

Curriculum Vitae

Personal Data

Name: Markus Hrachowitz, Assoc.Prof., PhD, MSc
 Place of birth: Vienna, Austria
 Date of birth: July 13, 1974
 Marital status: Married, 3 children
 Citizenship: Austria
 Languages: German, English, French (fluent)
 Dutch, Spanish (advanced)



Professional Experience (full time academic and industrial employment)

From June 2018 Associate Professor at the **Delft University of Technology** (TU Delft), Delft, The Netherlands
Field of research:
 1) Catchment-scale hydrological transport in conceptual modelling
 2) Process based model selection and structure analysis
 Teaching: Hydrological Models, Hydrology of Rivers and Deltas
 Current student supervision: 10 master students, 4 PhD students

April 2010 – May 2018 Assistant Professor (tenured from May 2015) at the **Delft University of Technology** (TU Delft), Delft, The Netherlands

August 2007 – April 2010 Post-doctoral research fellow at the **University of Aberdeen**, School of Geosciences, Aberdeen, UK
Field of Research:
 1) Use of tracers for transit time modelling
 2) Process based modelling with focus on upscaling

June 2005 – July 2007 Post-doctoral research fellow at the **University of British Columbia**, Department of Forest Resources Management (Hydrology Group), Vancouver, BC, Canada.
Field of Research:
 1) Spatial precipitation and temperature variability in complex terrain
 2) Modelling of snow melt in rain-on-snow dominated watersheds

July 2004 – May 2005 Research fellow at **University of Natural Resources and Applied Life Sciences Vienna** (BOKU), Department of Soil Science, Vienna, Austria.
Field of Research:
 Use of radioisotopes as tracers in European river systems

April 2002 – June 2004 Laboratory/Project Engineer **Low-Level-Counting Laboratory Arsenal** Department „Environment“, Vienna, Austria.
Principal tasks and activities:
 Radioisotope detector operation and maintenance, field sampling campaigns, data analysis and project reporting

Higher Education and Degrees

April 2011 **Habilitation:** “Hydrology”, University of Natural Resources and Applied Life Sci. (BOKU), Vienna, Austria. Thesis: “Tracers as tools to identify catchment heterogeneity and emergent processes”

April 2002 – June 2004 **PhD:** “Soil Science/Hydrology”, University of Natural Resources and Applied Life Sci., Austria. Thesis: „¹³⁷Cs – soil distribution conversion model“, received “with honours” (“outstanding effort and achievement”)

October 1998 – April 2002 **Joint Master Degree:** “Civil and Environmental Engineering”, University of Bristol, Faculty of Civil Engineering, UK and University of Natural Resources and Applied Life Sci., Vienna, Austria. Thesis: „Mass Movements at the Cliff of Walton-On-The-Naze“, received “with honours” (highest possible mark)

Publications

Publication statistics (01/10/2020):

