

## **Dr. Michael Behm**

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### **PROFESSIONAL APPOINTMENTS**

Since 1/2017:	Assistant Professor for Applied Geophysics, School of Geosciences, Oklahoma University, Norman, US
8/2013 - 9/2016:	Geophysical Expert, Centre of Excellence for Geophysics, OMV Exploration and Production, Vienna, Austria
8/2011 - 7/2013:	Visiting Scholar, Center of Wave Phenomena, Colorado School of Mines, Golden, US
6/2011 - 7/2013:	Assistant Professor (faculty, non-tenure track), Institute of Meteorology & Geophysics, University of Vienna, Austria
5/2006 - 4/2011:	Assistant Professor (faculty, non-tenure track), Institute of Geodesy & Geophysics, Vienna University of Technology, Austria
9/2005 - 4/2006:	Research Assistant, Institute of Geodesy & Geophysics, Vienna University of Technology, Austria
9/2004 - 9/2005:	Alternative military service, Central Agency for Meteorology & Geodynamics, Vienna, Austria
1/2000 - 9/2004:	Research Assistant, Institute of Geodesy & Geophysics, Vienna University of Technology, Austria

### **EDUCATION**

2006:	<b>Ph.D. Engineering Sciences (Geodesy and Geophysics)</b> , Vienna University of Technology, Austria Thesis: Accuracy and Resolution of 3D seismic model of the Eastern Alps Supervisor: Dr. Ewald Brückl (Vienna University of Technology) and Hans Thybo (University of Copenhagen)
2002	<b>M.Sc., Geodesy and Geophysics</b> , Vienna University of Technology, Austria Thesis: Towards a 3D seismic model of the Eastern Alps.
1991 - 1995	College study for Electro-Technical Engineering, Wr. Neustadt, Austria

LinkedIn:

<https://at.linkedin.com/pub/michael-behm/b3/745/621>

Google Scholar:

<https://scholar.google.at/citations?user=l2bvIwEAAAAJ&hl=de>

ResearchGate:

[http://www.researchgate.net/profile/Michael\\_Behm2](http://www.researchgate.net/profile/Michael_Behm2)

## PEER REVIEWED PUBLICATIONS

29. **Behm, M.**, Cheng, F., Patterson, A., and Soreghan, G. (2019) Passive processing of active nodal seismic data: Estimation of VP / VS-ratios to characterize structure and hydrology of an alpine valley infill, *Solid Earth*, 10, 1337-1354
28. Cheng, F., Xia, J., **Behm, M.**, Hu, Y., and Pang, J. (2019) Automated Data Selection in the Tau-p Domain: Application to Passive Surface Wave Imaging, *Surveys in Geophysics*, 1-18
27. **Behm, M.** (2018) Reflections from the inner core recorded during a regional active source survey: Implications for the feasibility of deep earth studies with nodal arrays. *Seismological Research Letters*, 89(5), 1698-1707
26. **Behm, M.** (2017) Feasibility of borehole ambient noise interferometry for permanent reservoir monitoring. *Geophysical Prospecting*, 65(2), 563-580
25. **Behm, M.**, Nakata, N., and Bokelmann, G. (2016) Regional ambient noise tomography in the Eastern Alps of Europe. *Pure and Applied Geophysics* 173(8), 2813-2840
24. Planes, T., Mooney, M., Rittgers, J., Parekh, M., **Behm, M.**, and Snieder, R. (2015). Time-lapse monitoring of internal erosion in earthen dams and levees using ambient seismic noise. *Gèotechnique* 66(4), 301-312
23. Bianchi, I., **Behm, M.**, Rumpfhuber, E., and Bokelmann, G. (2015). A new seismic data set on the Depth of the Moho in the Alps. *Pure and Applied Geophysics*, 172(2), 295-308
22. Nakata, N., Snieder, R., and **Behm, M.** (2014). Body-wave interferometry using regional earthquakes with multi-dimensional deconvolution after wavefield decomposition at free surface. *Geophysical Journal International*(199), 1125-1137
21. **Behm, M.**, and Shekar, B. (2014). Blind deconvolution of multichannel recordings by linearized inversion in the spectral domain. *Geophysics*, 79(2), V33–V45.
20. Loidl, B., **Behm, M.**, Thybo, H., and Stratford, W. (2014). Three-dimensional seismic model of crustal structure in Southern Norway. *Geophysical Journal International*, 196(3), 1643–1656.
19. **Behm, M.**, Leahy, G. M., and Snieder, R. (2014). Retrieval of local surface wave velocities from traffic noise – an example from the La Barge basin (Wyoming). *Geophysical Prospecting*, 62(2), 223–243.
18. **Behm, M.**, and Snieder, R. (2013). Love waves from local traffic noise interferometry. *The Leading Edge*, 32(6), 628–632.

