Fabien Maussion

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Professional career

Since 2021	**Associate professor** at the Department of Atmospheric and Cryospheric Sciences (**ACINN**), University of Innsbruck **Habilitation** obtained in September with the title "**Numerical modelling of global glacier change**" (University of Innsbruck)
2021	3 months research stay as "invited professor" at **Université Grenoble Alpes** & **Institut des Géosciences de l'Environnement**
2016–2021	Assistant professor at **ACINN**, University of Innsbruck
2015–2016	University Assistant at **ACINN**, University of Innsbruck
2014–2015	Post-doc at **ACINN**, University of Innsbruck
2008–2014	PhD then Post-doc at the **Chair of Climatology**, Technische Universität Berlin
2006–2007	Interim year as engineering trainee – Space mechanics at **C-S Group**, Toulouse

Education

2008–2014	**Technische Universität Berlin - Chair of Climatology** – PhD thesis **PhD Thesis** defended in February 2014 with the title "A new atmospheric dataset for High Asia : development, validation and applications in climatology and in glaciology" (summa cum laude). Supervisor: Dieter Scherer.
2007–2008	**Technische Universität Berlin** – International exchange year and Master degree
2002–2006	Master degree at **SUPAÉRO** – Institut Supérieur de l'Aéronautique et de l'Espace, Toulouse (aerospace engineering school)

Awards

Wilhelm-Lauer-Preis 2014 (Akademie der Wissenschaften und der Literatur, Mainz): Prize for an outstanding, original dissertation in the field of mountain geography

Functions at the University of Innsbruck

- Deputy speaker (2017-2021) then speaker (2021-) of the Innsbruck Doctoral College "**Mountain Climate and Environment**"
- Chair of the "working group on IT and software infrastructure" at **ACINN**

Research projects conducted as Principle Investigator

1M € of external funding secured over the past 4 years

2021–2024 **PROVIDE** – Paris Agreement Overshooting – Reversibility, Climate Impacts and Adaptation Needs (H2020, 230k€)

2022–2024 **A future-ready Open Global Glacier Model (OGGM)** (DFG, 180k€, co-PI: Ben Marzeion)

2021–2024 **UNCERTAIN** – Certainties and uncertainties in the future surface mass balance of mountain glaciers (**ÖAW**, 120k€, together with PhD student **Lilian Schuster**)

2019–2022 **AgroClim - Huaraz**, "Water availability and water demand in the Peruvian Andes" (**ÖAW**, 443k€)

2020–2022 **Scaling regional sea-level changes with climate forcings** (FWF, replacing previous PI Kristin Richter)

2018–2021 **Modelling glacier length changes in Alps on the base of tree-ring based temperature reconstructions for the last 2500 years** (Universtität Innsbruck, 120k€, Co-PI)

2019–2020 "Glaciers on the Cloud: OGGM-Edu" (University of Innsbruck, 20k€)

2018–2019 **The Upper Grindelwald Glacier as indicator for Holocene climate variability** (Tiroler Wissenschaftsförderung - TWF, 10k€)

Contributions to open source software and open data

OGGM Open-source global glacier evolution modelling framework (**oggm.org**). In active development since 2016, used by several research groups worldwide and in more than 20 publications, 3 completed and 3 ongoing PhD projects. *Project leader.*

OGGM-Edu Educational platform about glaciers based on the OGGM model (**edu.oggm.org**). Interactive applications, open-source graphics and computational notebooks applicable for teaching at the university level and for workshops. *Project leader.*

xarray Array manipulation software (**xarray.pydata.org**) very commonly used in all fields of geosciences. *Core developer since 2015*.

salem Map visualization and WRF model analysis software based on xarray (**salem.readthedocs.io**). *Main developer*.