78 peer reviewed publications in international journals

h-index: 35 – Google Scholar, 31 – Scopus

Citations: 4470 – Google Scholar, 3202 – Scopus

- Fugger, S., Bouman, C., Steele-Dunne, S.C., Parajka, J., Herrnegger, M., Schulz, K. and Hrachowitz, M. (2020).* Annual snow cover duration in the Greater Alpine Region (2000 – 2018): regional patterns of change. *The Cryosphere* (in prep).
- Hulsman, P., Hrachowitz, M. and Savenije, H.H.G (2020).* Why are long-term storage variations observed but not modelled in the Luangwa basin? *Water Resources Research* (in review).
- Loritz, R., Hrachowitz, M., Neuper, M. and Zehe, E: (2020).* The role and value of distributed precipitation data for hydrological models. *Hydrology and Earth System Sciences* (in review).
- Roodari, A., Hrachowitz, M., Hassanpour, F. and Yaghobzadeh, (2020).* Signatures of human intervention – or not? Downstream intensification of drought in a Central Asian River. *Hydrology and Earth System Sciences* (in review).
- Hrachowitz, M., Stockinger, M., Luecke, A, and Bogena, H. (2020).* Effects of deforestation on catchment travel time distributions and the role of water holding capacity in the root-zone. *Hydrology and Earth System Sciences* (in review).
- Hulsman, P., Savenije H.H.G. and Hrachowitz, M. (2020).* Learning from satellite observations: increased understanding of catchment processes through stepwise model improvement. *Hydrology and Earth System Sciences* (in review).
- Bouaziz, L., Thirel, G., de Boer-Euser, T., ...and Hrachowitz, M. (2020).* Behind the scenes streamflow model performance. *Hydrology and Earth System Sciences* (in review).
- Gharari, S., Gupta, H.V., Clark, M.P., Matgen, P., Hrachowitz, M., Fenicia, F. and Savenije, H.H.G. (2020).* Quantification of Information in Model Structure, Parameterization and Constraints in Models. *Water Resources Research* (in review).
- Uwihirwe, J., Hrachowitz, M. and Bogaard, T. (2020).* Landslide precipitation thresholds in Rwanda. *Landslides* 17:xxxx-xxxx
- Hulsman, P., Winsemius, H., Michailovsky, C., Savenije H.H.G. and Hrachowitz, M. (2020).* Using altimetry observations combined with GRACE to select parameter sets. *Hydrology and Earth System Sciences* 24:3331-3359.
- Mianabadi, A., Derakhshan, H., Davary, K., Hashemina, S.M. and Hrachowitz, M. (2020).* A Novel Idea for Groundwater Resource Management during Megadrought Events. *Water Resources Management* 34:1743-1755.
- Bouaziz, L., Steele-Dunne, S., Weerts, A., Schellekens, J., Stam, J., Winsemius, H., Savenije, H.H.G. and Hrachowitz, M. (2020).* Link between vegetation accessible storage and satellite-derived Soil Water Index. *Water Resources Research* 56.
- Kirchner, J.W., Berghuijs, W.R., Allen, S.T., Hrachowitz, M., Hut, R. and Rizzo, D.M. (2020).* Streamflow response to forest management. *Nature* 578: E12-E15
- Dembélé, M., Hrachowitz, M., Savenije, H.H.G., Mariéthoz, G. and Schaeffli, B. (2020).* Improving the predictive skill of a distributed hydrological model by calibration on spatial patterns. *Water Resources Research* 56, e2019WR026085.
- Zhou, C., van Nooijen, R., Kolechkina, A. and Hrachowitz, M. (2019).* Comparative analysis of nonparametric change-point detectors commonly used in hydrology. *Hydrological Sciences Journal* 64:1690-1710.
- Blöschl, G., Bierkens, M.F., Chambel, A., Cudennec, C., Destouni, G., Fiori, A., Hrachowitz, M., et al. (2019).* Twenty-three Unsolved Problems in Hydrology (UPH) – a community perspective. *Hydrological Sciences Journal* 64:1141-1158.
- Cain, M.R., Ward, A.S. and Hrachowitz, M. (2019).* Ecohydrologic separation alters interpreted hydrologic stores and fluxes in a headwater mountain catchment. *Hydrological Processes* 33:2658-2675.
- Sprenger, M., Stumpp, C., Allen, S., Benettin, P., Dubbert, M., Hartmann, A., Hrachowitz, M., Kirchner, J., McDonnell, J., Orlowski, N., Penna, D., Pfahl, S., Rinderer, M., Rodriguez, N., Werner, C. and Weiler, M. (2019).* The demographics of water: A review of water ages in the critical zone. *Reviews of Geophysics* 57.
- Gao, H., Birkel, C., Hrachowitz, M., Tetzlaff, D., Soulsby, C. and Savenije, H.H.G. (2019).* A simple topography-driven and calibration-free runoff generation model. *Hydrology and Earth System Sciences* 23:787-809.
- Prenner, D., Hrachowitz, M. and Kaitna, R. (2019).* Trigger characteristics of torrential flows from high to low alpine regions in Austria. *Science of the Total Environment* 658:958-972.
- Bouaziz, L., Weerts, A., Schellekens, J., Sprokkereef, E., Stam, J., Savenije, H.H.G. and Hrachowitz, M. (2018).* Redressing the balance: quantifying intercatchment groundwater flow. *Hydrology and Earth System Sciences* 22:6415-6434.
- Nijzink, R.C., Almeida, S., Pechlivanidis, I.G., Capell, R., Gustaffsons, D., Arheimer, B., Parajka, J., Freer, J., Han, D., Wagener, T., Savenije, H.H.G. and Hrachowitz, M. (2018).* Constraining conceptual hydrological models with multiple information sources. *Water Resources Research* 54:8332-8362.
- Prenner, D., Kaitna, R., Mostbauer, K. and Hrachowitz, M. (2018).* The value of using multiple hydro-meteorological variables to predict debris flow susceptibility in an alpine environment. *Water Resources Research* 54:6822-6843.
- Mostbauer, K., Prenner, D., Kaitna, R. and Hrachowitz, M. (2018).* The temporally varying roles of rainfall, snow melt and antecedent soil moisture for debris flow initiation. *Hydrology and Earth System Sciences* 22:3493-3513.
- Hrachowitz, M. and Clark, M.P. (2017).* The complementary merits of top-down and bottom-up modelling philosophies in hydrology. *Hydrology and Earth System Sciences* 21:3953-3973.