## PEER REVIEWED PUBLICATIONS (continued)

17. Krainer, K., Mussner, L., **Behm, M.**, and Hausmann H. (2012). Multi-disciplinary investigation of an active rock glacier in the Sella Group (Dolomites; Northern Italy). *Austrian Journal of Earth Sciences*, 105(2): 48-62.
16. Mitterbauer, U., **Behm, M.**, Brückl, E., Lippitsch, R., Guterch, A., Keller, G. R., ... Šumanovac, F. (2011). Shape and origin of the East-Alpine slab constrained by the ALPASS teleseismic model. *Tectonophysics*, 510(1-2), 195–206.
15. Hausmann, H. and **Behm, M.** (2011). Imaging the structure of cave ice by ground-penetrating radar, *The Cryosphere*, 5, 329-340.
14. Oeberseder, T., **Behm, M.**, Kovács, I., and Falus, G. (2011). A seismic discontinuity in the upper mantle between the Eastern Alps and the Western Carpathians: Constraints from wide angle reflections and geological implications. *Tectonophysics*, 504(1–4), 122–134.
13. Spahić, D., Exner, U., **Behm, M.**, Grasemann, B., Haring, A., and Pretsch, H. (2011). Listric versus planar normal fault geometry: An example from the Eisenstadt-Sopron Basin (E Austria). *International Journal of Earth Sciences*, 100(7), 1685–1695.
12. Brückl, E., **Behm, M.**, Decker, K., Grad, M., Guterch, A., Keller, G.R, and Thybo, H. (2010). Crustal structure and active tectonics in the Eastern Alps. *Tectonics*, 29, TC2011
11. Plan, L., Filipponi, M., **Behm, M.**, Seebacher, R., and Jeutter, P. (2009). Constraints on alpine speleogenesis from cave morphology - A case study from the eastern Totes Gebirge (Northern Calcareous Alps, Austria). *Geomorphology*, 106(1-2), 118–129.
10. Grad, M., Brückl, E., Majdański, M., **Behm, M.**, Guterch, A., Acevedo, S., ... Yliniemi, J. (2009). Crustal structure of the Eastern Alps and their foreland: Seismic model beneath the CEL10/Alp04 profile and tectonic implications. *Geophysical Journal International*, 177(1), 279–295.
9. Grad, M., Tiira, T., **Behm, M.**, Belinsky, A. A., Booth, D. C., Brückl, E., ... Zolotov, E. E. (2009). The Moho depth map of the European Plate. *Geophysical Journal International*, 176(1), 279–292.
8. Binder, D., Brückl, E., Roch, K. H., **Behm, M.**, Schöner, W., and Hynek, B. (2009). Determination of total ice volume and ice-thickness distribution of two glaciers in the Hohe Tauern region, Eastern Alps, from GPR data. *Annals of Glaciology*, 50(51), 71–79.
7. **Behm, M.** (2009). 3-D modelling of the crustal S-wave velocity structure from active source data: Application to the eastern Alps and the Bohemian Massif. *Geophysical Journal International*, 179(1), 265–278.

## PEER REVIEWED PUBLICATIONS (continued)

6. **Behm, M.**, and Hausmann, H. (2007). Eisdickenmessungen in alpinen Höhlen mit Georadar (Determination of ice thickness in alpine caves with ground penetrating radar). *Die Höhle, Zeitschrift für Karst-und Höhlenkunde*, 58, 3–11.
5. **Behm, M.**, Brückl, E., Chwatal, W., and Thybo, H. (2007). Application of stacking and inversion techniques to three-dimensional wide-angle reflection and refraction seismic data of the Eastern Alps. *Geophysical Journal International*, 170(1), 275–298.
4. **Behm, M.**, Brückl, E., and Mitterbauer, U. (2007). CELEBRATION 2000 and ALP 2002 Working Groups, 2007: A new seismic model of the Eastern Alps and its relevance for Geodesy and Geodynamics. *Österreichische Zeitschrift für Vermessung und Geoinformation (Austrian Journal for Geodesy and Geoinformation)*, 95(2), 121–133
3. Brückl, E., Mitterbauer, U., and **Behm, M.** (2006). Studies on Crustal Structure and Gravity in the Eastern Alps. In *International Association of Geodesy Symposia* (Vol. 131, pp. 181–192).
2. Majdański, M., Grad, M., Guterch, A., **Behm, M.**, Bodoky, T., Brinkmann, R., ... Zelaźniewicz, A. (2006). 2-D seismic tomographic and ray tracing modelling of the crustal structure across the Sudetes Mountains basing on SUDETES 2003 experiment data. *Tectonophysics*, 413(3-4), 249–269.
1. **Behm, M.**, Plan, L., and Roch, K. (2005). Erfolgreicher Versuch einer Höhlendetektion mit Georadar (GPR) (Successful delineation of a karst cavity with ground penetrating radar). *Die Höhle, Zeitschrift für Karst-und Höhlenkunde*, 56, 20–23.

