

**Susan L. Bilek**

Earth and Environmental Sciences Dept.

New Mexico Institute of Mining and Technology, Socorro, NM 87801

Email: Susan.Bilek@nmt.edu Webpage: <https://nmt.edu/academics/ees/faculty/sbilek.php>

**Professional Preparation:**

B.S., with honors, Geosciences, minor in Economics, Penn State University, May 1996

M.S., Earth Sciences/Geophysics, University of California, Santa Cruz, June 1998

M.S. Thesis title: *Lower mantle heterogeneity beneath Eurasia imaged by parametric migration of shear waves*

Ph.D. Earth Sciences/Geophysics, University of California, Santa Cruz, June 2001

Ph.D. Dissertation title: *Multi-scale examination of seismogenic zone processes in circum-Pacific subduction zones*

Turner Postdoctoral Fellow, Dept. Geological Sciences, University of Michigan, 2001-2003

**Appointments:**

Professor, Earth and Environmental Science Dept., New Mexico Tech, 2014 – present

Associate Professor, Earth and Environmental Sciences Dept., New Mexico Tech, 2008 – 2014

Assistant Professor, Earth and Environmental Sciences Dept., New Mexico Tech, 2003 – 2008

**Selected Recent Synergistic Activities:**

National/International:

Board of Directors, Seismological Society of America, 2020-2026

PI of IRIS PASSCAL Instrument Center, Oct 2013-2023

Associate Editor, *Geophysical Research Letters*, 2020-2022

Editorial Board, *Tectonophysics*, 2016-2022

Associate Guest Editor, Subduction Top to Bottom 2, special issue of *Geospheres*, 2016-2021

IRIS Board of Directors, 2010-2012, Board secretary 2012

Reviewer: NSF, NNSA, *Science*, *Science Advances*, *Nature*, *Nature Geoscience*, *Earth and Planetary*

*Science Letters*, *Geology*, *Geophysical Research Letters*, *J. Geophysical Research*, *Geochemistry*

*Geophysics Geosystems*, *Bulletin of the Seismological Society of America*, *Geophysical J. International*,

*Tectonophysics*, *Geosphere*, *J. Hydrology*

Selected University Service (NMT):

NMT Search committees - Associate VP for Academic Affairs, 2021, EMRTC Director, 2023

EES Department graduate coordinator, 2008-2013, 2018-2019, 2021-present

NMT Education and Research Efficiency committee, 2019-2023

EES Department Geo Program Coordinator 2012 – 2019

NMT Budget and Research committee, 2017-2019

Manager of NM seismic network, 2005-2014

**Funding Record (PI unless otherwise indicated)**

Dates	Project	Funding Agency	NMT Amount
2023-2025	SAGEII/GAGEII: Student and Staff Support for EarthScope Primary Instrument Center	EarthScope/NSF	\$511,000
2022-2023	Optimizing Machine Learning Capabilities to Detect Earthquakes in Delaware Basin, Southeastern New Mexico	USGS-NEHRP	\$59,00
2019-2023	Monitoring bedload transport: Advancing seismic and acoustic surrogate methods in ephemeral channels (co-PI)	NSF Geomorphology and Geophysics, BSF (Israel)	\$497,177
2018-2022 (NCE-2022)	Collaborative Research: Geophysical characterization of a karst aquifer using dynamic recharge events (co-PI)	NSF-Hydrologic Sciences	\$480,452
2020-2023	Biogeophysics: Seismic activity stimulates microbial activity (co-PI)	Keck Foundation	\$197,000
2018-2023	Operations of the IRIS/PASSCAL Instrument Center at New Mexico Tech (for SAGE II)	IRIS/NSF	\$22,318,096
2014-2016	Developing methods for detection and analysis of repeating earthquakes and non-volcanic tremor using Cascadia Initiative Amphibious Network data	NSF-Marine Geology and Geophysics	\$160,000
2013-2018	Operations of the IRIS/PASSCAL instrument center, in support of Seismological Facilities for the advancement of geoscience and EarthScope	IRIS/NSF	\$25,818,673
2013-2018	Collaborative MRI: Development of Geophysical Earth Observatory for Ice Covered Environments (GEOICE)	IRIS/NSF	\$549,000
2013-2018	Greenland Ice Sheet Monitoring Network	IRIS/NSF	\$791,090
2013-2015	Deep megathrust conditions by comparing seismicity rates and source with tremor, slow slip, and the Mw 7.4 Ometepec, Mexico earthquake	NSF-Geophysics	\$161,726
2012-2013	Examining the variation in earthquake parameters along the Nicaragua and Costa Rica subduction zone using onshore and offshore seismic data	NSF-Geophysics	\$61,800
2011-2014	Rio Grande Rift II: Kinematics and dynamics of continental deformation in low strain rate environments (co-PI)	NSF-EarthScope	\$132,972
2009-2014	Monitoring of Seismic Activity Near the Waste Isolation Pilot Plant (WIPP) Site	Washington TRU-Solutions (DOE)	\$543,717
2009-2011	Defining locations and patch sizes for slow earthquake ruptures in subduction zones	NSF-MGG	\$110,300
2008-2010	Characterization of subduction zone earthquake rupture parameters with respect to subduction zone complexity	NSF-MGG	\$117,598
2008-2009	Explosion source characterization of underground nuclear tests at the Nevada test site using data from	Los Alamos National Lab	\$54,000

	the LLNL and SNL archives		
2006-2008	Development and application of modern analysis techniques to determine yields of Nevada Test Site explosions using Sandia National Laboratory seismic data	Sandia University Research Program (SURP)	\$80,000
2006-2008	Examination of earthquake stress drop variations using coda waves	Los Alamos National Lab	\$35,000
2005-2008	Finite element modeling of a subducted topographic high: Determining regional stress changes due to subducting features	NSF-Geophysics	\$132,235

