VIPUL SILWAL

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Education

PhD candidate in Geophysics — 2012-present
University of Alaska Fairbanks, USA
Thesis: Earthquake sources and wavefield simulation in Alaska.

Integrated BS and MS, Exploration Geophysics — 2007-2012
Indian Institute of Technology (IIT), Kharagpur, India
Thesis: Moment Tensor Inversion in Alaska using Body and Surface Waves.

Experience

Research Assistant University of Alaska Fairbanks — 2012-present

- Moment tensor inversion of small to intermediate magnitude earthquakes in Alaska using body waves, surface waves and polarities.
- Moment tensor and source duration inversion of Very Low frequency earthquakes in interior Alaska.
- Estimation of uncertainty in moment tensors using probabilistic approach.
- Examine effects of topography smoothing and choice of velocity model on the minimum resolvable period of the synthetic seismograms
- Wavefield simulations in wrangell, southern and interior Alaska.
- Preparing a reference velocity model of Alaska for tomographic inverion.

Field Technician Alaska Earthquake Center — Summer 2012, 2013

- Installation and maintainence of seismic stations in Alaska.

Research Assistant University of Alaska Fairbanks and IIT Kharagpur — 2011-2012

- Computation of green's function and synthetics required for moment tensor inversion.
- Gained experience on working in a collaborative environment and version controlled setup.

Research Intern University of Tromso, Norway — Summer 2010

- Seismicity analysis of Hakon Mosbey Mud Volcano (Barents Sea).
- Offshore field trip in Barents Sea for sedimentary coring and seismic reflection survey.

Teaching

Teaching Assistant Physics 211 — Spring 2015

- Teaching Physics 211 lab, Homework help
- Coursework- Physics Teaching Seminar/Practicum

Student mentor
QingPing Yu, undergrad project on moment tensor inversion in interior Alaska.
Joshua Purba, undergrad project on moment tensor inversion in southern Alaska. *(now at University of Calgary)*

Computer Skills

Languages:	Python, C, Fortran, Perl, Latex, Shell scripting
Software:	MATLAB, Obspy, SPECFEM3D, GEOCUBIT, GMT, SAC
Platforms:	Linux, Mac, Windows, CPU cluster, GPU cluster

Publications

11. **Silwal, V.**, C. Tape, and E. Casarotti, A seismic velocity reference model for Alaska. (*in prep*)
10. **Silwal, V.**, C. Tape, and A. Lomax, Crustal earthquakes in the Cook Inlet and Susitna regions, southern Alaska. (*in prep*)

9. Alvizuri, C., **V. Silwal**, L. Krischer, and C. Tape, Estimation of full moment tensors including uncertainties for earthquakes, volcanic events and nuclear explosions. (*in prep*)
8. Tape, C., S. Holtkamp, **V. Silwal**, Y. Kaneko, J. Hawthorne, J. P. Ampuero, N. Ruppert, K. Smith, and M. E. West, Slow-to-fast earthquake nucleation in the lower crust of central Alaska. (*Nature Geosciences, Submitted*)
7. Tape, C., A. Lomax, **V. Silwal**, J. D. Agnew and B. Brettschneider, 2017, The 1904 Ms 7.3 Earthquake in Central Alaska, Bulletin of the Seismological Society of America, Vol. 107, No. 3, pp. 11471174, June 2017, doi: 10.1785/0120160178.
6. **Silwal, V.** and C. Tape, 2016, Seismic moment tensor in Alaska derived from Body waves and Surface waves, Journal of Geophysical Research: Solid Earth., v. 121, doi: 10.1002/2015JB012588.
5. Tape, C., **V. Silwal**, C. Ji, L. Keyson, M.E. West, and N. Ruppert, 2015, Transtensional tectonics of the Minto Flats fault zone and Nenana basin, central Alaska, Bulletin of the Seismological Society of America, Vol. 105, No. 4, pp. 20812100, August 2015, doi: 10.1785/0120150055.
4. Tape, C., M. West, **V. Silwal**, and N. Ruppert, 2013, Earthquake nucleation and triggering on an optimally oriented fault, Earth and Planetary Science Letters, v. 363, p. 231- 241. doi: 10.1016/j.epsl.2012.11.060.
3. Trivedi, D. **et. al.**, 2012, Interpretation of Dune Genesis from the Sedimentological Data and Ground Penetrating Radar (GPR) Signatures: A case study from Ashirmata Dune Field, Mandvi Beach, Gujarat, India, International Journal of Geosciences, 2012, 3, 772-779, doi: 10.4236/ijg.2012.34078.
2. **Silwal, V.**, Online catalog: Seismic moment tensor catalog for southern Alaska, ScholarWorks@UA.
1. **Silwal, V.**, Online catalog: Seismic moment tensor catalog for Minto Flats fault zone (2000-2014), ScholarWorks@UA.

Other Activities

1. Seismology Brownbag talk coordinator at Geophysical Institute, UAF 2013-2014
2. Schlumberger PETREL Seismic Visualization and Interpretation Course 2010
3. TOTAL Well Log Analysis Course 2011

Awards

1. Earthscope National Meeting Scholarship 2017
2. Best student poster at Alaska Geological Society Conference 2016
3. Geophysical Society of Alaska scholarship 2015
4. SEG scholarship 2014
5. IRIS travel grant for IRIS Workshop 2014
6. Geophysical Institute travel grant for AGU Fall Meeting 2013
7. INSPIRE scholarship by the Department of Science & Technology, India 2007-2012

Research Statement

I am interested in theoretical and computational aspects of seismology. Seismology is a data-rich science with tremendous opportunities for understanding source processes and Earth structure. To pursue this I perform forward modeling of wave propagation through a media representative of Earth structure. The misfit between the synthetic thus generated and the observed data is then minimized using different approaches. The inversion technique and the applied minimization depends on many factors, such as theory underneath, linear or non-linear problem, dimensionality of the problem, and computational resources available. The uncertainty in the solution is also an integral part. For source inversion I have tried to quantify the uncertainty using Bayesian approach. These earthquake sources are the priori for the tomographic inversion. With the recent advances in high performance computing people have been able to carry out adjoint tomography at both regional and global scale. Similar effort is undergoing by us to better understand Alaska structure.

References

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