## BOOKS AND ARTICLES IN BOOKS

3. **M.Behm**, L.Plan, R.Seebacher, G.Buchegger (2016). Dachstein. In: *Höhlen und Karst in Österreich (Caves and karst in Austria)*, C.Spötl, L.Plan, E.Christian (ed.); Österreichisches Landesmuseum, Linz, 2007, ISBN: 978-3-85474-321-7, 569-588.
2. R.Lippitsch, **M.Behm**, E.Brückl, (2007). Die Moho: Grenze zwischen Erdkruste und Erdmantel (The Moho: Boundary between the Earth's crust and mantle). In: *Geo-Atlas Österreich - Die Vielfalt des geologischen Untergrundes*, T. Hofmann, H. Schönlaub (ed.); Böhlau, Wien, 2007, ISBN: 978-3-205-77726-7, 58-59.
1. **M.Behm**, G.Raffeiner, W.Schöner, (2006). Auswirkungen der Klima- und Gletscheränderung auf den Alpinismus (Impact of climate change and glacier retreat on mountaineering). *Umweltdachverband*, Vienna, 2006, 96 p, ISBN 3-900 711-81/X.

## TEACHING EXPERIENCE

2018: Lecturer for **Geophysical Imaging of the Near Surface** (graduate course)

2017-2019: Lecturer for **Gravity and Magnetic Exploration** (graduate course) and **Geophysical Field Camp**, Oklahoma University

2016: Lecturer for **Seismic Monitoring**, Vienna University of Technology (graduate course)

2016: Lecturer for the EAGE student short course **Alternative Geophysical Technologies**

2014 - 2015: Lecturer for **Seismic Acquisition** and **Alternative Geophysical Technologies** (CSEM, Gravimetry/Magnetics, Microseismic) within the graduate and in-house training programs at OMV E&P.

2009 - 2010: Lecturer for **Seismic Processing**, Vienna University of Technology (graduate course)

2008 - 2011: Implementation and teaching of the field course **Engineering Geophysics**, Vienna University of Technology (undergraduate course)

2007 - 2010: Implementation and teaching of the course **Engineering Geophysics**, Vienna University of Technology (undergraduate course)

## STUDENT ADVISING

### Graduate students

2018 (start): Z. Wang, PhD in Geophysics: Regional and local reflectivity imaging from teleseismic and induced earthquakes in Oklahoma

2018 (start): D. Dangwal, MSc in Geophysics: Ambient noise interferometry applied to a dense local deployment in a mining environment

2017 (start): A. Patterson, MSc. in Geology: Seismic imaging of Unaweep Canyon in Colorado

2017 (start): P. Ratre, PhD in Geophysics: 3D crustal velocity model of Oklahoma

2019: A. Patterson, MSc. in Geology: Seismic Imaging of Unaweep Canyon in Colorado

2012: B. Loidl, MSc in Geophysics: Application of 3-D stacking techniques to wide angle data from Southern Norway.

2010: T. Oeberseder, MSc in Geophysics: Seismic Modelling of Reflections in the Upper Mantle in the Alpine-Carpathian-Pannonian transition zone.

## **STUDENT ADVISING (CONTINUED)**

2010: C. Tierno Ros, MSc in Geophysics: 3D gravimetric investigation of the crust in the Vienna Basin region.

2009: K. Alten, MSc in Geophysics: Calculation of static corrections by 3D tomographic methods.

2008: K. Mayer, MSc in Geophysics: Application of tomographic methods to 3D near surface data

## **Undergraduate students**

2007 – 2011, 2017: supervised 15 undergraduate projects.

## **SELECTED FIRST AUTHOR PRESENTATIONS**

35. AGU annual meeting, December 2018, Washington, US. Seismic and Electrical Resistivity Imaging of the Meers Fault in Oklahoma

34. EGU annual meeting, April 2018, Vienna, Austria. Interpretation of passive seismic data obtained during active source surveys with nodal arrays: A case study from Western Colorado

33. *(Invited)* Feb. 2018, Conference “Recovery of difficult hydrocarbons”, KAUST, Saudi Arabia: Application of Microseismic Monitoring and Ambient Noise Tomography for Improved Oil Recovery

32. AGU annual meeting, Dec. 2017, New Orleans, US. Seismic Monitoring and Characterization of the 2012 Outburst Flood of the Ice-Dammed Lake A.P.Olsen (NE Greenland)

31. *(Invited)* Aug. 2017, Shadong University, China: Ambient noise interferometry for seismic imaging and monitoring.

