

CONTACT INFORMATION

New Mexico Institute of Mining and Technology
Department of Earth and Environmental Science
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POSITION

Assistant Professor of Geophysics, 2014–present

INTERESTS

Volcanic, hydrologic and tectonic crustal deformation processes, high-rate and real-time GNSS applications, non-traditional GNSS signals, signal processing & time series analysis, inverse methods, software engineering

EDUCATION

- 09/2007 – 07/2012 Ph.D. Geophysics, University of Alaska Fairbanks (UAF), USA
Dissertation: “Volcano Deformation and Subdaily GPS Products”
- 10/1999 – 08/2007 M.Sc. Computer Science, Humboldt-Universität zu Berlin, Germany
Thesis: “CRUSDE: A plug-in based simulation framework for composable CRUSTal Deformation simulations using Green’s functions”

PROFESSIONAL EXPERIENCE

- 08/2012 – 08/2014 *Postdoctoral Employee, Berkeley Seismological Laboratory, UC Berkeley, USA*
Implementation of GPS integrated earthquake early warning (Python, Shell)
Volcano deformation studies in Alaska, Iceland
- 09/2007 – 07/2012 *Research Assistant, Geophysical Institute and Alaska Volcano Observatory, University of Alaska Fairbanks, USA*
Volcano deformation studies in Alaska, Kamchatka and Iceland; volcano monitoring; development of computer programs for data analysis (Matlab, Shell, Perl)
- 03/2006 – 09/2006 *Visiting Student, Nordic Volcanological Center, Iceland*
Forecast elastic crustal response to the Hálslón water reservoir, investigation of seasonal cycles in continuous GPS time series in Iceland (Matlab, C).
- 06/2003 – 07/2007 *Developer/Programmer, Zuse Institute Berlin, Germany*
Redesign of a platform independent museum database system (C/C++, Qt)
- 09/2001 – 12/2002 *Programmer, DaimlerChrysler Research/Technology, Germany*
Multi-Agent-System to analyze supply net relations in the automotive industry (Java)
- 05/2001 – 05/2002 *Developer/Programmer, Skilldeal AG, Germany*
Web application design and development to manage company and employee profiles and administer outsourcing tasks (PHP, MySQL).
- until 2007 *Freelance Programmer, Germany*
Development of several commercial and private websites or webbased projects.

ACADEMIC HONORS AND AWARDS

Student Publication Award 2013, Geophysical Institute, UAF (for [Redoubt paper](#))
Outstanding Student Performance Award 2011, Geophysical Institute, UAF
Geophysical Society of Alaska, Scholarship Award 2010
Alaska Geological Society, Scholarship Award 2010
Best Diploma Thesis in Applied Computer Science: CS Dept. Humboldt Univ. Berlin, 2008
AGU Outstanding Student Paper Award: Geodesy Section, Fall Meeting, 2006.
Erasmus Exchange Programme grant: Háskóli Íslands, Reykjavík, Iceland, 2005.

ACTIVE FUNDING

- NASA New Investigator Program (06/2018-04/2021, \$250k, PI): Joining InSAR with GRACE: Geofluid Dynamics Analysis for New Mexico
- NSF-OPP Antarctic Sciences (04/2017-04/2019, \$151k, PI): Collaborative Research: Multi-Parameter Geophysical Constraints on Volcano Dynamics of Mt. Erebus and Ross Island, Antarctica
- NSF-EAR Hydrology (04/2018-08/2020, \$480k + \$49k supplement, co-PI): Collaborative Research: Geophysical characterization of a karst aquifer using dynamic recharge events
- City of Santa Fe (2018/19, \$15k, co-PI): GPS-based soil moisture/snow pack monitoring system prototyping.
- NM Bureau of Geology and NMT Research Foundation (2018, \$6k, PI): Hydrogeodesy for Southern New Mexico Pilot Project (seed funding).

