

# Anne Glerum

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## Experience

- Nov **Postdoctoral researcher**, *GFZ Potsdam, Germany*.
- 2021–Oct 2024
  - Couple numerical models of thermo-mechanical rift dynamics with models of hydrothermal flow of subsurface fluids
  - Unravel tectonic conditions for the formation of sediment-hosted metal deposits in rift basins
- 2017–Oct 2021 **Postdoctoral researcher**, *GFZ Potsdam, Germany*.
  - Demonstrate [edge-driven microplate rotation in the East African Rift System](#)
  - Construct data-driven numerical models of the present-day EARS stress field to distinguish between geodynamic drivers
  - Develop [ASPECT](#) code for modeling of continental rifting in terms of e.g. initial and boundary conditions, visco-elasto-plastic rheology, thermodynamic relations for melting of olivine solid-solution, surface topography diffusion and mesh deformation in combination with the particle-in-cell method
- 2018–Present **Maintainer (since 2020) and Principal developer ASPECT software**.
  - Develop code for personal and community research
  - Review and merge GitHub pull requests
  - Plan future development directions
  - Mentor and support ASPECT users and community through hackathons, short courses and workshops
- 2012–2017 **Doctoral researcher**, *Utrecht University, The Netherlands*.  
**Promotor:** Prof. Dr. W. Spakman. Title awarded 01-03-2019.  
**Thesis:** [Geodynamics of complex plate boundary regions](#).
  - Quantify geodynamic forcing of Mediterranean crustal deformation
  - Model 2D and 3D thermo-mechanically coupled time-dependent and instantaneous subduction
  - Develop ASPECT code for [subduction modeling](#) in terms of multi-composition, visco-plastic rheology and 3D data-driven initial conditions

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## Education

- 2009-2012 **MSc in Geophysics**, *Utrecht University, The Netherlands*, highest distinction.  
**Thesis:** Implementation of a simple melt formulation in SEPRAN to explain on-going mantle melting and short-lived core dynamo on Mars with 2D convection models.
- 2006-2009 **BSc in Earth Sciences**, *Utrecht University, The Netherlands*, highest distinction.  
**Thesis** on the origin of hydrothermal gold mineralization.

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## Grants & Awards

The proposals I spearheaded and administrated were granted €1,820,000 of computational time for our modeling group.

- 2022 **Project administrator HPC time on HRLN cluster**, Germany.  
**Project:** [Geodynamic modeling of the crust, lithosphere and mantle](#), phase 3.  
**Monetary equivalent:** €1,300,000.
- 2022 **DFG proposal for a three-year Postdoc position**, Germany.  
**Project:** Tectonic control on geothermal systems in active continental rifts. **In review.**

- 2021 **HPC time on HRLN cluster**, Germany.  
**Project:** Geodynamic modeling of the crust, lithosphere and mantle, phase 2.  
**Monetary equivalent:** €260,000.
- 2020 **HPC time on HRLN cluster**, Germany.  
**Project:** Geodynamic modeling of the crust, lithosphere and mantle.  
**Monetary equivalent:** €260,000.
- 2019 **Contributor to NSF grant #1551864**, USA.  
**Project:** Quantifying plume-lithosphere interactions with GNSS geodesy, seismology, and geodynamic modeling.  
**Total award:** \$399,047.
- 2019 **External collaborator on NSF grant #1925595**, USA.  
**Project:** Development and application of a framework for integrated geodynamic Earth models.  
**Total award:** \$1,000,000.
- 2019 **Geo.X international travel grant €500**, Germany.
- 2018 **2nd Prize Best poster €150**, *Dutch Earth Scientific Conference*, The Netherlands.
- 2016 **HPC time on Dutch National Supercomputer Cartesius**, The Netherlands.

## Outreach

Communicating our research both to the public and to other disciplines is vital. Therefore I have written and edited for the EGU Geodynamics blog and organize a short course at the EGU assembly.

