

Ronni Grapenthin (he/him/his)

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CONTACT INFORMATION

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POSITION

Associate Professor of Geodesy, 2019 – 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

EDUCATION

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

PROFESSIONAL EXPERIENCE

08/2014 – 08/2019	<i>Assistant Professor, New Mexico Tech, USA (tenure awarded)</i>
08/2012 – 08/2014	<i>Postdoctoral Employee, Berkeley Seismological Laboratory, UC Berkeley, USA</i> Implementation of GPS integrated earthquake early warning (Python, Shell) Volcano deformation studies in Alaska, Iceland
09/2007 – 07/2012	<i>Research Assistant, Geophysical Institute and Alaska Volcano Observatory, University of Alaska Fairbanks, USA</i> Volcano deformation studies in Alaska, Kamchatka and Iceland; volcano monitoring; development of computer programs for data analysis (Matlab, Shell, Perl)

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.

TEACHING EXPERIENCE (UAF)

Foundations of Geophysics (GEOS 4/631) (Fall 2020)

Applications of continuum mechanics, heat flow theory, and potential theory to geophysical, geologic and glaciological problems. Topics such as postglacial rebound, non-Newtonian fluid flow, thermal convection, stress-relaxation, rheology of earth materials, gravity, and magnetics are discussed.

Programming and Automation for Geoscientists (GEOS 4/636) (Fall 2020)

Basic concepts of computer programming and effective automation of tasks using a computer, with an emphasis on tools and problems common to the geosciences and other physical sciences. Use of Python, shell scripting and various command line tools for data analysis, making scientific figures, maps and visualizations.

Geodetic Methods & Modeling (GEOS 4/693) (Fall 2019)

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. Taught synchronously remote.

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, 2019)

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, 2018)

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

Geophysics Journal Club (GEOP 572) (every semester 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, Spring 2019)

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

Department Seminar (ERTH 493, GEOC, 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, GRADUATE STUDENT)

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 Graves, Ph.D. Geophysics expected 2023: “*Joining InSAR with GRACE for Geofluid Dynamics Analysis in New Mexico*”.
- Mario Angarita Vargas, Ph.D. Geophysics expected 2024: “*Reanalysis of Volcanic Eruptions in the Aleutians*”.
- Jacob Gochenour, Ph.D. Geophysics expected 2023 (co-advised, NMT): “*Geophysical Signals in Karst Systems*”.
- Natasha Graham, M.Sc. Geophysics expected 2022: “*Deformation at Erebus Volcano, Antarctica*”.
- Logan Fusso, M.Sc. Geophysics expected 2021: “*Post-rifting Deformation after the 2014/15 Holuhraun, Iceland, eruption*”
- Yitian Cheng, undergraduate student, University of Science and Technology, Hefei: “*2016-2018 Deformation at Makushin Volcano*”
- Katarina Vance, UAF Geophysics undergraduate: “*Renewed inflation at Akutan Volcano*”

GRADUATE STUDENT COMMITTEES

- Emily Graves, Ph.D. (chair)
- Mario Angarita Vargas, Ph.D. (chair)
- Logan Fusso, M.S. (chair)
- Natasha Graham, M.S. (chair)
- Liam Toney, Ph.D. (member)
- David Polashenski, Ph.D. (member)
- Jacob Gouchenour, Ph.D. (member, NMT)
- Jonathan Schmidt, M.S. (member, NMT)
- Kimberley Haar, M.S. (member, NMT)

PAST STUDENT ADVISEES (COMMITTEE CHAIR)

- Emily Snyder, M.Sc. Geophysics (chair), 2020: “*Deformation at Erebus Volcano, Antarctica from decadal GPS records*”.
- Jeanine Chmielewski, M.S. (chair), 2015-2016, aborted studies for personal reasons

PAST GRADUATE ADVISEES (COMMITTEE MEMBER)

- Emily Morton, Ph.D., 2020: “*Newly detected earthquakes in the Cascadia Subduction Zone, Pacific Northwest Region of the U.S., and their ties to megathrust fault zone heterogeneities*”
- Yipeng Zhang, Ph.D., 2019: “*Impact of oil-field brine reinjection and continental glaciations on pore pressure evolution, rock failure, brine migration in sedimentary basins and crystalline basement*”

PAST UNDERGRADUATE ADVISEES

- Jared Ciarico, undergraduate Geophysics, 2017-2019
- Shyla Kupis, undergraduate Math, 2015, now PhD student at Clemson University; NSF-Graduate Research Fellowship recipient in 2017.

FIELDWORK

2014-2020	New Mexico	campaign GPS (SMB, Valles), cont. maintenance/installations	GPS maintenance
2018-2020	Florida	seismometer & (borehole) tiltmeter installations	
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 Spring 2019)

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

- UNAVCO Board of Directors, Vice Chair (2020-present)
- UNAVCO-IRIS Merger Negotiations Committee (2020)
- BSSA Associate Editor (2018-present)
- CONVERSE Research Coordination network Geodesy discipline lead (2018-present)
- UNAVCO Geodetic Data Services Advisory Committee (GDSAC) (2015-2019)
- UNAVCO GNSS Data Products Subcommittee (liaison to GDSAC) (2017-2019)
- USGS ShakeAlert Geodesy Committee (2016-2018)
- 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, Transactions on Geoscience and Remote Sensing
- NSF, NASA panels 2019
- proposal reviews for NSF, NASA, BSF (US-Israeli Bi-national Science Foundation), NZ Earthquake Commission, FONDECYT (Chilean National Science and Technology Commission)