HAR High Asia Refined analysis (**HAR**), atmospheric dataset for High Mountain Asia (>500 citations). *Main developer.*

RGItools Suite of scripting tools and data accompanying the production process of the Randolph Glacier Inventory (**RGI**). Topography data (**RGI-TOPO**), data processing chain (**RGI-scripts**), and more. *Project leader.*

Other activities & services to the community

- Co-Chair of the IACS working group: **Randolph Glacier Inventory (RGI) and its role in future glacier monitoring and GLIMS**
- Member of the IACS working group: **Glacier ice thickness estimation**
- Member of the CLIC working group: **Glacier Model Intercomparison Project**
- Scientific editor: **Geoscientific Model Development** (EGU Journal)
- Session convener **Observing and modelling glaciers at regional to global scales** (EGU2020-2022), **Climate modeling in Mountain regions** (**IMC2019**), **Scientific Committee** at **IMC2022**…
- Reviewer: *J. Climate, J. Geophys. Res., Nature, Nature CC, J. Hydrometeorol., Int. J. Climatol., J. Hydrol., The Cryosph., J. Glaciol., Hydrol. Earth Syst. Sci., Q.J.R. Meteorol. Soc., Earth Syst. Dynam., …*

Teaching

Current teaching load: 8 hours per week (240 hours per year)

- **Physics of the climate system**: **advanced course in physical climatology** for graduate students (winter semester, 3hrs). Lecture practicals **available online**.
- **The cryosphere in the climate system**: **advanced course in glaciology** for graduate students (summer semester, 3hrs shared with others).
- **Introduction to climatology**: **entry level course in climatology** for undergraduate students (winter semester, 2hrs shared with others).
- **Introduction to programming for atmospheric scientists**: **bachelor level course in programming** for graduate students (summer semester, 3hrs). Lecture notes **available online**.
- **Scientific programming**: **master level course in programming** for graduate students (winter semester, 3hrs). Lecture notes **available online**.
- **Advanced scientific programming**: **advanced course in programming** for graduate students (summer semester, 2hrs). Lecture notes **available online**.

For a full list of past classes and student evaluations, visit **my personal website**.

Student supervision

PhD theses (current)

- **Lilian Schuster** (ACINN): Working on the uncertainty of large scale surface mass-balance models *(**project website**)*
- **Patrick Schmitt** (ACINN): Working on the global glacier response under climate targets overshoot scenarios *(**project website**)*

- **Lorenz Hänchen** (Institute of Ecology, co-supervised): Working on the spatio-temporal variability in water availability and demand in the Peruvian Andes *(**project website**)*
- **Niklas Richter** (ACINN, co-supervised): Atmospheric drivers of glacier change in High Mountain Asia *(**project website**)*

PhD theses (completed)

- **Julia Eis** (Universität Bremen, co-supervised, 2020): Reconstructing glacier evolution using a flowline model (**link**)
- **Beatriz Recinos** (Universität Bremen, co-supervised, 2020): Ocean-glacier interaction on the large regional scale (**link**)
- **Anouk Vlug** (Universität Bremen, co-supervised, 2021): The influence of climate variability on the mass balance of Canadian Arctic land-terminating glaciers, in simulations of the last millennium (**link**)

Visiting PhD students

- **Rodrigo Aguayo** (Universidad de Concepción, Chile, 2022): working on glacier change and hydrology of Patagonia.
- **Li Fei** (Institute of Tibetan Plateau Research, China, 2020-2021): working on ice volume estimates in High Mountain Asia

21 completed master and bachelor theses. For a full list, visit **my personal website**.

