

ANNA GÜLCHER

PhD candidate in the Geophysical Fluid Dynamics group at ETH Zürich



Full name	Johanna Pia Gülcher (<i>nickname: Anna</i>)
Date of birth	25-07-1994
Place of birth	Amsterdam
Nationality	Dutch
Languages	Dutch (native), English (excellent), German (good), French (basic)
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geodynamics | deep Earth | tectonics | planetary sciences | numerical modelling | science communication | visualisation | teaching

Academic qualifications

nov 2018 - present	PhD candidate, ETH Zürich Investigating the preservation of primordial heterogeneity in terrestrial planetary interiors by 2D & 3D spherical numerical models. Advisors: dr. Maxim Ballmer (UCL) and prof. Paul Tackley (ETH)
sep 2016 - aug 2018	MSc Earth Sciences, ETH Zürich, with distinction, GPA: 4.0/4.0 Major: Geophysics Thesis: <i>Plume penetration into Venusian lithosphere and the origin of coronae: 3D thermomechanical modelling.</i> Supervisors: Taras Gerya (ETH); Laurent Montési (UMD), grade: 6.0/6.0
sep 2013 - jul 2015	BSc Earth Sciences, Utrecht University, Cum Laude, GPA: 4.0/4.0 Major: Dynamics of Earth's Interior Thesis: <i>Obtaining a high resolution geomagnetic field intensity curve for the Azores region, the IZZI-Thellier approach.</i> Supervisor: dr. Lennart de Groot (UU), grade: 8.5/10

Grants/awards

may 2019	Oustanding Student Presentation Award (OSPP), EGU 2019 Award for an outstanding scientific poster presentation in the Geodynamics division of EGU
oct 2018	ETH MSc thesis medaille 2018, ETH Zürich , Best MSc thesis in the department of Earth Sciences ETH in 2018
sep 2016	Master Scholarship Award, ETH Zürich , Excellence scholarship based on previous academic performances
may 2016	Molengraaff Fonds, TU Delft , Grant for carrying out paleomagnetic fieldwork for BSc thesis project in the Azores

Professional/teaching experience

feb 2018 - present	Research project supervisor, ETH Zürich BSc thesis on the formation of asymmetrical Venusian coronae, MSc research project on the formation of Venusian tesserae, MSc research project on the Caribbean subduction zone (Co-supervised by prof. Taras Gerya, ETH)
jan 2019 - present	Teaching assistant, ETH Zürich 2nd yr BSc Geodynamics; 2nd yr BSc Geophysical fieldwork
sep 2015 - aug 2016	Student member Board of Education, Utrecht University Professional board aiming to optimize the Earth Sciences BSc/MSc educational programme
sep 2014 - aug 2016	Student assistant, Utrecht University 1st yr BSc Mathematics; 1st yr BSc Physics, 2nd yr BSc Linear Algebra and Vector Analysis; 2nd year BSc Deformation and Metamorphism of the Crust; 2nd year BSc Differential Equations in Earth Sciences

Publications

Gülcher, A. J. P., Gerya, T.V., Montési, L.G.J. and Munch, J. (2020) Corona structures driven by plume-lithosphere interactions and evidence for ongoing plume activity on Venus. *Nature Geoscience*, vol. 13, pp. 547-554, DOI:10.1038/s41561-020-0606-1

Gülcher, A. J. P., Gebhardt, D., Ballmer, M.D. and Tackley, P.J. (2020). Variable dynamic styles of primordial heterogeneity preservation in Earth's lower mantle. *Earth and Planetary Science Letters*, vol. 536, 116160, DOI:10.1016/j.epsl.2020.116160

Gülcher, A. J. P., Beaussier, S. J. and Gerya, T.V., (2019). On the formation of oceanic detachment faults and their influence on intra-oceanic subduction initiation: 3D thermomechanical modeling. *Earth and Planetary Science Letters*, vol. 506, pp. 195-208

Selected talks/posters (selected)