- Savenije, H.H.G. and **Hrachowitz, M.** (2017). Catchments as meta-organisms – a new blueprint for hydrological modelling. *Hydrology and Earth System Sciences* 21:1107-1116.
- Drever, M. and **Hrachowitz, M.** (2017). Migration as Flow: Using hydrological concepts to estimate residence time of migrating shorebirds from daily counts. *Methods in Ecology and Evolution* 8:1146-1157.
- Gao, H., Ding, Y., Zhao, Q., **Hrachowitz, M.** and Savenije, H.H.G. (2017). The importance of aspect for modelling the hydrological response in a glacier catchment in Central Asia. *Hydrological Processes* 31:2842-2859.
- Nijzink, R.C., Hutton, C., Pechlivanidis, I., Capell, R., Arheimer, B., Freer, J., Han, D., Wagener, T., McGuire, K., Savenije, H. and **Hrachowitz, M.** (2016). The evolution of root-zone moisture capacities after deforestation: a step towards hydrological predictions under change? *Hydrology and Earth System Sciences* 20:4775-4799.
- Gao, H., **Hrachowitz, M.**, Sriwongsitanon, N., Fenicia, F., Gharari, S. and Savenije, H.H.G. (2016). Towards understanding the influence of vegetation and topography on model transferability. *Water Resources Research* 52:7999-8022
- Hrachowitz, M.**, Benettin, P., van Breukelen, B.M., Fovet, O., Howden, N.J.K., Ruiz, L., van der Velde, Y. and Wade, A.J. (2016). Transit times – how catchments store and release water. The link between hydrology and water quality at the catchment scale. *WIREs – Water* 3:629-657.
- Nijzink, R.C., Samaniego, L., Mai, J., Kumar, R., Thober, S., Zink, M., Schäfer, D., Savenije, H.H.G. and **Hrachowitz, M.** (2016). Subgrid process heterogeneity in hydrological models. *Hydrology and Earth System Sciences* 20:1151-1176.
- De Boer-Euser, T., McMillan, H., **Hrachowitz, M.**, Winsemius, H. and Savenije, H.H.G. (2016). Influence of soil and climate on root zone storage capacity. *Water Resources Research* 52:2009-2024.
- Rinaldo, A., Benettin, P., Harman, C., **Hrachowitz, M.**, McGuire, K., Van der Velde, Y., Bertuzzo, E. and Botter, G. (2016). Comment on “Storage selection functions: a coherent framework for quantifying how catchments store and release water and solutes” by Rinaldo et al.: Reply. *Water Resources Research* 52:616-618.
- Euser, T., **Hrachowitz, M.**, Winsemius, H. and Savenije, H.H.G. (2015). The effect of forcing and landscape distribution on performance and consistency of model structures. *Hydrological Processes* 29:3727-3743.
- Hrachowitz, M.**, Fovet, O., Ruiz, L. and Savenije, H.H.G. (2015). Variable low pass filter characteristics of catchments link $1/f^n$ scaling and long-term biogeochemical responses to control water quality. *Hydrological Processes* 29:5241-5256.
- Rinaldo, A., Benettin, P., Harman, C., **Hrachowitz, M.**, McGuire, K., Van der Velde, Y., Bertuzzo, E. and Botter, G. (2015). Debates – Storage selection functions: a coherent framework for quantifying how catchments store and release water and solutes. *Water Resources Research* 51: 4840-4847.
