

# Johannes Horak

## Personal Details



Date of birth 07.08.1984  
Place of birth Steyr, Austria  
Nationality Austria  
Phone +43 677 / 6396 1193  
Mail johannes.horak@mag.linz.at  
Web www.horak.xyz

## Education

12/2015 - current

PhD programme Atmospheric Sciences, Area of dissertation: Meteorology and Geophysics  
Supervisors: Prof. Dr. Alexander Gohm and Univ. Prof. Dr. Mathias Rotach.

Downscaling of the state of the atmosphere above complex topography with the Intermediate Complexity Atmospheric Research Model and assessing its performance.

Expected completion: Spring – Summer 2021

03/2006 - 03/2013

Diploma programme: Physics, University of Vienna  
Thesis: *Design and Characterisation of a LIAD Source in View Of Matter Wave Interferometry*  
Supervisor: Univ. Prof. Dr. Markus Arndt.

The thesis characterizes a self-designed molecular beam source based on Laser induced acoustic desorption. It explores its applicability for experiments in matter wave interferometry and investigates the driving mechanism of the process with numerical and experimental methods.

10/2004 - 02/2005

Diploma programme: Philosophy, University of Salzburg

10/2003 - 09/2004

Civil service, AKH Linz

09/1998 - 06/2003

School leaving exam at technical college for software engineering and business, HTBLA Leonding

## Peer Reviewed Publications

### First Author

**Horak, J.**, Hofer, M., Gutmann, E., Gohm, A., and Rotach, M. W., (2021). A process-based evaluation of the Intermediate Complexity Atmospheric Research Model (ICAR) 1.0.1, *Geoscientific Model Development*, in press, 2021.

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A., and Rotach, M. W., (2019). Assessing the added value of the Intermediate Complexity Atmospheric Research (ICAR) model for precipitation in complex topography. *Hydrology and Earth System Sciences*, 23(6), 2715-2734.

**Horak, J.**, Haberleitner, A., and Schauburger, G., (2017). How to transport veterinary drugs in insulated boxes to avoid thermal damage by heating or freezing. *BMC Veterinary Research*, 13(1), 140.

**Horak, J.**, Schmerold, I., Wimmer, K., and Schauburger, G., (2017). Cabin air temperature of parked vehicles in summer conditions: life-threatening environment for children and pets calculated by a dynamic model. *Theoretical and Applied Climatology*, 130(1), 107-118.

**Horak, J.**, Heunoske, D., Lueck, M., Osterholz, J., and Wickert, M., (2015). Numerical modeling and characterization of the laser-matter interaction during high-power continuous wave laser perforation of thin metal plates. *Journal of Laser Applications*, 27(S2), S28003.

### Co-Author

Hofer, M. and **Horak, J.**, (2020). Extending Limited In Situ Mountain Weather Observations to the Baseline Climate: A True Verification Case Study. *Atmosphere*, 11(11):1256.

Osterholz, J., Heunoske, D., **Horak, J.**, Lexow, B., Lueck, M., Schaeffer, S., and Wickert, M., (2017). Experimental characterization of energy transfer from large-diameter kilowatt continuous-wave laser beams to metal samples. *Journal of Laser Applications*, 29(1), 12011.

Sezer, U., Wörner, L., **Horak, J.**, Felix, L., Tüxen, J., Götz, C., Vaziri, A., Mayor, M., and Arndt, M., (2015). Laser-Induced Acoustic Desorption of Natural and Functionalized Biochromophores. *Analytical Chemistry*, 87(11), 5614-5619.

Haberleitner, A., Schauburger, G., **Horak, J.**, and Schmerold, I., (2014). Thermal drug storage conditions in veterinary vehicles – A one-year field study in Austria. *Wiener Tierärztliche Monatsschrift*, 101(5-6), 110-119.

## Talks

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: An evaluation of linear theory based downscaling with ICAR in complex topography, Session: Climate modeling in Mountain regions, *IMC 2019*, Innsbruck, Austria. (download)

Hofer, M., **Horak, J.**: Extending limited in situ mountain weather observations to the baseline climate: A true verification case study, Session: Climate information for impact modeling, *IMC 2019*, Innsbruck, Austria. (download)

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: Computationally efficient modelling of precipitation with ICAR in complex topography, Seminar: Climate change of long and short timescales, *Centre for Climate - Cryosphere and Atmosphere*, Innsbruck, Austria. (download)

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: Assessing the Added Value of the Intermediate Complexity Atmospheric Research Model (ICAR) Without Applying Observation Based Tuning, Graduate Seminar, *Department of Atmospheric and Cryospheric Sciences*, Innsbruck, Austria. (download)

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: Weather pattern-based evaluation of the Intermediate Complexity Atmospheric Research Model (ICAR), Session: Downscaling, Methods and Applications, *EGU 2018*, Vienna, Austria. (download)

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: Downscaling the Local Weather Above Glaciers in Complex Topography, Session: Downscaling, Methods and Applications, *EGU 2017*, Vienna, Austria. (download)

**Horak, J.**, Heunoske, D., Lueck, M., Osterholz, J., and Wickert, M.: Numerical Modelling and Characterization of the Laser-Matter Interaction During High-Power CW Laser Perforation of Thin Metal Plates, Session: Modelling and Simulation, *ICALEO 2014*, San Diego, USA.