List of publications

*41 peer-reviewed publications, h-index 24 (**google scholar** June 2022)*

1. Hänchen, L., Klein, C., **Maussion, F.**, Gurgiser, W., Calanca, P. and Wohlfahrt, G.: *Widespread greening suggests increased dry-season plant water availability in the Rio Santa valley, Peruvian Andes*, Earth Syst. Dyn., 13(1), 595–611, doi:**10.5194/esd-13-595-2022**, 2022.
2. Furian, W., **Maussion, F.** and Schneider, C.: *Projected 21st-Century Glacial Lake Evolution in High Mountain Asia*, Front. Earth Sci., 10, doi:**10.3389/feart.2022.821798**, 2022.
3. Azam, M. F., Kargel, J. S., Shea, J. M., Nepal, S., Haritashya, U. K., Srivastava, S., **Maussion, F.**, Qazi, N., Chevallier, P., Dimri, A. P., Kulkarni, A. V, Cogley, J. G. and Bahuguna, I.: *Glacio-hydrology of the Himalaya-Karakoram*, Science (80-.)., 373(6557), eabf3668, doi:**10.1126/science.abf3668**, 2021.
4. Edwards, T. L., Nowicki, S., Marzeion, B., Hock, R., Goelzer, H., Seroussi, H., Jourdain, N. C., Slater, D. A., Turner, F. E., Smith, C. J., McKenna, C. M., Simon, E., Abe-Ouchi, A., Gregory, J. M., Larour, E., Lipscomb, W. H., Payne, A. J., Shepherd, A., Agosta, C., Alexander, P., Albrecht, T., Anderson, B., Asay-Davis, X., Aschwanden, A., Barthel, A., Bliss, A., Calov, R., Chambers, C., Champollion, N., Choi, Y., Cullather, R., Cuzzone, J., Dumas, C., Felikson, D., Fettweis, X., Fujita, K., Galton-Fenzi, B. K., Gladstone, R., Golledge, N. R., Greve, R., Hattermann, T., Hoffman, M. J., Humbert, A., Huss, M., Huybrechts, P., Immerzeel, W., Kleiner, T., Kraaijenbrink, P., Le clec'h, S., Lee, V., Leguy, G. R., Little, C. M., Lowry, D. P., Malles, J.-H., Martin, D. F., **Maussion, F.**, Morlighem, M., O'Neill, J. F., Nias, I., Pattyn, F., Pelle, T., Price, S. F., Quiquet, A., Radić, V., Reese, R., Rounce, D. R., Rückamp, M., Sakai, A., Shafer, C., Schlegel, N.-J., Shannon, S., Smith, R. S., Straneo, F., Sun, S., Tarasov, L., Trusel, L. D., Van Breedam, J., van de Wal, R., van den Broeke, M., Winkelmann, R., Zekollari, H., Zhao, C., Zhang, T. and Zwinger, T.:

Projected land ice contributions to twenty-first-century sea level rise, Nature, 593(7857), 74–82, doi:10.1038/s41586-021-03302-y, 2021.