- Ceola, S., Arheimer, B., Bloeschl, G., **Hrachowitz, M.** et al. (2015). Virtual laboratories: New opportunities for collaborative science. *Hydrology and Earth System Sciences* 19:2101-2117.
- Fovet, O., Ruiz, L., **Hrachowitz, M.**, Fauchaux, M. and Gascuel-Oudou, C. (2015). Hydrological hysteresis and its value for assessing process consistency in catchment conceptual models. *Hydrology and Earth System Sciences* 19:105-123.
- Gao, H., **Hrachowitz, M.**, Schymanski, S.J., Fenicia, F. and Savenije, H.H.G. (2014). Ecosystems and societies use similar strategies to manage water supply. *Geophysical Research Letters* 41:7916-7923.
- Hrachowitz, M.**, Fovet, O., Ruiz, L., Euser, T., Gharari, S., Nijzink, R., Freer, J., Savenije, H.H.G. and Gascuel-Oudou, C. (2014). Process Consistency in Models: the Importance of System Signatures, Expert Knowledge and Process Complexity. *Water Resources Research* 50:7445-7469.
- Gharari, S., **Hrachowitz, M.**, Fenicia, F., Gao, H. and Savenije, H.H.G. (2014). Using expert knowledge in environmental systems models can dramatically reduce the need for calibration. *Hydrology and Earth System Sciences* 18:4839-4859.
- Gharari, S., Shafiei, M., **Hrachowitz, M.**, Fenicia, F., Gupta, H.V. and Savenije, H.H.G. (2014). A search strategy for constraint-based parameterization of environmental models. *Hydrology and Earth System Sciences* 18:4861-4870.
- Berghuijs, W.R., Woods, R.A. and **Hrachowitz, M.** (2014). A precipitation shift from snow towards rain leads to a decrease in streamflow. *Nature Climate Change* 4:583-586.
- Gao, H., **Hrachowitz, M.**, Fenicia, F., Gharari, S. and Savenije, H.H.G. (2014). Testing the realism of a topography driven model (FLEX-Topo) in the nested catchments of the Upper Heihe. *Hydrology and Earth System Sciences* 18:1895-1915.
- Coenders-Gerrits, A.M.J., van der Ent, R.J., Bogaard, T.A., Wang-Erlandsson, L., **Hrachowitz, M.** and Savenije, H.H.G. (2014). Data and model bias transpiration estimates. *Nature* 506.
- Hrachowitz, M.**, Savenije, H.H.G., Blöschl, G., McDonnell, J.J., Sivapalan, M., et al. (2013). A decade of Predictions in Ungauged Basins (PUB) – a review. *Hydrological Sciences Journal* 58(6):1198-1255.
- Tetzlaff, D., Al-Rawas, G., Blöschl, G., Carey, S.K., Fan, Y., **Hrachowitz, M.**, et al. (2013). Process realism: Flow paths and storage. In: *Runoff Prediction in Ungauged Basins*, Blöschl et al. (eds.), Cambridge University Press Cambridge, UK.
- Hrachowitz, M.**, Savenije, H.H.G., Bogaard, T., Tetzlaff, D. and Soulsby, C. (2013). What can flux tracking teach us about water age distribution patterns and their temporal dynamics? *Hydrology and Earth System Sciences* 17:533-564.
- Gharari, S., **Hrachowitz, M.**, Fenicia, F. and Savenije, H.H.G. (2013). An approach to identify time consistent model parameters: sub-period calibration. *Hydrology and Earth System Sciences* 17, 149-161.
- Euser, T., Winsemius, H.C., **Hrachowitz, M.**, Fenicia, F., Uhlenbrook, S. and Savenije, H.H.G. (2013). A framework to assess the realism of model structures using hydrological signatures. *Hydrology and Earth System Sciences* 17: 1893-1912.