30. AGU annual meeting, Dec. 2016, San Francisco, US. Characterizing the crustal structure in the Eastern Alps with teleseismic reflections from the inner core boundary.

29. EAGE 78<sup>th</sup> annual meeting, May 2016, Vienna, Austria. 3D modeling of the regional basement structure off- and onshore Congo based on inversion of satellite-derived gravity data.

28. Workshop “Salt Challenges in Hydrocarbon Exploration”, SEG 85<sup>th</sup> annual meeting, Oct. 2015, New Orleans, US. Interpretation of salt thickness offshore Gabon supported by Voxel Assisted Layered Earth Modelling.

27. 5<sup>th</sup> Passive Seismic Workshop (EAGE), Sept. 2014, Lisbon, Portugal. Temporal and Spatial Variability of Microseismic Events due to Water Flooding: A Case Study from the Tazlau Field (RO).

26. EGU annual meeting, Apr. 2014, Vienna, Austria. Love and Rayleigh wave dispersion from regional Ambient Noise Tomography in the Eastern Alps of Europe.

## SELECTED FIRST AUTHOR PRESENTATIONS (continued)

25. AGU annual meeting, Dec. 2013, San Francisco, US. Ambient Noise Topography in the Eastern Alps of Europe.
24. Center for Wave Phenomena (CWP) Project Review Meeting, May 2013, Colorado, US. Imaging shallow crustal structure by blind deconvolution of teleseismic body waves.
23. AGU annual meeting, Dec. 2012, San Francisco, US. Near surface characterisation with passive seismic data - a case study from the La Barge basin (Wyoming).
22. Center for Wave Phenomena (CWP) Project Review Meeting, May 2012, Colorado, US. Retrieval of local surface velocities from traffic noise – an example from the La Barge Basin (Wyoming).
21. EGU annual meeting, May 2011, Vienna, Austria. Imaging the structure of cave ice by ground-penetrating radar.
20. (*Invited*) Wintertreffen der Schweizerischen Gesellschaft für Höhlenforschung, Feb. 2011, Bern, Switzerland. Anwendung von Georadar in Karst und Höhlen (Application of GPR to karst and caves).
19. 4th International Workshop on Ice Caves, Jun. 2010, Obertraun, Austria. Thickness and internal structure of underground ice in a lowelevation cave in the Eastern Alps (Beilstein-Eishöhle, Hochschwab, Austria).
18. 3<sup>rd</sup> Polarsymposium, Mar. 2009, Vienna, Austria. Georadarmessungen in Eishöhlen (GPR survey in ice caves).
17. Pangeo, Sep. 2008, Vienna, Austria. Poisson's ratio of the crust and Moho structure from shear wave analyses in the Eastern Alps and their surroundings.
16. Pangeo, Sep. 2008, Vienna, Austria. A new Moho map for the European Alpine collision zone.
15. 3<sup>rd</sup> international workshop on ice caves, May 2008, Kungur, Russia. Determination of ice thicknesses in alpine caves using georadar.
14. IGC33, Aug. 2008, Oslo, Norway. CELEBRATION 2000 and ALP 2002 Working Group, 2008. Tectonic interpretation of deep geophysical data from the Eastern Alps.
13. EGU annual meeting, Apr. 2008, Vienna, Austria. A new Moho map for the entire Alpine region.
12. AGU annual meeting, Dec. 2007, San Francisco, US. Determination of ice thicknesses in alpine caves with ground penetrating radar.
11. EGU annual meeting, Apr. 2007, Vienna, Austria. Crustal structure of the Eastern Alps and their foreland along the CEL/10/ALP04 seismic profile.
10. Pangeo, Sep. 2006, Innsbruck, Austria. Neue Erkenntnisse zum Tiefbau der Ostalpen aus seismischen Experimenten (New insights into the deep structure of the Eastern Alps from new seismic experiments).