### **Current Student and Postdoctoral Advisees**

Siobhan Niklasson – PhD student

John Mitchell McLaughlin – PhD student

### **Previous Graduate Student and Postdoctoral Advisees**

Dr. Jessica Aerts, PhD, graduated 2024, scientist at Sandia National Lab

Dr. Jacob Gochenour, PhD, graduated 2024, scientist at NNSA

John Mitchell McLaughlin, MS, graduated 2023, PhD student at NMT

Dr. Rhiannon Viececi, PhD, graduated 2022, scientist at Sandia National Lab

Jonathan Schmidt, M.S., graduated 2022, geologist at Kentucky Geological Survey

Dr. Emily Morton, M.S (2013), PhD, graduated 2020, scientist at U. Utah Seismograph Stations

Rosalynn Wang, M.S., graduated 2016, scientist, Verisk

Dr. Holly Rotman, Ph.D., graduated 2015, data specialist, IRIS PASSCAL, NM

Stanislav Edel, M.S., graduated 2015, physicist with Infinite Optics, CA

Steven Bernsen, M.S., graduated 2015, operations research, Wilson Alaska Technical Center

Dr. Kyle Murray, M.S., (academic advisor), graduated 2015, U. Hawaii

Ashley Hutton, M.S., (academic advisor), graduated 2015, geophysicist at Chevron

Paige Czoski, M.S., (academic advisor), graduated 2014, NM State Land Office

Katherine Anderson, M.S., graduated 2012, seismologist, Sandia National Lab

Dr. Maya El Hariri, Ph.D., graduated 2012, geophysicist with BP Houston

Dr. Pamela Moyer, M.S., graduated 2010, postdoc, U. of New Hampshire

Dr. Christine Ruhl, M.S., graduated 2010, senior scientist, Verisk

Jana Stankova-Pursley, M.S., graduated 2009, data analyst, USGS NEIC

John Morton, M.S., graduated 2008, data analyst, LDEO

Candy Elliott, M.S., graduated 2007, geologist with AMEC Geomatrix

Dr. Kimberly Schramm, postdoctoral researcher, 2006-2010, research analyst, University Research Association

Dr. Han Byul Woo, postdoctoral researcher 2021-2023, NASA postdoc

Dr. Urbi Basu, postdoctoral researcher 2022-2024, manager, NMT Seismological Observatory

### **Teaching Experience (NMT, most recent year taught)**

Earth Processes (GEOL 1101) –2022

Earth Science as a Profession (GEOL 1110) - 2024

Catastrophic Earth (ERTH 150) - 2018

Earthquake and Volcano Hazards (ERTH 389) – 2022

Earth Science Math Review (GEOL 3089) = 2024

General Geophysics (GEOL 448) - 2023

Computational Methods for Geoscientists (GEOP 501) - 2017  
Theoretical Seismology (GEOP 523) –2022  
Observational Seismology (GEOP 524) - 2023  
Tectonophysics (GEOP 525) - 2011  
Mechanics of Earthquakes and Faulting (GEOP/GEOL 558) - 2018  
Subduction Zone Processes (GEOP 572) – 2015  
Current Topics in Earthquake Seismology (GEOP 5070) - 2024  
Graduate Seminar (GEOL/GEOP/HYD 592) –2021

### Professional Societies and Honors

2024 Elected to SSA President-elect  
2020, 2023 Elected to Seismological Society of America Board of Directors (2 3-year terms)  
2009 Elected to IRIS Board of Directors  
2007 New Mexico Tech Distinguished Teacher Nominee  
2001 - 2003 Turner Fellowship, University of Michigan  
2000 UC Institute of Geophysics and Planetary Physics Young Fellow  
1996 – present SSA and AGU member

**Publications: h-index = 28, i10-index=50 total citations = 4874 (as of June 2024, Google Scholar)**  
(\* student or postdoc first author)

1. \*Gochenour, J.A., Rinehart, A.J., Luhmann, A.J., Grapenthin, R., **Bilek, S.L.**, Poroelastic Response to Karst Conduit Pressurization: A Finite Element Modeling Exercise Toward the Use of Tiltmeters in Karst Aquifer Monitoring Applications, *Water Resources Res.*, <http://doi.org/10.1029/2022WR034293>, 2024.
2. \*Gochenour, J., **Bilek, S.L.**, Woo, H.B., Luhmann, A., Grapenthin, R., Martin, J., Ambient Seismic Noise Tomography within the Floridan Aquifer System, Santa Fe River-Sink Rise, Florida, U.S, *J. Geophysical Research-Solid Earth*, 129, e2023JB027644. <https://doi.org/10.1029/2023JB027644>, 2024.
3. **Bilek, S.L.**, Luhmann, A.J., Grapenthin, R., Woo, H.B., and Gochenour, J.A., Capturing seismic signals from karst aquifer injection experiments and a natural recharge event, *J. Geophys. Res.*, 128, e2022JB025635. <https://doi.org/10.1029/2022JB025635>, 2023.
4. Morton, E.A., **Bilek, S.L.**, and Rowe, C.A., Cascadia Subduction Zone Fault Heterogeneities from Newly Detected Small Magnitude Earthquakes, *J. Geophys. Res.*, 128, e2023JB026607, <https://doi.org/10.1029/2023JB026607>, 2023.
5. \*Niklasson, S.M., Veneziani, M., Rowe, C.A., Worcester, P.F., Dzieciuch, M.A., **Bilek, S.L.**, Price, S.F., and Roberts, A.F., Estimating Arctic ocean acoustic travel times using an Earth system model, *Geophys. Res. Lett.*, 50, e2022GL102216. <https://doi.org/10.1029/2022GL102216>, 2023.
6. \*Woo, H.B., **Bilek, S.L.**, Gochenour, J.A., Grapenthin, R., Luhmann, A.J., Martin, J.B., Processing ambient noise data using phase cross-correlation and application towards understanding spatiotemporal environmental effects, *J. Geophys. Res. Earth Surface*, <https://doi.org/10.1029/2023JF007091>, 2023.
7. \*Glasgow, M., Schmandt, B., and **Bilek, S.L.**, Cascading Multi-Segment Rupture in an Injection-Induced Earthquake Sequence with a Mw 5.3 Mainshock, *Earth Planet. Sci. Lett.*, 620, 118335, <https://doi.org/10.1016/j.epsl.2023.118335>, 2023.
8. Rowe, C.A., Nuñez-Cornu, F.J., Nuñez, D., **Bilek, S.**, Lindsey, N., Advances in Ocean Bottom Seismology, *Frontiers in Earth Science (Solid Earth Geophysics section)*, doi:

10.3389/feart.2022.852059, 2022.