- Imholt, C., Soulsby, C., Malcolm, I.A., Hrachowitz, M., Gibbins, C., Langan, S. and Tetzlaff, D. (2013).* Influence of scale on thermal characteristics in a large montane river basin. *River Research and Applications* 29: 403-419.
- Gharari, S., Hrachowitz, M., Fenicia, F. and Savenije, H.H.G. (2011).* Hydrological landscape classification: investigating the performance of HAND based landscape classifications. *Hydrology and Earth System Sciences* 15:3275-3291.
- Dawson, J.J.C., Tetzlaff, D., Speed, M., Hrachowitz, M. and Soulsby, C. (2011).* Seasonal controls on DOC dynamics in nested catchments in NE Scotland. *Hydrological Processes* 25, 1647-1658.
- Hrachowitz, M., Bohte, R., Mul, M.L., Bogaard, T.A., Savenije, H.H.G. and S. Uhlenbrook (2011).* On the value of event runoff and tracer analysis to understand catchment functioning. *Hydrology and Earth System Sciences* 15: 2007-2024.
- Hrachowitz, M., Soulsby, C., Tetzlaff, D. and Malcolm, I.A. (2011).* Sensitivity of mean transit time estimates to model conditioning and data availability. *Hydrological Processes* 25:980-990.
- Hrachowitz, M. and Weiler, M. (2011).* A fuzzy logic approach for capturing spatial precipitation variability in complex terrain. *Journal of Hydrological Engineering* 16(5): 460-471.
- Speed, M., Tetzlaff, D., Hrachowitz, M. and Soulsby, C. (2011).* Evolution of the spatial and temporal characteristics of the isotope hydrology of a montane river basin. *Hydrological Sciences Journal* 56:426-442.
- Tetzlaff, D., Soulsby, C., Hrachowitz, M. and Speed, M. (2011).* Relative influence of upland and lowland headwaters on the isotope hydrology and transit times of larger catchments. *Journal of Hydrology* 400:438-447.
- Hrachowitz, M., Soulsby, C., Tetzlaff, D., Malcolm, I.A. and Schoups, G. (2010).* Gamma distributions for transit time estimation: interpretation of parameters and implications transit times. *Water Resources Research* 46, W10536.
- Hrachowitz, M., Soulsby, C., Imholt, C., Malcolm, I.A. and Tetzlaff, D. (2010).* Thermal regimes in a large upland salmon river: the influence of landscape controls and climate change on temperatures. *Hydrological Processes* 24:3374-3391.
- Hrachowitz, M., Soulsby, C. and Tetzlaff, D. (2010).* Catchment transit times and landscape controls – does scale matter? *Hydrological Processes* 24:117-125.
- Soulsby, C., Tetzlaff, D. and Hrachowitz, M. (2010).* Spatial distribution of transit times in montane catchments: conceptualization tools for management. *Hydrological Processes* 24:3283-3288.
- Soulsby, C., Tetzlaff, D. and Hrachowitz, M. (2010).* Are transit times useful process-based tools for flow prediction and classification in ungauged basins in montane regions? *Hydrological Processes* 24:1685-1696
- Speed, M., Tetzlaff, D., Soulsby, C., Hrachowitz, M. and Waldron, S. (2010).* Isotopic and geochemical tracers reveal similarities in transit times in contrasting catchments. *Hydrological Processes* 24:1211-1224.
- Hrachowitz, M., Soulsby, C., Tetzlaff, D., Dawson, J.J.C. and Malcolm, I.A. (2009).* Integrating landscape controls to regionalize transit time estimates in montane catchments. *Water Resource Research* 45, W05421.
- Hrachowitz, M., Soulsby, C., Tetzlaff, D., Dawson, J.J.C., Dunn S.M. and Malcolm, I.A. (2009).* Using longer-term data sets to understand transit times in contrasting headwater catchments. *Journal of Hydrology* 367:237-248.
- Dawson, J.J.C., Soulsby, C., Hrachowitz, M., Speed, M. and Tetzlaff, D. (2009).* Seasonality of $epCO_2$ at different scales along an integrated river continuum within the Dee Basin, NE Scotland. *Hydrological Processes* 23:2929-2942.
- Lair, G.J., Zehetner, F., Hrachowitz, M., Franz, N., Maringer, F.J. and Gerzabek, M.H. (2009).* Dating of soil layers in a young floodplain using iron oxide crystallinity. *Quaternary Geochronology* 4:260-266.
- Maringer, F.J., Gruber, V., Hrachowitz, M., Baumgartner, A., Weilner, S. and Seidel, C. (2009).* Long-term monitoring of the Danube River - Sampling techniques, radionuclide metrology. *Applied Radiation and Isotopes* 67:894-900.
- Soulsby, C., Tetzlaff, D. and Hrachowitz, M. (2009).* Tracers and transit times: windows for viewing catchment scale storage? *Hydrological Processes* 23:3503-3507.
- Dawson, J.J.C., Soulsby, C., Tetzlaff, D., Hrachowitz, M., Dunn, S.M. and Malcolm, I.A. (2008).* Influence of hydrology and seasonality on DOC exports from contrasting upland catchments. *Biogeochemistry* 90(1):93-113.
- Fiebig, M., Hrachowitz, M., Kugler, H., Mentler, A., Ottner, F., Pamperl, S., Sieghardt, M. and Blum, W. (2007):* Soil properties and radionuclide distributions in Costa Rica. *Neues Jahrbuch für Geologie und Paläontologie* 246:283-297.
- Hrachowitz, M., Maringer, F.J. and Gerzabek, M.H. (2005):* Soil Redistribution Model for Undisturbed and Cultivated Sites Based on Chernobyl Cesium-137 Fallout. *Journal of Environmental Quality* 34:1302-1310.
- Maringer, F.J., Tesch, R., Hrachowitz, M. and Gruber, V. (2004):* Long-term environmental monitoring and application of low-level 3H , 7Be , ^{137}Cs and ^{210}Pb activity concentrations in the Danube. *Applied Radiation and Isotopes* 61: 313-317.