5. Eis, J., van der Laan, L., **Maussion, F.** and Marzeion, B.: *Reconstruction of Past Glacier Changes with an Ice-Flow Glacier Model: Proof of Concept and Validation*, Front. Earth Sci., 9(March), 1–16, doi:10.3389/feart.2021.595755, 2021.
6. Rounce, D. R., Hock, R., McNabb, R. W., Millan, R., Sommer, C., Braun, M. H., Malz, P., **Maussion, F.**, Mouginot, J., Seehaus, T. C. and Shean, D. E.: *Distributed global debris thickness estimates reveal debris significantly impacts glacier mass balance*, Geophys. Res. Lett., doi:10.1029/2020GL091311, 2021.
7. Recinos, B., **Maussion, F.**, Noël, B., Möller, M. and Marzeion, B.: *Calibration of a frontal ablation parameterisation applied to Greenland's peripheral calving glaciers*, J. Glaciol., 1–13, doi:10.1017/jog.2021.63, 2021.
8. Schuster, L., **Maussion, F.**, Langhamer, L. and Moseley, G. E.: *Lagrangian detection of precipitation moisture sources for an arid region in northeast Greenland: relations to the North Atlantic Oscillation, sea ice cover, and temporal trends from 1979 to 2017*, Weather Clim. Dyn., 2(1), 1–17, doi:10.5194/wcd-2-1-2021, 2021.
9. Marzeion, B., Hock, R., Anderson, B., Bliss, A., Champollion, N., Fujita, K., Huss, M., Immerzeel, W., Kraaijenbrink, P., Malles, J., **Maussion, F.**, Radić, V., Rounce, D. R., Sakai, A., Shannon, S., Wal, R. and Zekollari, H.: *Partitioning the Uncertainty of Ensemble Projections of Global Glacier Mass Change*, Earth's Futur., 8(7), doi:10.1029/2019ef001470, 2020.
10. Pelto, B. M., **Maussion, F.**, Menounos, B., Radić, V. and Zeuner, M.: *Bias-corrected estimates of glacier thickness in the Columbia River Basin*, Canada, J. Glaciol., 1–13, doi:10.1017/jog.2020.75, 2020.
11. Zemp, M., Huss, M., Thibert, E., Eckert, N., McNabb, R., Huber, J., Barandun, M., Machguth, H., Nussbaumer, S. U., Gärtner-Roer, I., Thomson, L., Paul, F., **Maussion, F.**, Kutuzov, S. and Cogley, J. G.: *Global glacier mass changes and their contributions to sea-level rise from 1961 to 2016*, Nature, 568(7752), 382–386, doi:10.1038/s41586-019-1071-0, 2019.
12. Recinos, B., **Maussion, F.**, Rothenpieler, T. and Marzeion, B.: *Impact of frontal ablation on the ice thickness estimation of marine-terminating glaciers in Alaska*, Cryosph., 13(10), 2657–2672, doi:10.5194/tc-13-2657-2019, 2019.
13. **Maussion, F.**, Butenko, A., Champollion, N., Dusch, M., Eis, J., Fourteau, K., Gregor, P., Jarosch, A. H., Landmann, J., Oesterle, F., Recinos, B., Rothenpieler, T., Vlug, A., Wild, C. T. and Marzeion, B.: *The Open Global Glacier Model (OGGM) v1.1*, Geosci. Model Dev., 12(3), 909–931, doi:10.5194/gmd-12-909-2019, 2019.
14. Horak, J., Hofer, M., **Maussion, F.**, Gutmann, E., Gohm, A. and Rotach, M. W.: *Assessing the added value of the Intermediate Complexity Atmospheric Research (ICAR) model for precipitation in complex topography*, Hydrol. Earth Syst. Sci., 23(6), 2715–2734, doi:10.5194/hess-23-2715-2019, 2019.
15. Eis, J., **Maussion, F.** and Marzeion, B.: *Initialization of a global glacier model based on present-day glacier geometry and past climate information: an ensemble approach*, Cryosph., 13(12), 3317–3335, doi:10.5194/tc-13-3317-2019, 2019.
16. Zolles, T., **Maussion, F.**, Galos, S. P., Gurgiser, W. and Nicholson, L.: *Robust uncertainty assessment of the spatio-temporal transferability of glacier mass and energy balance models*, Cryosph., 13(2), 469–489, doi:10.5194/tc-13-469-2019, 2019.
17. Farinotti, D., Huss, M., Fürst, J. J., Landmann, J., Machguth, H., **Maussion, F.** and Pandit, A.: *A consensus estimate for the ice thickness distribution of all glaciers on Earth*, Nat. Geosci., 12(3), 168–173, doi:10.1038/s41561-019-0300-3, 2019.