9. \*Glasgow, M., Schmandt, B., Wang, R., Zhange, M., **Bilek, S.L.**, Kiser, E., Raton Basin induced seismicity is hosted by networks of short basement faults and mimics tectonic earthquake statistics, *J. Geophys. Res.*, doi: 10.1029/2021JB022839, 2021.
10. \*Finlay, T.S., Worthington, L.L., Schmandt, B., Ranasinghe, N.R., **Bilek, S.L.**, and Aster, R.C., Teleseismic scattered-wave imaging using a large-N array in the Albuquerque Basin, New Mexico, *Seismo. Res. Lett.*, *91*, 287-303, doi:10.1785/0220190146, 2020.
11. Sweet, J.R., Huerta, A., Winberry, P., Anderson, K., Beaudoin, B., **Bilek, S.L.**, Carpenter, P., and Woodward, R., Building a geophysical Earth observatory for ice-covered environments (GEOICE), *EOS*, 2020.
12. Pankow, K.L., Stickney, M., Ben-Horin, J.Y., Litherland, M., Payne, S., Koper, K.D., **Bilek, S.L.**, and Bogolub, K., Regional seismic network monitoring in the eastern Intermountain West, *Seismo. Res. Lett.*, *91*, 631-646, doi: 10.1785/0220190209, 2020.
13. \*Morton, E.A., **Bilek, S.L.**, and Rowe, C., Newly detected earthquakes in Cascadia subduction zone linked to seamount subduction and deformed upper plate, *Geology*, *46*, 943-946, doi:10.1130/G45354.1, 2018.
14. **Bilek, S.L.** and Lay, T., Subduction zone megathrust earthquakes, (invited review paper) *Geospheres*, *14*, doi:10.1130/GES01608.1, 2018.
15. **Bilek, S.L.**, Schmandt, B., Worthington, L.L., Aster, R.C., Finlay, T.S., and Schmidt, J., The 2015 Sevilleta Socorro Magma Body mixed-mode seismic experiment, *Seismo. Res. Lett.*, doi: 10.1785/0220180070, 2018.
16. Sweet, J.R., Anderson, K.R., **Bilek, S.**, Brudzinski, M., Chen, X., DeShon, H., Hayward, C., Karplus, M., Keranen, K., Langston, C., Lin, F-C., Magnani, B., Woodward, R.L., A community experiment to record the full seismic wavefield in Oklahoma, *Seismo. Res. Lett.*, doi:10.1785/0220180079, 2018.
17. Ranasinghe, N.R., Worthington, L.L., Schmandt, B., Jiang, C.X., Finlay, T. , **S.L. Bilek**, and Aster, R.C., Upper crustal shear wave velocity structure of the south-central Rio Grande Rift above the Socorro magma body imaged with ambient noise by the large-N Sevilleta seismic array, *Seismo. Res. Lett.*, *89*, 1708-1719, doi:10.1785/0220180074, 2018.
18. \*Ortiz, J.P., Person, M.A., Mozley, P.S., Evans, J.P., and **Bilek, S.L.**, The Role of Fault-Zone Architectural Elements on Pore Pressure Propagation and Induced Seismicity, *Groundwater*, doi:10.1111/gwat.12818, 2018.
19. \*Nakai, J.S., Weingarten, M., Sheehan, A.F., **Bilek, S.L.**, and Ge, S., A possible causative mechanism of Raton Basin, New Mexico and Colorado earthquakes using recent seismicity patterns and pore pressure modeling, *J. Geophys. Res.*, doi:10.1002/2017JB014415, 2017.
20. \*Nakai, J.S., Sheehan, A.F. and **Bilek, S.L.**, Seismicity of the rocky mountains and Rio Grande Rift from the EarthScope Transportable Array and CREST temporary seismic networks, 2008-2010, *J. Geophys. Res.*, *122*, 1–20, doi:10.1002/2016JB013389, 2017.
21. **Bilek, S.L.** Rotman, H.M., and Phillips, W.S., Low Stress Drop Earthquakes in the Rupture Zone of the 1992 Nicaragua Tsunami Earthquake, *Geophys. Res. Lett.*, *43*, doi:10.1002/2016GL070409, 2016.
22. \*Zhang, Y., Edel, S.S., Pepin, J., Person, M., Broadhead, R., Stone, W., **Bilek, S.L.**, Mozley, P., and Evans, J.P., Exploring the Potential Linkages Between Oil-Field Brine ReInjection, Crystalline

Basement Permeability, and Triggered Seismicity for the Dagger Draw Oil Field, Southeastern New Mexico, USA Using Hydrologic Modeling, *Geofluids*, doi: 10.1111/gfl.12199, 2016.