PAST FUNDING

- NSF-EAR Geophysics (12/2014-11/2015, \$49,981, PI): RAPID: Bárðarbunga Eruption Response: Monitoring of post-rifting deformation and activity at Askja Volcano with continuous GPS

PENDING FUNDING

- NSF-EAR (08/2018-08/2025, \$2.1M total; \$250k for NMT, co-PI): Collaborative Research: Community Volcanoes Experiment)
- NASA-ESI (03/2019-02/2021, \$280k, PI): Instantaneous GNSS Velocities for Rapid Ground Motion Characterization

TEACHING EXPERIENCE (NMT)

Computational Methods in the Geosciences (ERTH 401, GEOL, GEOP 501) (Fall 2017)

Modern computational tools to organize, manipulate, analyze and plot data of various origins in the Geosciences.

Time Series Analysis (GEOP 505) (Spring 2018)

An introductory overview of methods for analyzing temporal and spatial series with an emphasis on scientific applications.

Geophysical Inverse Methods (GEOP 529) (Spring 2015, 2017)

Theory and practice of various techniques of inverting geophysical data to obtain model parameters. Emphasis is on the understanding and use of linear inverse techniques.

Geodetic Methods (ERTH 455 & GEOP 555) (Fall 2015, 2017)

Theory and application of modern geodetic tools to measure Earth's surface deformation with emphasis on GPS and InSAR. Data processing from raw data to kinematic products. Evaluation of signals and modeling of their sources.

Volcanology (ERTH 456 & GEOL 556) (Fall 2016, 2017)

Volcanic systems from storage to plume and deposits combined with monitoring and analysis techniques.

Geophysics Journal Club (GEOP 572) (every semester Spring 2015-2017)

Discussion of recent papers of significant relevance to the field or current geologic events.

Complex Systems Seminar (GEOP 572) (Spring 2018)

Exploration of current trends and applications in complexity theory through discussions of general theory and a review of current literature. Offered by Earth Science, Biology, Social Science, Computer Science faculty.

Florida Karst (GEOP 572) (Fall 2018)

Discussion of papers in environmental geophysics, subsurface flow, karst systems.

Department Seminar (ERTH 493, GEOG, GEOL, GEOP, HYD 593) (Fall 2017, Spring 2018)

Seminar presentations by faculty, students, and outside speakers. Provides a broad overview of current Earth Science research and directions.

The Earth's Crust (ERTH 203) (Spring 2016)

Basic structural geology and dynamic processes for earth science majors and petroleum engineers.

Earth Science Practicum (ERTH 205) (Spring 2015)

Instruction and practice in computational methods used to solve Earth science problems. Simple ways to describe physical processes mathematically, then approximate them numerically. Introduction to spreadsheets, Matlab, graphics programs. Review of math and statistics.

TEACHING EXPERIENCE (UAF)

Beyond the Mouse – Programming Skills for Geoscientists (GEOS 692) (Fall 2009, 2010, 2011)

I created a new 2 credit course (2009: 1 credit) together with faculty supervisor Jeff Freymueller aimed at geoscience students with little or no programming experience. General introduction to programming and fundamental concepts, Matlab, Shell Scripting, Unix Tools, Generic Mapping Tools, HTML/CSS.

International Volcanological Fieldschool – Lectures on Volcano Deformation (Summer 2009)

Lectures on volcano deformation focusing on data acquisition and source modeling. Aimed at undergraduate and graduate students of volcanology and related fields.

