avouac, N. Lapusta, Frictional properties of the Longitudinal Valley Fault from kinematic and dynamic modeling of earthquake sequences. *AGU Fall Meeting: Bridging Tectonics and Earthquake Cycles III*, USA, 2016.

H. S. Bhat, **M. Y. Thomas**, Brittle dynamic damage due to earthquake rupture. *EGU: Open Session on Rock Physics*, Austria, 2016.

**M. Y. Thomas**, Quasi-dynamic versus fully-dynamic simulations of long-term fault slip. *Advances in Earthquake Source Physics Workshop, UCL, London, September 2014*, (invited talk).

**M. Y. Thomas**, J.-P. Avouac, J. Champenois, J.-C. Lee, Spatio-temporal evolution of seismic and aseismic slip on the Longitudinal Valley Fault, Taiwan, *AGU Fall Meeting : The Extent to Which Large Portions of Major Faults Slip Both Seismically and Aseismically — Observations and Implications III*, USA, 2013.

**M. Y. Thomas**, J.-P. Avouac, J.-C. Lee, Imaging seismic and aseismic fault slip on the Longitudinal Valley Fault, Taiwan. *AGU Fall Meeting: Fault Slip Rate Variability: New Constraints on Temporal and Spatial Patterns II*, USA, 2011.

**M. Y. Thomas**, N. Lapusta, H. Noda, J.-P. Avouac, Quasi-dynamic versus fully-dynamic simulations of slip accumulation on faults with heterogeneous friction properties, *GSA Annual Meeting: Where Does Earthquake Physics Meet Earthquake Geology?*, USA, 2010.

#### Posters:

**M. Y. Thomas**, H. S. Bhat, Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics. *Royal Society Meeting: Faulting, friction and weakening: from slow to fast motion*, UK, 2016.

H. S. Bhat, **M. Y. Thomas**, Towards Developing Constitutive Models for Hydro-Mechanical Behaviour of Faults. *AGU Fall Meeting: Pore Fluids, Faulting, and (A)seismicity I*, USA, 2015.

J.-P. Avouac, **M. Y. Thomas**, J. Gratier, Lithological control on the deformation mechanism and the mode of fault slip on the Longitudinal Valley Fault, Taiwan, *AGU Fall Meeting: The Microstructural Record of Aseismic to Seismic Fault Slip II*, USA, 2013.

**M. Y. Thomas**, J.-P. Avouac, J. Champenois, J.-C. Lee, Spatial and temporal evolution of fault slip on the longitudinal valley fault Taiwan, *AGU Fall Meeting: Seismic Rupture and Fault Zone Properties V*, USA, 2012.

N. Lapusta, **M. Y. Thomas**, H. Noda, J.-P. Avouac, Quasi-dynamic versus fully-dynamic simulations of slip accumulation on faults with enhanced dynamic weakening, *AGU Fall Meeting: Theory and Practice in Studies of the Earthquake Cycle: How Do We Reconcile Laboratory Constraints With Field Observations? II*, USA, 2012.

**M. Y. Thomas**, J.-P. Avouac, J.-C. Lee, B. Pyssegur, Y.-J. Hsu, Y.-C. Tsai, H.-Y. Chen, Exploring the conditions for seismic or aseismic fault slip on the Longitudinal Valley Fault, Taiwan, *GEEA Meeting: Neotectonic and seismotectonic studies*, France, 2010.

#### INVITED TALKS

- 2017 *ISTep seminar, UMPC, Paris*. What are the properties and processes controlling the constitutive behavior of active faults?  
*ENS, Paris*. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics.  
*Foalab seminars, University of Oxford*. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics.
- 2016 *GEOAzur seminars, University of Nice*. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics.  
*ISTerre seminars, University of Grenoble*. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics.  
*Active tectonics seminars, University of Oxford*. Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics.  
*Active tectonics seminars, University of Oxford*. Seismic vs aseismic behavior on fault : what controls the spatio-temporal evolution of slip mode? The study case of the longitudinale valley fault, Taiwan.  
*IGT seminars, University of Leeds*. Towards more realistic modeling of earthquake cycles accounting for geological and geodetic observations.  
*Séminaire Tectonique and Mechanics, IGGP*. Effect of Damage on Earthquake Rupture Dynamics  
*ISTep seminar, UMPC, Paris*. Comportement sismique et asismique des failles actives: quels sont les facteurs contrôlant le mode de glissement? Cas de la faille de la vallée longitudinale, Taiwan
- 2015 *Séminaire de l'IUEM, Brest*. Fluage ou glissement sismique sur la faille de la Vallée Longitudinale à Taïwan: quels sont les paramètres qui contrôlent le mode de glissement?  
*Séminaire de Géosciences Montpellier*. Seismic versus Aseismic behavior of fault: what controls the spatio-temporal evolution of slip mode?  
*Séminaire de Géosciences Montpellier*. Seismic versus Aseismic behavior of fault: what controls the spatio-temporal evolution of slip mode?  
*Bullard Seminar, University of Cambridge*. Seismic versus aseismic behavior on the Longitudinal Valley Fault (Taiwan): what controls the slip mode?  
*Séminaire Lyon*. Seismic versus aseismic behavior on the Longitudinal Valley Fault (Taiwan): what controls the slip mode?

- 2014 *Séminaire IPGS*. Seismic versus aseismic behavior on the Longitudinal Valley Fault (Taiwan): what controls the slip mode?  
*IGT seminars, University of Leeds*. Seismic versus aseismic behavior on the Longitudinal Valley Fault (Taiwan): what controls the slip mode?  
*Séminaire de Géosciences Montpellier*. Propriétés frictionnelles des failles: de l'observation sur la faille de la vallée longitudinale à Taïwan, aux simulations numériques.  
*Séminaire de Géosciences Rennes*. Frictional properties of faults : from observation on the Longitudinal Valley Fault (Taïwan) to dynamic simulations.  
*Séminaire Mécanique des Failles, ISTERre*. Frictional properties of faults : from observation on the Longitudinal Valley Fault (Taiwan) to dynamic simulations.
- 2013 *Séminaire Tectonique et Mécanique de la Lithosphère, IPGP3*. Frictional Properties of faults: from observation on the Longitudinal Valley Fault, Taiwan, to dynamic simulations.  
*Seismology and Tectonics Seminar, UCLA*. Spatial and Temporal Evolution of Fault Slip on the Longitudinal Valley Fault, Taiwan.  
*Tectonic Observatory seminar, Caltech*. Spatial and temporal evolution of fault slip on the longitudinal valley fault, Taiwan.
- 2010 *Academia Sinica geosciences seminar*. Exploring the conditions for seismic or aseismic fault slip on the Longitudinal Valley Fault, Taiwan.  
*Séminaire Tectonique et Mécanique de la Lithosphère, IPGP*. Exploring the conditions for seismic or aseismic fault slip on the Longitudinal Valley Fault, Taiwan.  
*Tectonic Observatory seminar, Caltech*. Exploring the conditions for seismic or aseismic fault slip on the Longitudinal Valley Fault, Taiwan.

### PHD THESIS

*Frictional Properties of faults: from observation on the Longitudinal Valley Fault, Taiwan, to dynamic simulations*. Division of Geological and Planetary Sciences, California Institute of Technology (Caltech) small skip

PhD Thesis committee:

<b>Paul Asimow</b>	Caltech	Chair of the Committee
<b>Brian Wernicke</b>	Caltech	Committee Member
<b>Tom Heaton</b>	Caltech	Committee Member
<b>Nadia Lapusta</b>	Caltech	Committee Member
<b>Jean-Philippe Avouac</b>	Caltech	PhD Advisor