23. \*Morton, E.A. and **Bilek, S.L.**, Preliminary event detection of earthquakes using Cascadia Initiative data, *Seismo. Res. Lett.*, 86, doi:10.1785/0220150098, 1270-1277, 2015.
24. \*Morton, E., and **Bilek, S.L.**, Limited dynamic triggering in the Socorro Magma Body region, Rio Grande Rift, New Mexico, *Bull. Seismo. Soc. Am.*, 104, 2182-2193, doi: 10.1785/0120140021, 2014.
25. Wang, K. and **Bilek, S.L.**, Invited review paper: Fault creep caused by subduction of rough seafloor relief, *Tectonophysics*, doi: 10.1016/j.tecto.2013.11.024, 2013.
26. \*El Hariri, M., **Bilek, S.L.**, DeShon, H.R., Engdahl, E.R., and Bisrat, S., Along-strike variability of rupture duration in subduction zone earthquakes, *J. Geophys. Res.*, doi:10.1029/2012JB009548, 2013.
27. Pursley, J., **Bilek, S.L.** and Ruhl, C., Earthquake catalogs for New Mexico and bordering areas: 2005-2009, *New Mexico Geology*, 35, 3-12, 2013.
28. \*Schramm, K., Patton, H., Abbott, R., **Bilek, S.**, Panha, A., and Asten, M., Broadband Rayleigh-wave dispersion curve and shear wave velocity structure for Yucca Flat, Nevada, *Bull. Seismo. Soc. Am.*, 102, doi:10.1785/0120110296, 2012.
29. **Bilek, S.L.**, DeShon, H.R., and Engdahl, E.R., Spatial variations in earthquake source characteristics within the 2011 Mw=9.0 Tohoku, Japan rupture zone, *Geophys. Res. Lett.* 39, L09304, doi:10.1029/2012GL051399, 2012.
30. **Bilek, S.L.**, Engdahl, E.R., DeShon, H.R., and El Hariri, M., The 25 October 2010 Sumatra tsunami earthquake: Slip in a slow patch, *Geophys. Res. Lett.* 38, L14306, doi:10.1029/2011GL047864, 2011.
31. \*Stankova-Pursley, J., **Bilek, S.L.**, Phillips, W.S. and Newman, A.V., Along-strike variations of earthquake apparent stress at the Nicoya Peninsula, Costa Rica subduction zone, *Geochem. Geophys. Geosyst.*, 12, Q08002, doi:10.1029/2011GC003558, 2011.
32. Wang, K. and **Bilek, S.L.**, Do subducting seamounts generate or stop earthquakes?, *Geology*, 39, 819-822, doi: 10.1130/G31856.1, 2011.
33. \*El Hariri, M., and **Bilek, S.L.**, Stress changes and aftershock distribution of the 1994 and 2006 Java subduction zone earthquake sequences, *J. Geophys. Res.*, 116, B06306, doi:10.1029/2010JB008124, 2011.
34. \*Moyer, P., **Bilek, S.L.**, and Phillips, W.S., Apparent stress variations near the Osa Peninsula, Costa Rica, influenced by subducted bathymetric features, *Geophys. Res. Lett.*, 38, L02304, doi:10.1029/2010GL045955, 2011.
35. **Bilek, S.L.**, Seismicity along the South American subduction zone: Large earthquakes, tsunamis, and subduction zone complexity (invited review paper), *Tectonophysics*, 495, 2-14, doi: 10.1016/j.tecto.2009.02.037, 2010.
36. \*Ruhl, C., **Bilek, S.L.**, and Stankova-Pursley, J., Relocation and characterization of the August 2009 microearthquake swarm above the Socorro Magma Body in the central Rio Grande Rift, *Geophys. Res. Lett.*, 37, L23304, doi:10.1029/2010GL045162, 2010.
37. **Bilek, S.L.**, The role of subduction erosion on seismicity, *Geology*, 38, 479-480, doi:10.1130/focus052010.1, 2010.
38. **Bilek, S.L.**, Elliott, C.E., Lithgow-Bertelloni, C., Triggered seismicity associated with the 1990 Nicoya

- Gulf, Costa Rica (Mw=7.0) earthquake, *Geochem. Geop Geosystems*, 10, Q04S13, doi:10.1029/2008GC002317, 2009.
39. \*Stankova-Pursley, J., **Bilek, S.L.**, Rowe, C.A., and Aster, R.C., Characteristics of the October 2005 microearthquake swarm and reactivation of seismic swarms over decade-scale time periods near Socorro, New Mexico, *Bull. Seismo. Soc. Am.*, 98, 93-105, doi: 10.1785/0120070108, 2008.
  40. **Bilek, S.L.** and Engdahl, E.R., Rupture characterization and relocation of aftershocks for the 1994 and 2006 tsunami earthquakes in the Java subduction zone, *Geophys. Res. Lett.*, 34, L20311, doi:10.1029/2007GL031357, 2007.
  41. **Bilek, S.L.**, Using earthquake rupture variations along the Sumatra-Andaman subduction system to examine fault zone variations, *Bull. Seismo. Soc. Am.*, 97, S62-S70, doi: [10.1785/0120050622](https://doi.org/10.1785/0120050622), 2007.
  42. Geist, E.L., Titov, V.V., Arcas, D., Pollitz, F., and **Bilek, S.L.** Implications of the December 26, 2004 Sumatra-Andaman earthquake on tsunami forecast and assessment models for great subduction zone earthquakes, *Bull. Seismo. Soc. Am.*, 97, S249-S270, doi: 10.1785/0120050619, 2007.
  43. **Bilek, S.L.**, Satake, K., and Sieh, K., Introduction to the Special Issue on the 2004 Sumatra-Andaman earthquake, *Bull. Seismo. Soc. Am.*, 97, S1-S5, doi: 10.1785/0120050633, 2007.
  44. **Bilek, S.L.**, Influence of subducting topography on earthquake rupture, in *The Seismogenic Zone of Subduction Thrust Faults*, ed. T.Dixon and C.Moore, Columbia University Press, pg. 123-146, doi: 10.7312/dixo13866-005, 2007.
  45. Lay, T. and **Bilek, S.L.**, Anomalous earthquake ruptures at shallow depths on subduction zone megathrusts, in *The Seismogenic Zone of Subduction Thrust Faults*, ed. T.Dixon and C.Moore, Columbia University Press, pg. 476-511, doi: [10.7312/dixo13866-015](https://doi.org/10.7312/dixo13866-015), 2007.
  46. Geist, E.L., **Bilek, S.L.**, Arcas, D., Synolakis, C.E., Titov, V.V., and Oppenheimer, D.H., Differences in tsunami generation between the December 26, 2004 and March 28, 2005 Sumatra earthquakes, *Earth, Planets, Space*, 58, 185-193, doi: [10.1186/BF03353377](https://doi.org/10.1186/BF03353377), 2006.
  47. **Bilek, S.L.** and Lithgow-Bertelloni, C., Stress changes in the Costa Rica subduction zone due to the 1999  $M_w=6.9$  Quepos earthquake, *Earth Planet. Sci. Lett.*, 230, 97-112, doi: [10.1016/j.epsl.2004.11.020](https://doi.org/10.1016/j.epsl.2004.11.020), 2005.
  48. Lay, T., Kanamori, H., Ammon, C.J., Nettles, M., Aster, R., Beck, S.L., **Bilek, S.L.**, Brudzinski, M.R., Butler, R., DeShon, H., Ekstrom, G., Satake, K., Sipkin, S., and Ward, S.N., The great Sumatra-Andaman earthquake of December 26, 2004, *Science*, 308, 1127-1133, doi: 10.1126/science.1112250, 2005.
  49. **Bilek, S.L.**, Conrad, C.P. and Lithgow-Bertelloni, C., Slab pull, slab weakening, and their relationship to deep intra-slab seismicity, *Geophys. Res. Lett.*, 32, L14305, doi:10.1029/2005GL022922, 2005.
  50. **Bilek, S.L.**, Lay, T., and Ruff, L.J., Radiated seismic energy and earthquake source duration variations from teleseismic source time functions for shallow subduction zone thrust earthquakes, *J. Geophys. Res.*, 109, B09308, doi:10.1029/2004JB003039, 2004.
  51. Conrad, C.P., **Bilek, S.L.** and Lithgow-Bertelloni, C., Great earthquakes and slab-pull: Interaction between seismic coupling and plate-slab coupling, *Earth Planet. Sci. Lett.*, 218, 109-122, doi: [10.1016/S0012-821X\(03\)00643-5](https://doi.org/10.1016/S0012-821X(03)00643-5), 2004.
  52. DeShon, H.R., Schwartz, S.Y. **Bilek, S.L.**, Dorman, L.M., Protti, J.M., Gonzalez, V., Flueh, E.R. and Dixon, T.H., Seismogenic zone structure of the southern Middle America Trench, Costa Rica, *J.*