SUPERVISED/FUNDED STUDENTS

- Emily Snyder, MS expected 2019, supported on 1/2 time RA
- Jacob Gouchenour, Ph.D. (start Fall 2018), supported on 1/4 time TA, 1/4 time RA
- Sergio Barbosa, Ph.D. (start Fall 2018), supported on 1/4 time TA, 1/4 time RA
- Logan Fusso, M.S. (start Fall 2018), supported on 1/4 time TA, otherwise self-funded
- Emily Graves, Ph.D. (starts in Spring 2019), supported on 1/2 time RA
- Jared Ciarico, undergraduate researcher, unsupported

GRADUATE STUDENT COMMITTEES

- Emily Graves, Ph.D. (chair, spring 2019)
- Jacob Gouchenour, Ph.D. (co-chair)
- Sergio Barbosa, Ph.D. (co-chair)
- Emily Snyder, M.S. (chair)
- Logan Fusso, M.S. (chair)

- Emily Morton, Ph.D. (member)
- Yipeng Zhang, Ph.D. (member)
- Christine Burrill, Ph.D. (member)
- Jonathan Schmidt, M.S. (member) - to graduate fall 2018
- Kimberley Haar, M.S. (member)

PAST STUDENT ADVISEES

- Shyla Kupis, undergraduate Math, 2015, now PhD student at Clemson University; NSF-Graduate Research Fellowship recipient in 2017.
- Jeanine Chmielewski, M.S., 2015-2016, aborted studies due to personal issues (supported on 1/4 TA, 1/4 RA).

ACADEMIC ADVISOR – GRADUATE STUDENTS

- Jeremy McComas, M.S. Geology; start Fall 2018
- Morgan Nasholds, M.S. Geology; start Fall 2018

ADVISING – UNDERGRADUATE STUDENTS

- Cheyenne Gant (since Spring 2017)
- Jared Ciarico (since Fall 2017, works on undergraduate research project with me)
- Alyssa Roanhorse (start Fall 2018)

FIELDWORK

2014-now	New Mexico	campaign GPS (SMB, Valles), cont. GPS maintenance
2018	Florida	seismometer installation, tiltmeter installation pending
2016	Antarctica, Erebus	campaign GPS
2014	Antarctica, Erebus	campaign GPS
2014	Iceland	continuous GPS installations
2011	Katmai, Alaska	GPS campaign, International Volcanological Field School
2009-2012	Alaska	Differential GPS campaigns in coastal towns
2009	Kamchatka, Russia	Field school at Mutnovsky and Gorely volcanoes
2008-2010	Kamchatka, Russia	GPS work for volcano deformation (Bezymianny, Karymsky 2008)
2008	Iceland	field assistant, examination of the Skerin ridge, Eyafjallajökull
2007-2012	Alaska	GPS campaigns
2006	Iceland	field assistant, GPS campaigns: Highlands and Skeiðarárjökull

CONTINUOUS GPS/GNSS NETWORKS

2014-now	Iceland	installation, open data, maintenance of 8 stations around Holuhraun eruption (with Icelandic Meteorological Office)
2014-now	New Mexico	open data, maintenance of 4 stations on Socorro Magma Body (2 NMT, 2 Georgia Tech)
2018-now	New Mexico	installation, & maintenance of 7 temporary continuous GPS stations in Mesilla and Rincorn Basins, NM (open data likely Fall 2018)

POPULAR RECOGNITION

March 11, 2011 Tohoku-oki Earthquake Response

- > 80,000 YouTube views of animations of Japan's continuous GPS data showing the evolution of permanent and dynamic displacements generated by the earthquake
- > 37,000 unique visitors of my response website: http://www.grapenthin.org/notes/2011_03_11-tohoku-oki/
- > 5,000 views of invited presentation on slideshare.net:

- <http://www.slideshare.net/rgrapenthin/visualization-of-the-seismic-waves-and-permanent-displacements>
- Animations featured in National Geographic video: "Rare Video: Japan Tsunami"
<http://video.nationalgeographic.com/video/news/japan-tsunami-2011-vin>
- Figure showing dynamic features of the event reproduced in Global – The International Briefing, Issue 6, second quarter 2011
- Paper (see Publication 4) covered by OurAmazingPlanet and syndicated outlets: <http://www.ouramazingplanet.com/1960-3d-japan-quake-animation.html>

Kamchatka PIRE Project

- Project was featured in one episode of the 4 part documentary "The Pacific Ring of Fire" for French/German TV station ARTE