Selected Recent Conference Papers and Contributions (as lead author)

(Plus ~ 75 additional contributions as lead author and >175 contributions as co-author - not listed)

Hrachowitz, M. (2020): Regional pattern of annual snow cover duration in the Greater Alpine Region. . European Geosciences Union (EGU) General Assembly, May 4 – 8, 2020, online

Hrachowitz, M. (2019): Regional pattern of annual snow cover duration in the Greater Alpine Region. 3.Workshop on Alpine Hydrology, November 20-22, 2019, Oberegurgl (invited)

Hrachowitz, M. (2019): The ecosystem as natural water manager of terrestrial hydrological systems. Vienna Hydrology Seminar, November 19, 2019, Vienna (invited)

Hrachowitz, M. (2019): The value of the macroscale perspective in hydrology. EGU Leonardo Conference on the Earth's Hydrological Cycle, October 16 – 18, 2019, Luxemburg (invited)

Hrachowitz, M. (2019): Catchments as Meta-organisms – is process complexity the link between emergent processes and temporal evolution of hydrological systems? Gordon Research Conference, June 23 – 28, 2019, Andover (invited)

Hrachowitz, M. (2019): Effects of deforestation on catchment travel time distributions and the role of water holding capacity in the root-zone. European Geosciences Union (EGU) General Assembly, April 7 – 12, 2019, Vienna

Hrachowitz, M. (2017): Catchments as living organisms – Darwinian approaches to conceptual modelling. European Geosciences Union (EGU) General Assembly, April 23 – 28, 2017, Vienna (invited)

Hrachowitz, M. (2016): Model Formulations Under Change – Sure, but how? Problems and Ideas (but no Solutions). American Geophysical Union (AGU) Fall Meeting, December 12 – 16, 2016, San Francisco (invited)

Hrachowitz, M. et al. (2016): Is fractal scaling of stream chemistry universal? American Geophysical Union (AGU) Fall Meeting, December 12 – 16, 2016, San Francisco

Hrachowitz, M. et al. (2016): Is fractal scaling of stream chemistry universal? European Geosciences Union (EGU) General Assembly, April 17 – 22, 2016, Vienna.

Hrachowitz, M. et al. (2015): Catchment low pass filter characteristics, legacy contamination and their link to variability in biogeochemical $1/F^n$ scaling. American Geophysical Union (AGU) Fall Meeting, December 14 – 18, 2015, San Francisco

Master and PhD Student Supervision

PhD (Co-)promotor, supervisor, and member of PhD committee of:

Defended:

Hongkai Gao, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Topographic information in catchment models." Defended 06/2015.

Shervan Gharari, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Using landscape information to inform hydrological model structures." Defended 01/2016

Tanja Euser, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Topographically based modelling and catchment signatures" Defended 01/2017.

Remko Nijzink, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Topographically driven flexible modelling on the European scale." Defended 01/2018.

David Premner, University of Natural Resources and Life Sciences (BOKU), Vienna.

PhD thesis: "Hydrological trigger conditions of mass movements." Defended 04/2019.