*Geophys. Res.*, 108, 2491, doi:10.1029/2002JB002294, 2003.

53. **Bilek, S.L.**, Schwartz, S.Y. and DeShon, H.R., Control of seafloor roughness on earthquake rupture behavior, *Geology*, 31, 455-458, doi: [10.1130/0091-7613\(2003\)031<0455:COSROE>2.0.CO;2](https://doi.org/10.1130/0091-7613(2003)031<0455:COSROE>2.0.CO;2), 2003.
54. **Bilek, S.L.** and Ruff, L.J., Analysis of the June 23, 2001 Mw=8.4 Peru underthrusting earthquake and its aftershocks, *Geophys. Res. Lett.*, 29, 1960, doi:10.1029/2002GL015543, 2002.
55. **Bilek, S.L.** and Lay, T., Tsunami earthquakes possibly widespread manifestations of frictional conditional stability, *Geophys. Res. Lett.*, 29, 1673, doi:10.1029/2002GL015215, 2002.
56. Geist, E.L. and **Bilek, S.L.**, Effect of depth-dependent shear modulus on tsunami generation along subduction zones, *Geophys. Res. Lett.*, 28, 1315-1318, doi: [10.1029/2000GL012385](https://doi.org/10.1029/2000GL012385), 2001.
57. **Bilek, S.L.** and Lay, T., Depth dependent rupture properties in Circum-Pacific subduction zones, *GeoComplexity and the Physics of Earthquakes*, AGU Geophys. Monograph 120, 165-186, doi: [10.1029/GM120p0165](https://doi.org/10.1029/GM120p0165), 2000.
58. **Bilek, S.L.** and Lay, T., Comparison of depth dependent fault zone properties in the Japan trench and Middle America trench, *Pure and Applied Geophysics*, 154, 433-456, doi: 10.1007/978-3-0348-8679-6\_3, 1999.
59. **Bilek, S.L.** and Lay, T., Rigidity variations with depth along interplate megathrust faults in subduction zones, *Nature*, 400, 443-446, doi: [10.1038/22739](https://doi.org/10.1038/22739), 1999.
60. **Bilek, S.L.** and Lay, T., Variation in interplate fault zone properties with depth in the Japan subduction zone, *Science*, 281, 1175-1178, doi: 10.1126/science.281.5380.1175, 1998.
61. **Bilek, S.L.** and Lay, T., Lower mantle heterogeneity beneath Eurasia imaged by parametric migration of shear waves, *Physics of the Earth and Planetary Interiors*, 108, 201-218, doi: [10.1016/S0031-9201\(98\)00105-8](https://doi.org/10.1016/S0031-9201(98)00105-8), 1998.
62. Brocher, T.M., **Bilek, S.L.**, Clayton, R.W., Fuis, G.S., and Okaya, D.A. Stacked wide-angle recordings of air-gun signals from the 1994 Los Angeles Region Seismic Experiment (LARSE), California, *USGS Open File Report 97-132*, doi: [10.3133/ofr97132](https://doi.org/10.3133/ofr97132), 1997.