Other Research News Coverage

- Paper 11 *The 2014 Mw 6.0 Napa earthquake, California: Observations from real-time GPS-enhanced earthquake early warning* was Science Editor's Choice (Science, Vol. 346, Issue 6214, page 1197) and covered by KQED Science.
- Paper 9 *Volcanic plume height correlated with magma pressure change at Grímsvötn volcano, Iceland* gained significant traction and was covered by Nature News, phys.org, Ars Technica, Live Science and others

COMMUNITY SERVICE

- BSSA Associate Editor (2018-present, 12 papers handled/in progress since May 2018)
- UNAVCO Geodetic Data Services Advisory Committee (GDSAC) (2015-present)
- UNAVCO GNSS Data Products Subcommittee (liaison to GDSAC) (2017-present)
- USGS ShakeAlert Geodesy Committee (2016-present)
- AGU Outstanding Student Presentation Judge: 2012, 2013, 2016, 2017
- Reviewer for BSSA, Earth and Planetary Science Letters, Earth Planets Space, Geografiska Annaler, Geophysical Research Letters, Geoscience Letters, International Association of Geodesy Symposia, Journal of Asian Earth Sciences, Journal of Atmospheric and Oceanic Technology, Journal of Geodesy, Journal of Geophysical Research, Journal of Seismology, Journal of Volcanology and Geothermal Research, PLOSOne, Proceedings of the National Academy of Sciences, Seismological Research Letters, Scientific Reports, Tectonics
- proposal reviews for NSF, BSF (US-Israeli Bi-national Science Foundation), NZ Earthquake Commission, FONDECYT (Chilean National Science and Technology Commission)

DEPARTMENT & UNIVERSITY SERVICE

- Geology, Geophysics & Geochemistry Grad Student Admissions Chair
- Geology, Geophysics & Geochemistry Grad Student Coordinator
- Department Computing Committee
- 2017/18: E&ES Department Seminar co-organizer, established distinguished lecture series & distinguished alumni lecture
- Faculty search committees (member, co-chair)

PUBLICATIONS (* STUDENT AUTHOR, + POSTDOC AUTHOR)

In Press

1. **Grapenthin, R.**, S. Hreinsdóttir, and A. van Eaton, Tephra, Water, Hail: The Volcanic Plumes of the 2011 Grímsvötn eruption, Iceland, as seen by GNSS, *in press at GRL*.

Under Review

1. ⁺Ruhl, D. Melgar, A. Chung, **R. Grapenthin**, and R.M. Allen, Quantifying the Value of Real-time Geodetic Constraints on Earthquake Early Warning using a Global Seismic and Geodetic Dataset, *in prep. for JGR*.
2. ^{*}Folsom, M., S. Kelley, **R. Grapenthin**, and M. Person, Surface Rebound and Groundwater Temperature Fluctuations at a Municipal wellfield during an Episode of Aquifer Recovery. *in revision for Water Resources Research*

In Preparation

1. **Grapenthin, R.**, A. Komjathy, R. Bürgmann, Precursor or No? Review of Earthquake Precursors seen with GNSS in the Ionosphere, *in prep. for SRL*
2. **Grapenthin, R.**, E. D’Anastasio, and S. Hreinsdóttir, GNSS Clips: Cycle slip during the 2016 M_w 7.8 Kaikōura Earthquake, New Zealand. *in prep. for GRL*
3. **Grapenthin, R.** et al., Post-rifting deformation following the 2014 Holuhraun eruption, Iceland, *in prep. for JGR*.