- 2021–2022 **EGU shortcourse Geodynamics 101 convener**, *vEGU, EGU*, Austria.
- 2017–2021 **EGU Geodynamics blog editor and author**.
- 2019 **News coverage of Victoria paper on *Newsweek* and *Science Daily***.
- 2019 **EGU shortcourse Geodynamics 101 convener and speaker**, *EGU*, Austria.
- 2019 **AGUTV clip of the GFZ Potsdam Geophysics Department**, *AGU*.
- 2018 **EGU shortcourse Geodynamics 101 convener and speaker**, *EGU*, Austria.

## Conferences and Workshops

I greatly enjoy expanding my network through presenting and convening at conferences and fostering the ASPECT user community through the yearly 10-day hackathons.

- 2022 EGU (invited talk), GRC Geochemistry of Mineral Deposits, GeoMinKöln, DOME meeting (invited workshop speaker)
- 2021 Geophysics and Tectonics Seminar (*invited talk*), ASPECT Hackathon, German-Swiss Geodynamics Workshop, MSC/SZ4D workshop (invited talk), AGU Fall meeting (invited talk, convener)
- 2020 EGU, Tectonics modeling Workshop (organizer and speaker), Tectonics Community Science Workshop (moderator), ASPECT Hackathon, AGU Fall Meeting (convener)
- 2019 EGU (talk), YES Conference (invited talk), ASPECT Hackathon, Ada Lovelace
- 2018 NAC, ASPECT Hackathon
- 2017 EGU, Nethermod (Ada Lovelace; organizer), ASPECT Hackathon, AGU (invited talk)
- 2016 GeoMod, ASPECT Hackathon
- 2015 EGU, ASPECT Hackathon, GeoBerlin
- 2014 EGU, GeoMod (ASPECT short course organizer and speaker), ASPECT Hackathon
- 2013 EGU, Lucky13 (Ada Lovelace), ASPECT Hackathon
- 2012 MedMeet, NAC (talk), AGU Fall Meeting

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## Community service

I review manuscripts for Tectonophysics, Geophysical Research Letters, Tectonics and Geochemistry, Geophysics, Geosystems and have reviewed a proposal for NSF.

2022 I am a topic editor for a [special issue](#) of *Frontiers in Earth Science*

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## Supervision & Teaching

**Cosupervision** of 3 PhD students (Dr. M. Richter, Dr. D. Neuharth, E. Heckenbach) and 4 MSc students (Dr. M. Fraters, C. Blom, E. Heckenbach, F. Gehrke) and supervision of 1 BSc student (E. Mahlo).

Despite having no teaching obligations at GFZ Potsdam, I like to stay connected to students through lecturing in courses at the University of Potsdam.

2020 **Instructor** *Introduction to numerical modeling*, University of Potsdam, Potsdam, Germany.

2019 **Instructor** *Modeling dynamics and structure of the lithosphere*, University of Potsdam, Potsdam, Germany.

2018 **Instructor** *Introduction to numerical modeling*, University of Potsdam, Potsdam, Germany.

2014 **Organizer and instructor** **ASPECT short course**, *GeoMod*, Potsdam, Germany.

2008-2016 **Instructor practicals**, *Utrecht University*, Utrecht, The Netherlands.

**Courses:** Continuum Mechanics, Linear Algebra and Vector Analysis, Math, Physical Chemistry

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## Courses and Training

I regularly partake in courses to further hone my communicating and collaborating skills.

2019–2020 **Viadrina Mentoring Program for Female Postdocs**, *Europa-University Viadrina*, Germany.

**Workshops** (EU Research funding, Career planning, Leadership and negotiation, Decision making and stress management, Presenting and personal branding), **Workshops** on EU research funding, career planning, leadership and negotiation, decision making and stress management, presenting and personal branding, **coaching** and **scientific mentoring**

2019 **Scientific Presenting Workshop**, *Geo.X*, Germany.

2018 **Time and Self Management Workshop**, *Potsdam Graduate School*, Germany.

2014-2016 **Courses**, *Utrecht University Graduate School*, The Netherlands.

Academic Writing, Advanced Writing, and Presenting in English

2015 **High Performance Computing Course**, *Delft Technical University*, The Netherlands.