**Recent Abstracts (2019-2024, \* student first author, † winner of student presentation award):**

1. **Bilek, S.L.**, McLaughlin, J.M., Luong, L., Cadol, D., Laronne, J., Characterization of Green's Function Parameters for Seismic-based Bedload Predictions: Application to Arroyo de los Pinos, NM Bedload Observatory, AGU Fall meeting, December 2023
2. Niklasson, S.\*, Rowe, C., **Bilek, S.**, Exploring the impacts of oceanographic and geologic factors on ocean-bottom seismic noise, AGU Fall meeting, December 2023
3. Basu, U.\*, **Bilek, S.L.**, and Litherland, M., Optimizing automated earthquake detection methods in Delaware Basin, southeastern New Mexico, AGU Fall meeting, December 2023
4. McLaughlin, J.M.\*, **Bilek, S.L.**, Cadol, D., Laronne, J.B., and **Luong, L.**, Unique Features of Seismic Signals Generated by Flash Floods at the Arroyo de los Pinos, AGU Fall meeting, December 2023
5. Aerts, J.\* and **Bilek, S.L.**, Relocation and Characterization of a 20-Year Earthquake Catalog Above the Socorro Magma Body in Central New Mexico, USA, AGU Fall meeting, December 2023.
6. Glasgow, M.\*, Schmandt, B., and **Bilek, S.**, Cascading-multisegmented rupture and earthquake triggering during a moderate magnitude injection-induced earthquake sequence, AGU Fall meeting, December 2023.
7. Luong, L.\*, Cadol, D., McLaughlin, J.M., **Bilek, S.**, Turowski, J.M., and Laronne, J.B., Seismic modeling of bedload transport in sandy gravel-bed alluvial channels, AGU Fall meeting, December



2023

8. Velasco, A.A., Weidner, J., Karplus, M., **Bilek, S.**, Bolton Valencius, C., Brudzinski, M., Chandrasekhar, D., Ebel, J., Hobbs, T., Hurtado, J.M., Jaume, S., Jones, E., Kafka, A., Lin, Y., Nunez, A-M., Pankow, K., Peng, Z., Savvaidis, A., Tien, I., Vanacore, E., Alvillar, M., Transforming Earthquake Science and Engineering Using Collective Impact: The Center for Collective Impact in Earthquake Science (C-CIES), AGU Fall meeting, December 2023
9. Lam, E.N\*, Noble, M.W., Luhmann, A.J., Woo, H.B., Gochenour, J.A., **Bilek, S.L.**, Grapenthin, R., Martin, J.B., Flint, M.K., and Covington, M.D., Comparison of electrical conductivity and temperature datasets along a karst sink-rise flow system to infer flow dynamics, Geological Society of America Annual Meeting, 2023.
10. Noble, M.W\*, Lam, E.N., Luhmann, A.J., Woo, H.B., Gochenour, J.A., **Bilek, S.L.**, Grapenthin, R., Martin, J.B., Flint, M.K., and Covington, M.D., Inferring hydrologic architecture from the propagation of water level signals at a karst sink-rise flow, Geological Society of America Annual Meeting, 2023
11. **Bilek, S.L.**, McLaughlin, J.M., Cadol, D., Laronne, J.B., Stark, K., Luong, L., Varyu, D., Overview of Bedload Estimates Based on Seismic Monitoring at the ephemeral Arroyo de los Pinos tributary of the Rio Grande, New Mexico, SedHyd annual conference 2023.
12. \*McLaughlin, J.M., **Bilek, S.L.**, Cadol, D., Laronne, J.B., Varyu, D., Field methods and instrument types for using seismic monitoring of bedload in sand-rich gravel bed ephemeral channels, SedHyd annual conference 2023
13. Stark, K., Cadol, D., Laronne, J.B., Varyu, D., **Bilek, S.**, Richards, M., Pimentel, S., Glasgo, S., McLaughlin, M., Luong, L., Moskal, R., Seven years of sediment measurements at the Arroyo de los Pinos monitoring station, SedHyd annual conference 2023.
14. \*Luong, L., Cadol, D., **Bilek, S.**, McLaughlin, J.M., Turowski, J.M., Laronne, J.B., and Varyu, D., Quantifying bedload transport in ephemeral channels using seismic methods, SedHyd annual conference 2023.
15. **Bilek, S.L.**, Morton, E., Heterogeneous earthquake distributions and stress drop estimates along the Cascadia subduction megathrust and upper plate faults, European Geophysical Union meeting, April 2023 (invited oral)
16. **Bilek, S.L.**, McLaughlin, J.M., Cadol, D., and Laronne, J.B., Using Seismic Methods to Monitor Bedload Transport Along a Desert Environment Ephemeral Tributary, European Geophysical Union meeting, April 2023
17. **Bilek, S.L.**, McLaughlin, J.M., Cadol, D., and Laronne, J.B., Using Seismic Methods to Monitor Bedload Transport Along a Desert Environment Ephemeral Tributary, Seismological Society of America meeting, April 2023
18. Basu, U., **Bilek, S.L.**, Litherland, M., Optimizing earthquake detection methods in Delaware Basin, southeastern New Mexico, Seismological Society of America meeting, April 2023
19. \*Glasgow, M., Schmandt, B., and **Bilek, S.L.**, Cascading and multi-segment rupture of a Mw 5.3 injection-induced earthquake, Seismological Society of America meeting, April 2023
20. \*Niklasson, S., Rowe, C., **Bilek, S.** Impacts of oceanographic and geologic factors on ocean-bottom seismic noise, Seismological Society of America meeting, April 2023
21. \*Hamawi, M., Laronne, J.B., **Bilek, S.**, Turowski, J., Goren, L., and Johnson, J.P.L., Detecting bedload transport by seismometers and ‘smart’ pebbles in ephemeral streams, Israeli Geological Society mtg, spring 2023.
22. \*Luong, L., Cadol, D., **Bilek, S.**, McLaughlin, J.M., and Laronne, J., Quantifying bedload transport in ephemeral channels using seismic methods, Geological Society of America annual meeting, fall 2022.
23. \*Niklasson, S., Veneziani, M., Rowe, C., **Bilek, S.**, Price, S., Roberts, A., Worcester, P., Dzieciuch, M., Toward predicting Arctic Ocean acoustic travel times using an Earth system model, Acoustical Society of America meeting, fall 2022.