Published

17. Murray, J.R., B.W. Crowell, **R. Grapenthin**, K. Hodgekinson, J.O. Langbein, T. Melbourne, D. Melgar, S.E. Minson, and D.A. Schmidt, *Development of a Geodetic Component for the U. S. West Coast Earthquake Early Warning System*, 2018, SRL, doi:10.1785/0220180162.
16. ^{*}Zhang, Y., M. Person, V. Voller, D. Cohen, J. McIntosh, and **R. Grapenthin**, *Hydromechanical Impacts of Pleistocene Glaciations on Pore Fluid Pressure Evolution, Rock Failure, and Brine Migration within Sedimentary Basins and the Crystalline Basement*, 2018, Water Resources Research, doi:10.1029/2017WR022464.
15. Sigmundsson, F., M. Parks, R. Pedersen, K. Jónsdóttir, B.G. Ófeigsson, **R. Grapenthin**, S. Dumont, P. Einarsson, V. Drouin, A.R. Hjartardóttir, M.T. Gudmundsson, H. Geirsson, S. Hreinsdóttir, E. Sturkell, E.R. Heimisson, Ád. Högnadóttir, A. Hooper, K. Vogfjörð, T. Barnie, M. Roberts, 2018, *Magma movements in volcano plumbing systems and their associated ground deformation*, In “Volcanic and Igneous Plumbing Systems”, edited by Steffi Burchardt. doi:10.1016/B978-0-12-809749-6.00011-X.
14. **Grapenthin, R.**, M. West, C. Tape, M. Gardine, J. T. Freymueller, *Single-frequency instantaneous GNSS velocities resolve dynamic ground motion and basin resonance of the 2016 M_w 7.1 Iniskin Earthquake, Alaska*. SRL, doi:10.1785/0220170235.
13. ⁺Ruhl, C., D. Melgar, **R. Grapenthin**, and R.M. Allen, 2017, *The Value of Real-Time GNSS to Earthquake Early Warning*, Geophys. Res. Lett., 44(16), 8311-8319, doi:10.1002/2017GL074502.
12. **Grapenthin, R.**, M. West, and J. T. Freymueller, 2017, *The Utility of GNSS for Earthquake Early Warning in Regions with Sparse Seismic Networks*, BSSA, doi:10.1785/0120160317 (UNAVCO science snapshot on this: unavco.org/science/snapshots/technology/2017/grapenthin.html).
11. **Grapenthin, R.**, I.A. Johanson, R.M. Allen, 2014, *The 2014 M_w 6.0 Napa earthquake, California: Observations from real-time GPS-enhanced earthquake early warning*, Geophys. Res. Lett., doi:10.1002/2014GL061923, Science Editor’s Choice: Science, Vol. 346, Issue 6214, page 1197.
10. **Grapenthin, R.**, I.A. Johanson, R.M. Allen, 2014, *Operational real-time GPS-enhanced earthquake early warning*, J. Geophys. Res., 119(10), 7944-7965, doi:10.1002/2014JB011400
9. Hreinsdóttir, S., F. Sigmundsson, M. Roberts, H. Björnsson, **R. Grapenthin**, P. Arason, Th. Árnadóttir, J. Hólmjárn, H. Geirsson, R.A. Bennett, M.T. Gudmundsson, B. Oddsson, B.G. Ófeigsson, T. Villemin, T. Jónsson, E. Sturkell, Á. Höskuldsson, G. Larsen, T. Thordarson, B.A. Óladóttir, 2014, *Volcanic plume height correlated with magma pressure change at Grímsvötn volcano, Iceland* Nature Geoscience, doi:10.1038/ngeo2044 (News & Views on this: doi:10.1038/ngeo2064, Nature News coverage: doi:10.1038/nature.2014.14498)