## SELECTED FIRST AUTHOR PRESENTATIONS (continued)

9. European Conference on Earthquake Engineering and Seismology, Sep. 2006, Geneva, Switzerland. A new seismic model of the Eastern Alpine crust. First European Conference on Earthquake Engineering and Seismology.
8. Workshop Geodynamics of Central Europe, Jun. 2005, Zakopane/Tatra mountains, Poland. Accuracy and resolution of a 3D seismic model of the Eastern Alps.
7. EGU annual meeting, Apr. 2005, Vienna, Austria. The Moho in the Eastern Alps - new insights from recent 3D refraction experiments.
6. Pangeo, Sep. 2004, Innsbruck, Austria. Seismic structure of the Eastern Alps – evidence for a ‘Pannonian’ microplate.
5. Workshop Geodynamics of Central Europe, May 2004. Zakopane/Tetra mountains, Poland. A 3D seismic model of the Eastern Alps: Modeling approach & results.
4. EGU 1<sup>st</sup> General Assembly, Apr. 2004, Nice, France. Accuracy and resolution of a 3D seismic model of the Eastern Alps.
3. AGU annual meeting, Dec. 2003, San Francisco, US. A 3-D seismic model of the Eastern Alps derived from CELEBRATION 2000 and ALP2002 data.
2. Minpet, Sep. 2003, Innsbruck, Austria. Bisherige Ergebnisse von CELEBRATION 2000 und ALP2002 im Ostalpenraum (Results from CELEBRATION 2000 and ALP2002 in the area of the Eastern Alps).
1. AGU annual meeting, Dec. 2002, San Francisco, US. The CELEBRATION 2000 Experiment: Results from the Alpine Area.

## AWARDS, SERVICE, SKILLS, CERTIFICATES

### Award

Best paper award 2008 ([Application](#) of stacking techniques to 3D WAR/R data of the Eastern Alps) of the Faculty of Mathematics and Geoinformation at Vienna University of Technology.

### Conference/event organizer

- Assistant Editor for the special section “Joint processing and interpretation of active and passive seismic data” in *Interpretation*
- Convener for the workshop ‘[Near-surface Zone Impact on Seismic Exploration](#)’ at the 77<sup>th</sup> EAGE Conference (Madrid, 2015)
- Organizer of the international workshop IWIC 2010 on ice caves (<http://info.tuwien.ac.at/geophysik/iwic2010>).
- ‘School on Ice’ (01/2007 – 04/2009): Introducing pupils and students to processes in the cryosphere and related research. Collaboration with GIScience (University of Salzburg, Austrian Academy of Sciences) as a part of the FERMAP initiative (Austrian contribution to the International Polar Year 2007-2008).



**University service**

- Member of the board of study affairs at Vienna University of Technology. I was jointly responsible for designing and implementing a new Bachelor curriculum of “Geodesy and Geoinformation”.
- Member of the appointing committee for the Professorship of Geophysics at Vienna University of Technology.
- Member of the appointing committee for the Professorship of Exploration Geophysics at Oklahoma University.
- Member of the appointing committee for the Professorship of Computational Geophysics at Oklahoma University.

**Languages:** English and German

**Membership:** SEG, AGU, EAGE, EGU, Austrian Geophysical Society

**Professional software and academic software packages**

- Seismic processing/modeling: ProMAX, OMNI, CGG Geovation (basics), ANRAY, HOLE, Seis83, FMTT, ZPLOT, Seismic Handler, Seismon
- Operation systems and programming: Linux (including basic administrative tasks), Solaris, Windows, Mac OS, MatLAB, MySQL (basics)
- Interpretation, visualization, and processing: Oasis Montaj, Petrel, GOCAD
- GPR Processing and modeling: ReflexW
- Gravimetric and magnetic modeling: GM-SYS 2D /3D
- Resistivity Imaging: AGI EarthImager 2D

**Field instrumentation**

- Seismic recording systems: Texan 125, Fairfield ZLAND, Geode
- GPR: GSSI SIR 2, GSSI SIR 3000, Sensor&Software
- Electromagnetics: EM-34
- Gravimetry: Scintrex CG5
- Electrical resistivity imaging: ARES-II

**Certificates and professional development**

- Introduction to Petroleum Engineering, HOT Engineering, Austria, 2014
- Introduction to Petrel, OMV, Austria, 2014
- BOSIET (Basic Offshore Safety Induction & Emergency Training), Maersk, UK, 2014
- Introduction to the CSEM Method, EMGS, Norway, 2014
- Microseismic Monitoring in Oil and Gas Reservoirs, Seismik, Czech Republic, 2013
- 3D Seismic Acquisition Planning & Modeling with OMNI 3D, SLB, UK, 2013
- Planning and Operating a Land 3D Seismic Survey, SEG, US, 2013
- Seismic Anisotropy: Basic Theory and Applications in Exploration and Reservoir Characterization, SEG, US, 2012
- Geostatistics for Seismic Data Integration in Earth Models, EAGE, Austria, 2010
- Blasting license, Austria, 2003