24. **Bilek, S.L.**, Gochenour, J.A., Luhmann, A.J., Woo, H.B., Grapenthin, R., Martin, J.B., Site characterization and seismic noise correlation with hydrologic data using a dense nodal seismic array deployed within the Santa Fe Sink-Rise, FL, USA karst aquifer system, American Geophysical Union annual meeting, fall 2022
25. \*Niklasson, S, Rowe, S., and **Bilek, S.** Noise characteristics of an ocean-bottom seismic network, American Geophysical Union annual meeting, fall 2022.
26. \*Emerson, E., Baer, J., Dunbar, S., **Bilek, S.L.**, Gochenour, J.A., Woo, H.B., Grapenthin, R., Martin, J.B., Luhmann, B.J., and Luhmann, A.J., Interactive museum exhibit illustrating seismic responses during flow through karst aquifers, American Geophysical Union annual meeting, fall 2022
27. Woo, H.B., **Bilek, S.L.**, Gochenour, J.A., Luhmann, A.J., Grapenthin, R., and Martin, J.B., High Frequency Ambient Noise Seismic Data Processing and Quality Control Towards Monitoring Changes in Spatio-Temporal Seismic Velocities, American Geophysical Union annual meeting, fall 2022.
28. \*Aerts, J. and **Bilek, S.L.**, Relocation of 2002-2009 Seismicity Above the Socorro Magma Body, Central New Mexico, USA, American Geophysical Union annual meeting, fall 2022.
29. Luhmann, A.J., Woo, H.B., Gochenour, J.A., Kranendonk, E.A., Covington, M.D., **Bilek, S.L.**, Grapenthin, R., Martin, J.B., Flint, M.K., Cross correlation of hydrologic data to assess water exchange between conduits and the surrounding rock matrix in karst aquifers, American Geophysical Union annual meeting, fall 2022.
30. \*McLaughlin, J.M., **Bilek, S.L.**, Cadol, D., Laronne, J., The Seismic Signature of Small Flash Flood Events in a Sand-rich Gravel-bed Arroyo, American Geophysical Union annual meeting, fall 2022.
31. \*Kranendonk, E.A., Luhmann, A.J., Woo, H.B., Gochenour, J.A., Covington, M.D., Flint, M.K., **Bilek, S.L.**, Grapenthin, R., Rinehart, A.J., and Martin, J.B., Cross correlation of hydrologic data to assess water exchange between conduits and the surrounding rock matrix in karst aquifers, American Geophysical Union annual meeting, fall 2022.
32. Velasco, A., Karplus, M., Weidner, J., **Bilek, S.**, Brudzinski, M., Ebel, J., Hobbs, T., Jaume, S., Pankow, K., Peng, Z., Savvaidis, A., Vanacore, E., Chandrasekhar, D., Valencius, C., Nunez, A-M., Jones, E., Hurtado, J.M., Center for Collective Impact in Earthquake Science (C-CIES): Building Inclusive Excellence, Diversity, Equity, and Community into Earthquake Science, American Geophysical Union annual meeting, fall 2022.
33. \*McLaughlin, M., **Bilek, S.**, Cadol, D., Seismic monitoring of flash floods—sediment transport, flood detection, and flow characteristics inferred from seismic signals in an ephemeral watershed, New Mexico Geological Society annual meeting, Apr 2022.
34. \*Luong, L., Cadol, D., **Bilek, S.**, and J.M. McLaughlin, Sediment transport in ephemeral channels: Validation of physics-based model and development of data-driven model, NMGS annual meeting, spring 2022
35. **Bilek, S.L.**, McLaughlin, M., Cadol, D., Laronne, J.B., Stark, K., Gochenour, J., Combined multi-year seismic, sedimentological, and hydrologic data collection and analysis from a state-of-the art sediment research station in an ephemeral tributary of Rio Grande, central New Mexico, USA, American Geophysical Union annual meeting, Dec 2021.
36. \*Gochenour, J.A., Rinehart, A.J., Luhmann, A.J., Grapenthin, R., **Bilek, S.L.**, Finite Element Modeling of Poroelastic Response to Karst Conduit Pressurization and Subsequent Change in Groundwater Storage: Toward the Use of High Precision Tiltmeters in Karst Aquifer Monitoring Applications, American Geophysical Union annual meeting, Dec 2021.
37. \*Glasgow, M., Schmandt, B., Wang, R., Zhang, M., **Bilek, S.** Kiser, E., Induced Seismicity in the Raton Basin Reactivates Networks of Short Basement Faults and Earthquake Statistics Mimic Tectonic Sequences, American Geophysical Union annual meeting, Dec 2021.
38. \*Aerts, J. and **Bilek, S.L.**, GrowClust and HypoDD relocation and characterization of the 2009 earthquake swarm above the Socorro Magma Body, central New Mexico, USA, American Geophysical