18. Strasser, U., Marke, T., Braun, L., Escher-Vetter, H., Juen, I., Kuhn, M., **Maussion, F.**, Mayer, C., Nicholson, L., Niedertscheider, K., Sailer, R., Stötter, J., Weber, M. and Kaser, G.: *The Rofental: a high Alpine research basin (1890–3770 m a.s.l.) in the Ötztal Alps (Austria) with over 150 years of hydrometeorological and glaciological observations*, Earth Syst. Sci. Data, 10(1), 151–171, doi:**10.5194/essd-10-151-2018**, 2018.
19. Goosse, H., Barriat, P.-Y., Dalaiden, Q., Klein, F., Marzeion, B., **Maussion, F.**, Pelucchi, P. and Vlug, A.: *Testing the consistency between changes in simulated climate and Alpine glacier length over the past millennium*, Clim. Past, 14(8), 1119–1133, doi:**10.5194/cp-14-1119-2018**, 2018.
20. Marzeion, B., Kaser, G., **Maussion, F.** and Champollion, N.: *Limited influence of climate change mitigation on short-term glacier mass loss*, Nat. Clim. Chang., 8, doi:**10.1038/s41558-018-0093-1**, 2018.
21. Mölg, T., **Maussion, F.**, Collier, E., Chiang, J. C. H. and Scherer, D.: *Prominent mid-latitude circulation signature in High Asia's surface climate during monsoon*, J. Geophys. Res. Atmos., 1–11, doi:**10.1002/2017JD027414**, 2017.
22. Galos, S. P., Klug, C., **Maussion, F.**, Covi, F., Nicholson, L., Rieg, L., Gurgiser, W., Mölg, T. and Kaser, G.: *Reanalysis of a 10-year record (2004–2013) of seasonal mass balances at Langenferner/Vedretta Lunga, Ortler Alps, Italy*, Cryosph., 11(3), 1417–1439, doi:**10.5194/tc-11-1417-2017**, 2017.
23. Farinotti, D., Brinkerhoff, D. J., Clarke, G. K. C., Fürst, J. J., Frey, H., Gantayat, P., Gillet-Chaulet, F., Girard, C., Huss, M., Leclercq, P. W., Linsbauer, A., Machguth, H., Martin, C., **Maussion, F.**, Morlighem, M., Mosbeux, C., Pandit, A., Portmann, A., Rabatel, A., Ramsankaran, R., Reerink, T. J., Sanchez, O., Stentoft, P. A., Singh Kumari, S., van Pelt, W. J. J., Anderson, B., Benham, T., Binder, D., Dowdeswell, J. A., Fischer, A., Helfricht, K., Kutuzov, S., Lavrentiev, I., McNabb, R., Gudmundsson, G. H., Li, H. and Andreassen, L. M.: *How accurate are estimates of glacier ice thickness? Results from ITMIX, the Ice Thickness Models Intercomparison eXperiment*, Cryosph., 11(2), 949–970, doi:**10.5194/tc-11-949-2017**, 2017.
24. Spiess, M., Schneider, C. and **Maussion, F.**: *MODIS-derived interannual variability of the equilibrium line altitude across the Tibetan Plateau*, Ann. Glaciol., 57(71), 140–154, doi:**10.3189/2016AoG71A014**, 2016.
25. Otto, M., Höpfner, C., Curio, J., **Maussion, F.** and Scherer, D.: *Assessing vegetation response to precipitation in northwest Morocco during the last decade: an application of MODIS NDVI and high resolution reanalysis data*, Theor. Appl. Climatol., 123(1–2), 23–41, doi:**10.1007/s00704-014-1344-3**, 2016.
26. Biskop, S., **Maussion, F.**, Krause, P. and Fink, M.: *Differences in the water-balance components of four lakes in the southern-central Tibetan Plateau*, Hydrol. Earth Syst. Sci, 20, 209–225, doi:**10.5194/hess-20-209-2016**, 2016.
27. Zhu, M., Yao, T., Yang, W., **Maussion, F.**, Huintjes, E. and Li, S.: *Energy- and mass-balance comparison between Zhadang and Parlung No. 4 glaciers on the Tibetan Plateau*, J. Glaciol., 61(227), 595–607, doi:**10.3189/2015JoG14J206**, 2015.
28. Spiess, M., **Maussion, F.**, Möller, M., Scherer, D. and Schneider, C.: *Modis derived equilibrium line altitude estimates for purogangri ice cap, tibetan plateau, and their relation to climatic predictors (2001–2012)*, Geogr. Ann. Ser. A, Phys. Geogr., 97(3), 599–614, doi:**10.1111/geoa.12102**, 2015.
29. Huintjes, E., Sauter, T., Schröter, B., **Maussion, F.**, Yang, W., Kropáček, J., Buchroithner, M., Scherer, D., Kang, S. and Schneider, C.: *Evaluation of a Coupled Snow and Energy Balance Model for Zhadang Glacier*, Tibetan Plateau, Using Glaciological Measurements and Time-Lapse Photography, Arctic, Antarct. Alp. Res., 47(3), 573–590, doi:**10.1657/AAAR0014-073**, 2015.