8. **Grapenthin, R.**, 2014, CRUSDE: *A plug-in based simulation framework for composable CRUSTal DEformation simulations*, Computers & Geosciences, 62, 168-177, doi:10.1016/j.cageo.2013.07.005
7. **Grapenthin, R.**, J. T. Freymueller, S. S. Serovetnikov, 2013, *Surface Deformation of Bezymianny Volcano, Kamchatka, Recorded by GPS: The Eruptions from 2005-2010 and Long-term, Long-wavelength Subsidence*, JVGR, 263, 58-74, doi:10.1016/j.jvolgeores.2012.11.012
6. **Grapenthin, R.**, J. T. Freymueller, A. M. Kaufman, 2013, *Geodetic Observations during the 2009 eruption of Redoubt Volcano, Alaska*, JVGR, 259, 115-132, doi:10.1016/j.jvolgeores.2012.04.021
5. **Grapenthin, R.**, 2011, *Computer Programing for Geosciences: Teach Your Students How to Make Tools*, EOS, Vol. 92, Issue 50, pp. 469–470, doi:10.1029/2011E0500010
4. **Grapenthin, R.** and J. T. Freymueller, 2011, *The dynamics of a seismic wave field: Animation and analysis of kinematic GPS data recorded during the 2011 Tohoku-oki earthquake, Japan*, Geophys. Res. Lett., 38, L18308, doi:10.1029/2011GL048405 – **GRL Editors' Highlight**
3. Ófeigsson, B.G., A. Hooper, F. Sigmundsson, E. Sturkell, and **R. Grapenthin**, 2011, *Deep magma storage at Hekla volcano, Iceland, revealed by InSAR time series analysis*, J. Geophys. Res., 116, B05401, doi:10.1029/2010JB007576
2. **Grapenthin, R.**, B. G. Ófeigsson, F. Sigmundsson, E. Sturkell, and A. Hooper, 2010, *Pressure sources versus surface loads: Analyzing volcano deformation signal composition with an application to Hekla volcano, Iceland*, Geophys. Res. Lett., 37, L20310, doi:10.1029/2010GL044590
1. **Grapenthin, R.**, F. Sigmundsson, H. Geirsson, Th. Árnadóttir, V. Pinel, 2006, *Icelandic rhythms: Annual modulation of land elevation and plate spreading by snow load*, Geophys. Res. Lett., 33, L24305, doi:10.1029/2006GL028081

Significant Reports & White Papers

4. Holt, B., **R. Grapenthin**, A. Borsa, J. Haase, George Hajj, B. Hammond, T. Herring, and H. Martens, 2018. UNAVCO GNSS Data Products Subcommittee Report, prepared for UNAVCO Geodetic Data Services Advisory Committee and UNAVCO Management, 16 pp.
3. **Grapenthin, R.**, T. Fischer, Rick Aster, Jessica Larsen, Craig Cary, and Nelia Dunbar, 2016. A Vision for a Facility Supporting Antarctic Volcano Studies, submitted to NSF & Mount Erebus Research Community.
2. 3 contributions to *The Benefits of Enhanced Earthquake Monitoring and Potential Earthquake Early Warning in Alaska – A Stakeholder Survey*, 2016. Developed by the Alaska Seismic Hazards Safety Commission for the Office of Alaska Governor Bill Walker; http://seismic.alaska.gov/presentations_reports.php
1. **Grapenthin, R.**, and F. Sigmundsson, 2006. Green's Functions and Crustal Deformation - Manual and Examples - Institute of Earth Sciences, University of Iceland, Nordic Volcanological Center, Report 0602, 30 pp.

INVITED PRESENTATIONS

- 11/2018 Re-examining our Grand Challenges in Geodesy Workshop, East Lansing, USA.
- 08/2018 University of Alaska Fairbanks, Alaska Earthquake Center Seminar
- 02/2018 University of Oregon, Geology Seminar
- 03/2016 Department of Earth and Planetary Science, University of New Mexico, Department Seminar
- 03/2016 ShakeAlert Research Meeting, Caltech, California, USA.
- 11/2015 Earthquake Early Warning in Subduction Zones, UC Berkeley, California, USA.
- 06/2015 EarthScope National Meeting, Stowe, Vermont, USA.
- 04/2015 School of Earth Sci. and Env. Sustainability, Northern Arizona University, Department Seminar
- 03/2014 Department of Terrestrial Magnetism, Carnegie Institution Washington, Department Seminar
- 02/2014 South Dakota School of Mines and Technology, Department Seminar
- 01/2014 New Mexico Tech, Department Seminar
- 10/2013 Cornell University, Department Seminar and Active Tectonics lecture
- 04/2013 University of Oregon, Geology Seminar