Artemis Roodari, University of Zabol, Iran

PhD thesis: "Climate change effects on drought indices in the Helmand Basin." Defended 10/2019.

Ongoing:

Laurene Bouaziz, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Climate change, land use change and the resilience of hydrological systems." To be submitted 03/2020.

Petra Hulsman, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Impacts of change on the hydrology of the Zambesi River." To be submitted 05/2020.

Judith Uwihirwe, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Effect of land use change on Hydro-geotechnical processes triggering landslides." To be submitted 01/2022.

Philipp Aigner, University of Natural Resources and Life Sciences (BOKU), Vienna.

PhD thesis: " Determination of sediment dynamics in torrential watersheds." To be submitted 12/2022.

Franse van Oorschot, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Representation of vegetation in land surface models." To be submitted 10/2024.

Siyuan Wang, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section

PhD thesis: "Catchment-scale hydrological transport in cold regions." To be submitted 10/2024.

External member of PhD and habilitation committees:

Alice Aubert (PhD; 2014; Université de Rennes, France); **Pierre Quéloz** (PhD; 2015; EPFL Lausanne, Switzerland); **Thabiso Mohobane** (PhD; 2016; Rhodes University, South Africa); **Dipangkar Kundu** (PhD; 2017; University of Sydney, Australia); **Zahra Thomas** (Habilitation; 2018; Université de Rennes, France); **Flora Branger** (Habilitation; 2019; IRSTEA Lyon, France); **Jose Tunqui** (PhD; 2019; Sorbonne University, France); **Ralf Loritz** (PhD; 2019; Karlsruhe Institute of Technology, Germany); **Harsh Beria** (PhD; 2020; EPFL Lausanne, Switzerland); **Mohammed Saadi** (PhD; 2020; Sorbonne, France)

Master student Supervisor and member of MSc committee of:

- Shervan Gharari*, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Use of topographic information in conceptual hydrological models". Defended 06/2011.
- Tanja Euser*, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "A framework to assess the realism of model structures using hydrological signatures". Defended 04/2012.
- Frehiwot Desta Baidamariam*, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Land classification on the basis of topography, land use and hydrological function". Defended 04/2012.
- Wang Ling*, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Data requirements for identification of most adequate model structures". Defended 04/2013.
- Vincent de Looij*, Delft University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Internal consistency of topographically driven flexible rainfall-runoff models". Defended 06/2014.
- Asta Kunkel*, Vrije Universiteit Amsterdam and Delft University of Technology, Faculty of Civil Engineering.
Master thesis: "Application of a flexible topographic based model to the Bridge Creek". Defended 08/2014.
- Stephan Rikkert*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Process consistency of models in the European context". Defended 09/2015.
- Nathalie van Veen*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Rain water harvesting in rural Indonesia". Defended 11/2016.
- Karin Mostbauer*, University of Nat. Resour. and Life Sci. (BOKU), Vienna and Delft University of Technology, Faculty of Civil Engineering. Master thesis: "Hydrologic disposition for triggering debris flow events". Defended 12/2016.
- Anais Couasnon*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Understanding extreme river discharges using a stochastic model at a global level". Defended 01/2017.
- Lotte de Vos*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "The equivalence of mixing assumptions and storage age selection functions". Defended 10/2017.
- Safa Mohammed*, UNESCO-IHE Delft in collaboration with University of Technology, Faculty of Civil Engineering, Water Resources Section. Master thesis: "Model calibration when there is little data". Defended 03/2018.
- Stefan Fugger*, University of Nat. Resour. and Life Sci. (BOKU), Vienna and Delft University of Technology, Faculty of Civil Engineering. Master thesis: "Changes in snow cover duration in the Austrian Alps 2000-2017". Defended 09/2018.
- Chris Bouman*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Snow cover dynamics and effects on water resources in the Sierra Nevada". Defended 10/2018.
- Nicolette van der Tak*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master Thesis: "Decreasing parameter uncertainty for hydrological models using measured data". Defended 12/2018.
- Felipe Fischman*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Changes in flood frequencies due to reservoir construction in Rwanda". Defended 12/2018.
- Niek Hunink*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master Thesis: "The influence of inter-catchment groundwater flow in a lowland catchment". Defended 07/2019
- Xinxin Sui*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "The hydrologic Influence analysis of Low Impact Development on catchment scale". Defended 08/2019.
- Brendan Dalmijn*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Information content of hydrological signatures for model calibration". Defended 10/2019.
- Thijs van Esch*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Changes in snow cover duration in Europe 2000-2017". Defended 12/2019.
- Qiaodan Liu*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Changes in snow cover duration in China 2000-2019". Defended 02/2020.
- Franse van Oorschot*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Representation of root-zone storage capacities in HTESSSEL". Defended 02/2020.
- Mengya Wei*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Regional pattern and controls of root-zone storage capacity". Defended 05/2020.
- Xiaopei Guo*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "The relationship of land use and streamflow". Defended 06/2020.
- Xinbai Xie*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Assessment of Variation in Streamflow in case of Long-term Drought". Defended 06/2020.
- Leon van Voorst*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Controls on vegetation accessible water storage in Northern regions". Defended 07/2020.
- Geerten van der Zalm*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Antarctic hydrology – does it matter?". Defended 09/2020.
- Bart Veenings*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Vegetation-accessible water storage in alpine regions". Defended 09/2020.
- Stijn Terswiga*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Effect of multi-year drought on root-zone storage capacities". Defended 09/2020.
- Thies Blokhuijsen*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Understanding flows in the Choqueyapu basin, Bolivia". In progress.
- Sarah Hanus*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Climate change impact on Hydrology in Austria". In progress.
- Pau Wiersma*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Glacier processes in global hydrological models". In progress.
- Daan te Witt*, University of Technology, Faculty of Civil Engineering, Water Resources Section
Master thesis: "Spatial pattern to inform distributed hydrological models in the Volta basin". In progress.