## Posters

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: An evaluation of linear theory based downscaling with ICAR in complex topography, *IMC 2019*, Innsbruck, Austria. (download)

Hofer, M., **Horak, J.**: Extending limited in situ mountain weather observations to the baseline climate: A true verification case study, *IMC 2019*, Innsbruck, Austria. (download)

**Horak, J.**, Hofer, M.: Precipitation downscaling in complex topography with ICAR evaluated with a weather-pattern based approach, *ICAM 2019*, Riva del Garda, Italy. (download)

**Horak, J.**, Hofer, M., Maussion, F., Gutmann, E., Gohm, A. and Rotach, M. W.: Simplified physics-based precipitation downscaling for glacierized mountain regions, *AGM 2019*, Innsbruck, Austria. (download)

## Teaching Experience

|                   |  |
|-------------------|--|
| 10/2011 - 01/2012 | Tutor for mathematics exercises<br>University of Natural Resources and Life Sciences, Vienna |
| 03/2010 - 07/2010 | Tutor for introductory physics lab exercises<br>University of Veterinary Medicine, Vienna    |
| 03/2009 - 07/2009 | Tutor for introductory physics lab exercises<br>University of Veterinary Medicine, Vienna    |

## Outreach

Author and owner of the science communication blog [timaios.org](http://timaios.org). Selected articles:

- [Gravitationswellen und ihre Bedeutung](#) (link)
- [Wie funktioniert Wissenschaft?](#) (link)
- [Wie funktioniert eine Infrarotkamera?](#) (link)

Member of the “Eis and Klima Blog” of the Austrian newspaper [derStandard.at](http://derStandard.at). Author of the articles: “[Die Vermessung der Gletscher](#)” (link) and “[Wetter und Klima: Vertrauen in Modelle finden](#)” (link).

## Research Stays / Courses

|                  |   |
|------------------|---|
| 4/2016 - 05/2016 | National Center for Atmospheric Research, Boulder, USA<br>An introduction to the intermediate complexity atmospheric research model (ICAR). |
| 06/2014          | Thermography in R&D and automation (three days)   |
| 02/2014          | Basics of FEM modelling (two days)  |

## Grant / Scholarship

- 2016: KWA scholarship of the University of Innsbruck for a three week research stay at the National Center for Atmospheric Research, Boulder, USA. Amount: 600 €

## Professional Experience

- 06/2020 - current      **Urban Climatologist, *Municipality of Linz***  
Preparation, support, coordination and management of climate relevant projects, assessing the impact of anthropogenic climate change in Linz, development of a climate change adaptation strategy, provision of urban climatology expertise on urban development projects within city limits.
- 12/2015 - current      **Research assistant, *University of Innsbruck***  
Downscaling of atmospheric variables with the Intermediate Complexity Atmospheric Research Model in complex topography with a focus on target quantities relevant for process-based distributed glacier mass-balance models.
- 09/2013 - 08/2015      **Research assistant, *Fraunhofer EMI, Freiburg (Germany)***  
Group: Laser technology. Numerical and experimental studies of the interaction between high-power continuous-wave laser radiation and metal plates.
- 10/2010 - 06/2012      Creation of L<sup>A</sup>T<sub>E</sub>X versions of lecture notes and presentations for Prof. Dr. Helmuth Hüffel, *University of Vienna*
- 04/2008 - 06/2010      **Project staff member, *University of Veterinary Medicine, Vienna***  
Department: Medical physics. Development of a balance equation based numerical model describing the temporal evolution of the cabin temperature of a vehicle. Input parameters are its geometry, optical/thermal properties and meteorological data during the time interval to be simulated for.
- 05/2007 - 06/2007      **Project staff member, *University of Vienna***  
Group: Quantum nanophysics and molecular quantum optics. Setting up of Young's double slit experiment with single photons.
- 07/2005 - 07/2006      **Software engineer, *MIC Customs Solutions, Linz***  
Adaption and development of Oracle Forms based customs software for corporations.
- 03/2005 - 06/2005      **Mobile patrol, *Securitas, Linz***

## Languages

German (first language), English (C2) and Russian (A1)

## Further Expertise

|                   |   |
|-------------------|---|
| Thermography      | Collection of data with a thermographic camera and its analysis with corresponding software.  |
| Coding            | Python (numpy, scipy, cartopy, matplotlib, xarray, pandas, ...), Fortran, Bash Script, C, C++, C#, Java, JavaScript, PHP, HTML, SQL (Oracle, MySQL, PostgreSQL), Access   |
| Operating systems | Windows, Linux (server and desktop)   |
| Software          | Mathematica, MATLAB, Origin, Solidworks, MS Office, L <sup>A</sup> T <sub>E</sub> X, LS-Dyna, LS-Prepost, COMSOL, Adobe Bridge, Lightroom and Photoshop, Steinberg Cubase, Open Source blogsystems and CMS (Serendipity, Wordpress) |