30. Curio, J., **Maussion, F.** and Scherer, D.: *A 12-year high-resolution climatology of atmospheric water transport over the Tibetan Plateau*, Earth Syst. Dyn., 6(1), 109–124, doi:**10.5194/esd-6-109-2015**, 2015.
31. Collier, E., **Maussion, F.**, Nicholson, L. I., Mölg, T., Immerzeel, W. W. and Bush, a. B. G.: *Impact of debris cover on glacier ablation and atmosphere–glacier feedbacks in the Karakoram*, Cryosph., 9(4), 1617–1632, doi:**10.5194/tc-9-1617-2015**, 2015.
32. **Maussion, F.**, Gurgiser, W., Großhauser, M., Kaser, G. and Marzeion, B.: *ENSO influence on surface energy and mass balance at Shallap Glacier, Cordillera Blanca, Peru*, Cryosph., 9(4), 1663–1683, doi:[10.5194/tc-9-1663-2015, 2015.
33. Mölg, T., **Maussion, F.** and Scherer, D.: Mid-latitude westerlies as a driver of glacier variability in monsoonal High Asia, Nat. Clim. Chang., 4(1), 68–73, doi:**10.1038/nclimate2055**, 2014.
34. **Maussion, F.**, Scherer, D., Mölg, T., Collier, E., Curio, J. and Finkelnburg, R.: *Precipitation Seasonality and Variability over the Tibetan Plateau as Resolved by the High Asia Reanalysis*, J. Clim., 27(5), 1910–1927, doi:**10.1175/JCLI-D-13-00282.1**, 2014.
35. Dietze, E., **Maussion, F.**, Ahlborn, M., Diekmann, B., Hartmann, K., Henkel, K., Kasper, T., Lockot, G., Opitz, S. and Haberzettl, T.: *Sediment transport processes across the Tibetan Plateau inferred from robust grain-size end members in lake sediments*, Clim. Past, 10(1), 91–106, doi:**10.5194/cp-10-91-2014**, 2014.
36. Collier, E., Nicholson, L. I., Brock, B. W., **Maussion, F.**, Essery, R. and Bush, a. B. G.: *Representing moisture fluxes and phase changes in glacier debris cover using a reservoir approach*, Cryosph., 8(4), 1429–1444, doi:**10.5194/tc-8-1429-2014**, 2014.
37. Kropacek, J., **Maussion, F.**, Chen, F., Hoerz, S., Hochschild, V. and Kropáček, J.: *Analysis of ice phenology of lakes on the Tibetan Plateau from MODIS data*, Cryosph., 7(1), 287–301, doi:**10.5194/tc-7-287-2013**, 2013.
38. Collier, E., Mölg, T., **Maussion, F.**, Scherer, D., Mayer, C. and Bush, a. B. G.: *High-resolution interactive modelling of the mountain glacier–atmosphere interface: an application over the Karakoram*, Cryosph., 7(3), 779–795, doi:**10.5194/tc-7-779-2013**, 2013.
39. Mölg, T., **Maussion, F.**, Yang, W. and Scherer, D.: *The footprint of Asian monsoon dynamics in the mass and energy balance of a Tibetan glacier*, Cryosph., 6(6), 1445–1461, doi:**10.5194/tc-6-1445-2012**, 2012.
40. **Maussion, F.**, Scherer, D., Finkelnburg, R., Richters, J., Yang, W. and Yao, T.: *WRF simulation of a precipitation event over the Tibetan Plateau, China – an assessment using remote sensing and ground observations*, Hydrol. Earth Syst. Sci., 15(6), 1795–1817, doi:**10.5194/hess-15-1795-2011**, 2011.
41. Bolch, T., Yao, T., Kang, S., Buchroithner, M. F., Scherer, D., **Maussion, F.**, Huintjes, E. and Schneider, C.: *A glacier inventory for the western Nyainqentanglha Range and the Nam Co Basin, Tibet, and glacier changes 1976-2009*, Cryosph., 4(3), 419–433, doi:**10.5194/tc-4-419-2010**, 2010.