2014 **Parallel Programming Course**, *Stuttgart University*, Germany.

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## Publication list

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*in review* Gernon, T. M., T. K. Hincks, S. Brune, S. M. Jones, A. Cunningham, D. Keir, and **Glerum, A.** (*in review*). "Great Escarpments shaped by rift-related delamination of mantle lithosphere". *Nature*.

Gernon, T. M., S. M. Jones, S. Brune, T. K. Hincks, **Glerum, A.**, R. N. Mitchell, M. R. Palmer, J. C. Schumacher, R. M. Primiceri, R. S. J. Sparks, M. Field, W. L. Griffin, S. Y. O'Reilly, D. Keir, C. J. Spencer, and A. S. Meredith (*in review*). "Diamond ascent by rift-driven disruption of cratonic mantle keels". *Nature*. DOI: [10.21203/rs.3.rs-986686/v1](https://doi.org/10.21203/rs.3.rs-986686/v1).

**Glerum, A.**, W. Spakman, D. J. J. van Hinsbergen, C. Thieulot, and C. Pranger (*in review*). "Sensitivity of horizontal surface deformation to mantle dynamics from 3D instantaneous dynamics modeling of the eastern Mediterranean". *Journal of Geophysical Research - Solid Earth*. DOI: [10.31223/X5FW59](https://doi.org/10.31223/X5FW59).