- Union annual meeting, Dec 2021.
39. \*McLaughlin, M., **Bilek, S.L.**, Cadol, D., Laronne, J.B., Stark, K., Glasgow, S., Seismic monitoring of bedload in monsoon floods in gravel bed arroyos in central New Mexico, American Geophysical Union annual meeting, Dec 2021.
  40. van Wijk, J., Axen, G., Grapenthin, R., **Bilek, S.**, Phillips, F., Waters, L., Naliboff, J., Okonkwo, B., Emplacement of a mid-crustal sill in an active continental rift: the Socorro magma body, Rio Grande rift, American Geophysical Union annual meeting, Dec 2021.
  41. \*McLaughlin, J.M., **Bilek, S.**, and Cadol, D., Seismic analysis of monsoon flood events in an ephemeral channel in central New Mexico, NM WRRRI conference, fall 2021.
  42. **Bilek, S.L.** and E.A. Morton, Examining Cordilleran subduction zone megathrust slip heterogeneity across magnitude scales, Geological Society of America Annual Meeting, Oct 2021 (invited)
  43. **Bilek, S.L.** and E.A. Morton, Subduction zone heterogeneity observed across the magnitude spectrum for megathrust earthquakes, EGU21-8100, EGU general Assembly, 19-30 April 2021 (invited).
  44. Morton, E.A., **Bilek, S.L.**, and Rowe, C.A., Using small earthquakes and the amphibious Cascadia Initiative dataset to probe Cascadia subduction zone heterogeneities, Seismological Society of America Annual Meeting, 2021.
  45. \*Gochenour, J.A., **Bilek, S.L.**, Woo, H.-B., Luhmann, A.J., Grapenthin, R., Martin, J.B., Seismic responses to the rate-of-change of surface and groundwater level within a karst aquifer system, Santa Fe River Sink-Rise, north-central Florida, AGU fall meeting, December 2020.
  46. Luhmann, A.J. **Bilek, S.L.**, Grapenthin, R., Covington, M.D., Seismic observations of possible overpressured air pocket release in karst aquifers, AGU fall meeting, December 2020.
  47. \*Woo, H.-B., **Bilek, S.L.**, Gochenour, J., Adams, P.N., Luhmann, A., Grapenthin, R., Martin, J.B., Monitoring spatial and temporal changes in seismic velocity of the Florida karst aquifer system with phase cross-correlation and wavelet cross-spectral analysis, AGU fall meeting, December 2020
  48. **Bilek, S.L.**, Morton, E.A., Rowe, C.A., A four-year catalog of Cascadia earthquakes using the Cascadia Initiative Amphibious Array and subspace detection algorithms, AGU fall meeting, December 2020.
  49. \*Vieceli, R.E., Dodge, D.A., **Bilek, S.L.**, Walter, W.R., Assessing the effectiveness of generalized likelihood ratio test detector schemes in seismic event detection and the avoidance of non-target signals, AGU Fall meeting, December 2020
  50. Grapenthin, R., **Bilek, S.**, Luhmann, A., Gochenour, J., Comparison of teleseismic responses at a co-located high-rate and high-density tilt and seismic array in Florida, Seismological Society of America Annual meeting, April 2020.
  51. **Bilek, S.L.**, Cadol, D., Laronne, J.B., and Stark, K., Characterizing shallow subsurface seismic attenuation at the Arroyo de los Pinos bedload monitoring site, central New Mexico, AGU Fall meeting 2019.
  52. \*Aerts, J. and **S.L. Bilek**, Relocation of the 2009 earthquake swarm above the Socorro Magma Body, central New Mexico, USA, AGU Fall meeting, 2019.
  53. \*Morton, E.A., **Bilek, S.L.**, and Rowe, C.A., Small Cascadia Subduction Zone Earthquakes and Their Ties to Seismogenic Zone Heterogeneities, AGU Fall meeting, 2019.
  54. \*Penney, L.J., **Bilek, S.L.**, Gochenour, J.A., Luhmann, A.J., Grapenthin, R., and Martin, J.B., Characterization of Environmental Seismic Noise near a Karst Aquifer in Florida, AGU Fall meeting, 2019.
  55. \*Vieceli, R.E., **Bilek, S.L.**, Dodge, D., Pyle, M., Walter, W.R., Enhancing the earthquake catalog in the Socorro Magma Body region using phase picks produced by a dynamic correlation processor, AGU Fall meeting, 2019.
  56. \*Fintel, A., Worthington, L., Schmandt, B., **Bilek, S.L.**, Aster, R.C., Finlay, T., Ranasignhe, N., Nakai, J., Using local seismicity recorded on large-N array to identify reflections off the mid-crustal Socorro Magma Body in Socorro, NM, AGU Fall meeting, 2019.

57. \*Gochenour, J.A., **Bilek, S.L.**, Grapenthin, R., Luhmann, A.J., Penney, L., Martin, J.B., Expanding environmental seismology to karst aquifer systems: Correlating seismic power to discharge from a conduit network, AGU Fall meeting, 2019.
58. \*Ciarico, J., Grapenthin, R., Gochenour, J.A., **Bilek, S.L.**, Luhmann, A.J., Flint, M., High-rate tilt observations at a karst conduit system, AGU Fall meeting, 2019.
59. Sweet, J.R., Huerta, A.D., Winberry, J.P., Anderson, K.R., Beaudoin, B.C., **Bilek, S.L.**, Carpenter, P., Woodward, R.S., Building a geophysical earth observatory for ice-covered environments (GEOICE), AGU Fall meeting, 2019.
60. Worthington, L., Finlay, T., Ranasinghe, N., Schmandt, B., **Bilek, S.L.**, Aster, R.C., Fintel, A., New insights into fault kinematics and basin structure in the southern Albuquerque basin from the dense passive Sevilleta seismic experiment (*invited*), Geological Society of America Annual Meeting, September 2019.
61. Luhmann, A.J., Browning, C.K., Dykhouse, L., Gochenour, J.A., Barbosa, S.A., **Bilek, S.L.**, Grapenthin, R., Summerall, T., Van Der Velde, K., Martin, J.B., Penney, L., Estimating conduit diameter in an eogenetic karst aquifer from modified water temperature signals, Geological Society of America Annual Meeting, September 2019.
62. **Bilek, S.L.**, Seismicity characteristics above the Socorro magma body, central New Mexico (*invited*), New Mexico Geological Society Annual Meeting, April 2019.
63. \*Gochenour, J.A., **Bilek, S.**, Grapenthin, R., Luhmann, A.J., Martin, J.B., Barbosa, S.A., Seismic observations of precipitation and recharge-related signals in the Floridan aquifer at Santa Fe River Sink and Rise, Florida, Seismological Society of America meeting, April 2019.
64. \*Morton, E.A., **Bilek, S.L.**, Rowe, C.A., Repeating earthquakes in the Cascadia subduction zone and their ties to the seismogenic zone heterogeneities, Seismological Society of America meeting, April 2019.
65. Sweet, J., Anderson, K., Frassetto, A., Beaudoin, B., **Bilek, S.**, Woodward, B., Evolution of the IRIS Portable Facility: New tools for wavefield imaging, rapid response, and magnetotellurics, Seismological Society of America meeting, April 2019.
66. **Bilek, SL**, What governs the size, location and frequency of great subduction zone earthquakes and how is this related to the spatial and temporal variation of slip behaviors observed along subduction faults? (*invited*), GeoPRISMS TEI Synthesis and Integration workshop, San Antonio, TX, Feb 2019.