Gülcher, A. J. P. (2020). Evidence for widespread ongoing plume activity on Venus - clues from corona morphologies. *Venus Science Today mini-conference day 4 - mantle dynamics on Venus* (contributed talk; panel discussion)

Gülcher, A. J. P. (2020). Towards a recipe of the deep Earth: chemical and rheological heterogeneity in Earth's lower mantle. *IGCP 648 virtual seminar series 'Supercontinent Cycles and Global Geodynamics'* (recorded seminar talk – 40 min)

Gülcher, A. J. P., Yan, J., Ballmer, M. D. and Tackley, P. J. (2020). The formation and preservation of chemical heterogeneities in the lower mantle. *Goldschmidt virtual 2020* (interactive PDF presentation)

Golabek, G. J., **Gülcher, A. J. P.**, Thielmann, M, Tackley, P. J. and Ballmer, M. D. (2020). Strain-weakening rheology in Earth's lower mantle: a multi-scale numerical endeavour. *ShareEGU 2020* (recorded presentation – 8 min)

Gülcher, A. J. P., Ballmer, M. D., Tackley, P. J. and Koelemeijer, P. (2020). The formation, preservation and seismic signatures of chemical heterogeneities in the lower mantle. *ShareEGU 2020* (recorded presentation – 8 min)

Gülcher, A. J. P., Ballmer, M.D. and Tackley, P.J. (2019). Constraints on primordial heterogeneity preservation in the lower mantle and implications for global-scale mantle dynamics. *AGU meeting, SF, USA* (poster)

Gülcher, A. J. P. (2019). Primordial and rheological heterogeneity in Earth's lower mantle and implications for global-scale mantle dynamics. *Geophysical Fluid Dynamics seminar series, ETH* (talk)

Gülcher, A. J. P., Golabek, G.J., Ballmer, M.D. and Tackley, P.J. (2019). Strain-dependent weakening in Earth's lower mantle and its control on convection dynamics. *Ada Lovelace workshop, Sienna, Italy* (poster)

Gülcher, A. J. P., Ballmer, M.D. and Tackley, P.J. (2019). The effect of rheological and tectonic parameters on the preservation of primordial reservoirs in Earth's lower mantle: a numerical study. *EGU General Assembly, Vienna, Austria*. (poster) **(OSPP award)**

Gülcher, A. J. P., Gerya, T.V., Montési, L.G.J. and Munch, J. (2018). Plume penetration into Venusian lithosphere and the origin of coronae. *AGU*

Convening

[sep 2020](#) **Feedbacks between mantle composition, structure and evolution, 3-day mini-workshop** (organiser and convener)

Extracurricular experience (selected)

[may 2020 - present](#) **Early Career Scientist representative**, *EGU Geodynamics division*

[may 2019 - present](#) **Editor of EGU GD blog website**, *EGU Geodynamics division*

[may 2019 - present](#) **Leading organizer** of the 2021 D-ERDW doctoral retreat, *ETH Zürich*
Leading organizer of the department-wide doctoral retreat: a 4-day event for doctoral students (~100) filled with workshops, excursions, academic talks and social events. Main responsibility.

[aug 2015 - aug 2016](#) **President** of the Geologic Women's Society Utrecht, *U.G.D.D. Saxifraga*

[aug 2015 - aug 2016](#) **Board of Advice member**, *Utrecht Earth Sciences study-association (U.A.V.)*
Counseling the full-time board of the Utrecht Earth Sciences Association (U.A.V.) on all important matters

[apr 2014 - aug 2016](#) **Writer/editor** of Earth Sciences magazine 'PanGeo', *U.A.V.*, a magazine for students and alumni at Utrecht University

Computing skills

Bash, Matlab, Fortran,
Python, Git, Paraview, LaTeX,
GMT, Adobe Illustrator,
Wordpress

Soft skills

Good communication, oral and written
Team worker and social
Open-minded
strong organization skills

Hobbies

Hiking, camping, windsurfing
(internationally recognized
teaching certificate), football,
snowboarding, art, writing