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- 2022 Neuharth, D., S. Brune, **Glerum, A.**, C. K. Morley, X. Yuan, and J. Braun (2022). "Flexural strike-slip basins". *Geology* 50.3, pp. 361–365. DOI: [10.1130/G49351.1](https://doi.org/10.1130/G49351.1).
- Neuharth, D., S. Brune, T. Wrona, **Glerum, A.**, J. Braun, and X. Yuan (2022). "Evolution of rift systems and their fault networks in response to surface processes". *Tectonics* 41.e2021TC007166. DOI: [10.1029/2021TC007166](https://doi.org/10.1029/2021TC007166).
- Zelst, I. van, F. Crameri, A. Pusok, **Glerum, A.**, J. Dannberg, and C. Thieulot (2022). "101 Geodynamic modelling: How to design, carry out, and interpret numerical studies". *Solid Earth* 13, pp. 583–637. DOI: [10.5194/se-13-583-2022](https://doi.org/10.5194/se-13-583-2022).
- 2021 Heckenbach, E. L., S. Brune, **Glerum, A. C.**, and J. Bott (2021). "Is there a speed limit for the thermal steady-state assumption in continental rifts?" *Geochemistry, Geophysics, Geosystems* 22.3. ISSN: 1525-2027. DOI: [10.1029/2020GC009577](https://doi.org/10.1029/2020GC009577).
- Neuharth, D., S. Brune, **Glerum, A.**, C. Heine, and J. K. Welford (2021). "Formation of continental microplates through rift linkage: Numerical modeling and its application to the Flemish Cap and Sao Paulo Plateau". *Geochemistry, Geophysics, Geosystems* 22.4. ISSN: 1525-2027. DOI: [10.1029/2020GC009615](https://doi.org/10.1029/2020GC009615).
- Richter, M. J. E. A., S. Brune, S. Riedl, **Glerum, A.**, D. Neuharth, and M. R. Strecker (2021). "Controls on asymmetric rift dynamics: Numerical modeling of strain localization and fault evolution in the Kenya Rift". *Tectonics* 40. ISSN: 0278-7407. DOI: [10.1029/2020tc006553](https://doi.org/10.1029/2020tc006553).
- Sandiford, D., S. Brune, **Glerum, A.**, J. Naliboff, and J. M. Whittaker (2021). "Kinematics of footwall exhumation at oceanic detachment faults: Solid-block rotation and apparent unbending". *Geochemistry, Geophysics, Geosystems* 22.4, pp. 1–25. ISSN: 1525-2027. DOI: [10.1029/2021GC009681](https://doi.org/10.1029/2021GC009681).
- 2020 **Glerum, A.**, S. Brune, D. S. Stamps, and M. R. Strecker (2020). "Victoria continental microplate dynamics controlled by the lithospheric strength distribution of the East African Rift". *Nature Communications* 11.1, p. 2881. DOI: [10.1038/s41467-020-16176-x](https://doi.org/10.1038/s41467-020-16176-x).
- Muluneh, A. A., S. Brune, F. Illsley-Kemp, G. Corti, D. Keir, **Glerum, A.**, T. Kidane, and J. Mori (2020). "Mechanism for deep crustal seismicity: Insight from modeling of deformation processes at the Main Ethiopian Rift". *Geochemistry, Geophysics, Geosystems* 21.7, pp. 1–13. DOI: [10.1029/2020GC008935](https://doi.org/10.1029/2020GC008935).
- Naliboff, J. B., **Glerum, A.**, S. Brune, G. Péron-Pinvidic, and T. Wrona (2020). "Development of 3-D rift heterogeneity through fault network evolution". *Geophysical Research Letters* 47.13. DOI: [10.1029/2019GL086611](https://doi.org/10.1029/2019GL086611).
- Rajaonarison, T. A., D. S. Stamps, S. Fishwick, S. Brune, **Glerum, A.**, and J. Hu (2020). "Numerical modeling of mantle flow beneath Madagascar to constrain upper mantle rheology beneath continental regions". *Journal of Geophysical Research: Solid Earth* 125.2, pp. 1–23. DOI: [10.1029/2019JB018560](https://doi.org/10.1029/2019JB018560).
- 2019 Corti, G., R. Cioni, Z. Franceschini, F. Sani, S. Scaillet, P. Molin, I. Isola, F. Mazzarini, S. Brune, D. Keir, A. Erbello, A. Muluneh, F. Illsley-Kemp, and **Glerum, A.** (2019). "Aborted propagation of the Ethiopian rift caused by linkage with the Kenyan rift". *Nature Communications* 10.1, p. 1309. DOI: [10.1038/s41467-019-09335-2](https://doi.org/10.1038/s41467-019-09335-2).
- Fraters, M. R.T., W. Bangerth, C. Thieulot, **Glerum, A.**, and W. Spakman (2019). "Efficient and practical Newton solvers for non-linear Stokes systems in geodynamic problems". *Geophysical Journal International* 218.2, pp. 873–894. DOI: [10.1093/gji/ggz183](https://doi.org/10.1093/gji/ggz183).
- Glerum, A.** (2019). "Geodynamics of complex plate boundary regions: Insights from numerical models of convergent eastern Mediterranean and divergent east African plate tectonics". PhD thesis. Utrecht University.

- 2018 **Glerum, A.**, C. Thieulot, M. Fraters, C. Blom, and W. Spakman (2018). “Nonlinear viscoplasticity in ASPECT: benchmarking and applications to subduction”. *Solid Earth* 9, pp. 267–294. DOI: [10.5194/se-9-267-2018](https://doi.org/10.5194/se-9-267-2018).
- Yamaguchi, T., K. Fujita, T. Ichimura, **Glerum, A.**, Y. van Dinther, T. Hori, O. Schenk, M. Hori, and L. Wijerathne (2018). “Computational Science – ICCS 2018, (Lecture Notes in Computer Science)”. In: ed. by Shi et al. Springer International Publishing, pp. 31–43. DOI: [10.1007/978-3-319-93701-4\\_3](https://doi.org/10.1007/978-3-319-93701-4_3).
- 2015 Tosi, N., C. Stein, L. Noack, C. Hüttig, P. Maierova, H. Samual, D. R. Davies, C. R. Wilson, S. C. Kramer, C. Thieulot, **Glerum, A.**, M. Fraters, W. Spakman, A. Rozel, and P. J. Tackley (2015). “A community benchmark for viscoplastic thermal convection in a 2-D square box”. *Geochemistry, Geophysics, Geosystems* 16, pp. 2175–2196. DOI: [10.1002/2015GC005807](https://doi.org/10.1002/2015GC005807).