- 03/2013 University of Alaska, Seismology Brown Bag Seminar
- 01/2013 Central Washington University, Geology Seminar
- 12/2012 Northern California GPS User Group Meeting
- 07/2012 USGS, Earthquake Science Center Seminar, Menlo Park, CA ([video](#))
- 05/2012 University of Iceland, Nordvulk Seminar, Reykjavik, Iceland
- 05/2012 Humboldt-University, METRIK Seminar, Berlin, Germany
- 03/2012 UC Berkeley, Seismological Laboratory Seminar, Berkeley, CA
- 05/2011 Real-time GPS for Seismology and other Applications Workshop, Austin, TX.

CONFERENCE PRESENTATIONS

* – presented for first author ◦ – invited # – student first author + – post-doc first author

2017–now

- 86. S. Kelley, M. Folsom, **R. Grapenthin**, M. Person, *Groundwater Temperature Rise During Aquifer Recovery at the Buckman Municipal Well Field, Santa Fe, New Mexico*, NM Geological Society Annual Spring Meeting, 13 April 2018, Socorro, USA.
- 85. Sigmundsson, F., M.T. Gudmundsson, S.A. Halldorsson, A. Hooper, V. Pinel, P. Einarsson, M. Parks, B.G. Ófeigsson, K. Jónsdóttir, K. Vogfjörð, **R. Grapenthin**, S. Li, V. Drouin, E.R. Heimisson, H. Geirsson, S. Dumont, *Physical modeling constraints on thickness and geometry of the melt body feeding the 2014-2015 diking and eruption, and the triggering of caldera collapse, in the Bardarbunga volcanic system*, Geoscience Society of Iceland Meeting, March 9, 2018, Reykjavik, Iceland.
- 84. C. Ruhl⁺, D. Melgar, **R. Grapenthin**, R.M. Allen, *Evaluating Geodetic Alarm System Alert Accuracy and Timeliness using Synthetic Earthquakes in Cascadia and California*, UNAVCO Science Workshop, March 27-29, 2018, Broomfield, CO, USA.
- 83. Sigmundsson, F., M.T. Gudmundsson, S.A. Halldorsson, A. Hooper, V. Pinel, P. Einarsson, M. Parks, B.G. Ófeigsson, K. Jónsdóttir, K. Vogfjörð, **R. Grapenthin**, S. Li, V. Drouin, E.R. Heimisson, H. Geirsson, S. Dumont, *Physical modeling constraints on thickness and geometry of the melt body feeding the 2014-2015 diking and eruption, and the triggering of caldera collapse, in the BÃqrÃrarbunga volcanic system*, UNAVCO Science Workshop, March 27-29, 2018, Broomfield, CO, USA.
- 82. **R. Grapenthin**, S. Li, B. Ófeigsson, F. Sigmundsson, V. Drouin, S. Hreinsdottir, M. Parks, H. M. Fridriksdottir, *Post-eruptive Deformation following the 2014 Holuhraun Rift, Iceland*, UNAVCO Science Workshop, March 27-29, 2018, Broomfield, CO, USA.
- 81. **R. Grapenthin**, S. Li, B. Ófeigsson, F. Sigmundsson, V. Drouin, S. Hreinsdottir, M. Parks, H. M. Fridriksdottir, *Post-eruptive Deformation following the 2014 Holuhraun Rift, Iceland*, AGU, 11-15 Dec 2017, New Orleans, USA.
- 80. C. Ruhl⁺, D. Melgar, **R. Grapenthin**, R.M. Allen, *Geodetic Finite-Fault-based Earthquake Early Warning Performance for Great Earthquakes Worldwide*, AGU, 11-15 Dec 2017, New Orleans, USA.
- 79.* S. Bilek, A. Luhmann, **R. Grapenthin**, *Karst aquifer characterization using geophysical remote sensing and modeling of dynamic recharge events*, AGU, 11-15 Dec 2017, New Orleans, USA.
- 78. A. Luhmann, S. Bilek, **R. Grapenthin**, J. B. Martin, *Geophysical characterization of karst aquifers using dynamic recharge events*, GSA, 22-25 Oct 2017, Seattle, USA.
- 77.* M. Folsom[#], S. Kelley, **R. Grapenthin**, M. Person, *Surface Rebound and Groundwater Temperature Rise during Aquifer Recovery at the Buckman Municipal Well Field, Santa Fe, New Mexico*, EarthScope Synthesis Workshop: Hydrological Applications of Geodetic Techniques, 25-27 Oct 2017, San Diego, USA.
- 76.* A. Luhmann, S. Bilek, **R. Grapenthin**, J. B. Martin, *Geophysical characterization of karst aquifers using dynamic recharge events*, EarthScope Synthesis Workshop: Hydrological Applications of Geodetic Techniques, 25-27 Oct 2017, San Diego, USA.