DEPARTMENT & UNIVERSITY SERVICE TO NMT (UNTIL 2019)

- 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
- Several faculty search committees (member, co-chair)

PUBLICATIONS (* STUDENT AUTHOR, + POSTDOC AUTHOR)

Under Review

1. Li, S., F. Sigmundsson, V. Drouin, B. Ofeigsson, M. Parks, K. Jonsdottir, **R. Grapenthin**, H. Geirsson, A. Hooper, S. Hreinsdóttir, *Ground deformation after a caldera collapse: Contributions of magma inflow and viscoelastic response to the 2015-2018 deformation field around Bardarbunga, Iceland*, in revision for JGR
2. **Grapenthin, R.**, The Global Navigation Satellite System (GNSS): Positioning, Velocities, and Reflections, book chapter to appear in Remote Sensing Applications for Characterization of Geohazards and Natural Resources, in press

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*.
4. **Grapenthin, R.**, P. Kyle, Twenty Years of Deformation Observed with GPS at Erebus, Antarctica, *in prep. for JVGR*.

22. Sigmundsson, F., V. Pinel, **R. Grapenthin**, A. Hooper, S. A. Halldorsson, P. Einarsson, B. G. Ófeigsson, E. R. Heimisson, K. Jónsdóttir, M. T. Guðmundsson, K. Vogfjörð, M. Parks, S. Li, V. Drouin, H. Geirsson, S. Dumont, H. M. Fridriksdóttir, G. B. Guðmundsson, T. Wright, T. Yamasaki, *Unexpected large eruptions from buoyant magma bodies within viscoelastic crust*, 2020, Nature Communications, Vol 11, 2403, doi:[10.1038/s41467-020-16054-6](https://doi.org/10.1038/s41467-020-16054-6).
21. **Grapenthin, R.**, S. Kelley, M. Person, and M. Folsom, *Decadal-scale aquifer dynamics and structural complexities at a municipal wellfield revealed by 25 years of InSAR and recent groundwater temperature observations*, 2019, Water Resources Research, Vol. 55 (12), pp. 10636-10656, doi:[10.1029/2018WR022552](https://doi.org/10.1029/2018WR022552).
20. Kaneko, Y., Y. Ito, B. Chow, L.M. Wallace, C. Tape, **R. Grapenthin**, E. D'Anastasio, S. Henrys, R. Hino, *Ultra-long duration of ground motion arising from a thick, low velocity sedimentary wedge*, 2019, JGR, Vol 124(10), pp. 10347-10359, doi:[10.1029/2019JB017795](https://doi.org/10.1029/2019JB017795).
19. Ruhl, C., D. Melgar, A. Chung, **R. Grapenthin**, R.M. Allen, *Quantifying the Value of Real-time Geodetic Constraints on Earthquake Early Warning using a Global Seismic and Geodetic Dataset*, 2019, JGR, Vol. 124(4), pp. 3819-3837, doi:[10.1029/2018JB016935](https://doi.org/10.1029/2018JB016935).
18. **Grapenthin, R.**, S. Hreinsdóttir, and A. van Eaton, *Volcanic Hail Detected With GPS: The 2011 Eruption of Grímsvötn Volcano, Iceland*, 2018, GRL, 45(22), 12,236-12,243, doi:[10.1029/2018GL080317](https://doi.org/10.1029/2018GL080317).
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, 89(6), 2322-2336, doi:[10.1785/0220180162](https://doi.org/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](https://doi.org/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. Guðmundsson, H. Geirsson, S. Hreinsdóttir, E. Sturkell, E.R. Heimisson, P. 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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. Guðmundsson, 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](https://doi.org/10.1038/ngeo2044) (News & Views on this: doi:[10.1038/ngeo2064](https://doi.org/10.1038/ngeo2064), Nature News coverage: doi:[10.1038/nature.2014.14498](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1016/j.jvolgeores.2012.04.021)
5. **Grapenthin, R.**, 2011, *Computer Programming for Geosciences: Teach Your Students How to Make Tools*, EOS, Vol. 92, Issue 50, pp. 469-470, doi:[10.1029/2011EO500010](https://doi.org/10.1029/2011EO500010)
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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1029/2010GL044590)
1. **Grapenthin, R.**, F. Sigmundsson, H. Geirsson, Th. Árnadóttir, V. Pinel, 2006, *Icelandic rhythmicics: Annual modulation of land elevation and plate spreading by snow load*, *Geophys. Res. Lett.*, 33, L24305, doi:[10.1029/2006GL028081](https://doi.org/10.1029/2006GL028081)

Significant Reports & White Papers

5. **Grapenthin, R.**, E. Montgomery-Brown, M. Poland, A. Bonforte, 2020. How to respond to (pre-)eruptive volcanic activity for the highest scientific return?, CONVERSE Research Coordination Network & IAVCEI Commission for Volcano Geodesy workshop report, 25 pp.
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.

OTHER PUBLICATIONS

Theses

2. **Grapenthin, R.**, Volcano Deformation and Subdaily GPS Products, *Dissertation, University of Alaska Fairbanks*, 167pp., 2012
1. **Grapenthin, R.**, CRUSDE: A plug-in based simulation framework for composable CRUSTal DEformation simulations using Green's functions, *Thesis, Humboldt-University Berlin*, 127pp., 2007