75. S. Bilek, A. Luhmann, **R. Grapenthin**, R. Diniakos, E. Morton, E. Alexander, S. Alexander, M. Larsen, J. Green, *Seismic monitoring of karst recharge events – Results from a pilot experiment*, GSA, 22-25 Oct 2017, Seattle, USA.
74. M. Folsom[#], S. Kelley, **R. Grapenthin**, M. Person, *Surface Rebound and Groundwater Temperature Rise during Aquifer Recovery at the Buckman Municipal Well Field, Santa Fe, New Mexico*, Espanola Basin Technical Advisory Group Workshop, 12-13 October 2017, Santa Fe, USA.
73. D. Melgar, C. Ruhl, **R. Grapenthin**, R.M. Allen, *The value and role of GNSS in earthquake and tsunami early warning*, JpGU-AGU, 20-25 May 2017, Makuhari, Japan.
72. C. Ruhl⁺, D. Melgar, **R. Grapenthin**, M. Aranha, R.M. Allen, *Testing a real-time GNSS-based earthquake and tsunami early warning system*, JpGU-AGU, 20-25 May 2017, Makuhari, Japan.
71. C. Ruhl⁺, D. Melgar, **R. Grapenthin**, M. Aranha, R.M. Allen, *Evaluating the Geodetic Alarm System (G-larmS) Performance using Synthetic Earthquakes*, SSA, 18-20 April 2017, Denver, USA.
70. C. J. Ruhl⁺, D. Melgar, R. Grapenthin, M. Aranha, and R. M. Allen, *Evaluating the Geodetic Alarm System (G-larmS) Performance using Synthetic Earthquakes*, Offshore Geophysical Monitoring of Cascadia for Early Warning and Hazards Research, April 3-5, 2017, Seattle, USA.
69. C. Ruhl⁺, **R. Grapenthin**, D. Melgar, M. Aranha, R.M. Allen, *West-Coast Wide Expansion and Testing of the Geodetic Alarm System (G-larmS)*, AGU Fall Meeting, 12-16. Dec 2016, San Francisco, CA, USA.
68. J. Freymueller, J. Elliott, **R. Grapenthin**, *GPS/GNSS for Earthquake, Tsunami and Volcano Hazards: Examples of Assessments, Response, and Real-time Monitoring in Alaska*, AGU Fall Meeting, 12-16. Dec 2016, San Francisco, CA, USA.
- 67.^o Murray, J.R., B. Crowell, **R. Grapenthin**, K. Hodgkinson, T. Melbourne, D. Melgar, S. Minson, D. Schmidt, *Toward incorporation of real-time GNSS data in the West Coast Earthquake Early Warning system*, 11th Joint Meeting U.S.-Japan Natural Resources Panel on Earthquake Research, 16-18. November 2016, Napa, CA, USA.
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