Current Teaching

Course manager and responsible instructor:

- “Hydrological Modelling” – CIE4431 (4 ECTS; ~45 students/year): Master level course consisting of lectures and computer labs. The objective of this course is for students to understand the model building process and its limitations for environmental systems together with meaningful uncertainty analysis. After successful completion of the course, students have developed the ability to independently build, implement and critically assess models and their results. Overall score in 2017 Student MSc Course Evaluation: 4.4 out of 5.
- “Hydrology in Catchments, Rivers and Deltas” – CIE5450 (4 ECTS; ~120 students/year): Master level course consisting of lectures, exercises, paper discussions and a field trip. The objective of this course is for students to understand fundamental hydrological concepts in different domains.

Contributing instructor:

- “Fieldwork Luxemburg” – CIE5471 (4 ECTS; ~50 students/year): Master level field course with the objective for students to see, do and understand practical field work in hydrology.
- “Environmental Modelling” – CIE4400 (4 ECTS; ~30 students/year): Master level course for understanding and designing models to represent point- and diffuse source water pollution.

Organizer for project-based lectures and short courses:

- “Hydrological Model Development” – as invited Visiting Professor at Department of Natural Hazards, BOKU Vienna (05/2017; 2 ECTS; ~20 students): Master level course consisting of lectures and computer labs.
- “Flux tracking in catchment-scale models” – as instructor during the Black Forest Autumn School on Water Ages in the Hydrological Cycle. Held 10/2019, Freudenstadt, Germany
- “Introduction to Hydrological Modelling”: recurring one-week short course (~20 participants), organized for post-graduate students and practitioners (industry and administration), from developing countries including Mozambique, Kenya, Afghanistan, etc. Held annually from 2013 onwards in collaboration with IHE Delft.

Scientific Community Service

Editorships of scientific journals:

- (1) Editor Hydrology and Earth System Sciences (since 2013)
- (2) Associate Editor of Water Resources Research (since 2017)

Scientific reviewer for:

- (1) Scientific journals: Geophysical Research Letters, Journal of Hydrology, Journal of Hydrometeorology, Hydrological Processes, Hydrology and Earth Systems Sciences, Hydrology Research, Science of the Total Environment, Water Research, Water Resources Research
- (2) Funding agencies: European Research Council (ERC), National Science Foundation (NSF; USA), Natural Sciences and Engineering Research Council of Canada (NSERC), Natural Environment Research Council of Great Britain (NERC), Swiss National Science Foundation (SNF)

Conference and workshop organization (selection of organized events with >25 participants):

- (1) Since 2012 regular session organizer/convenor at the American Geophysical Union Fall meeting (AGU) and at the European Geosciences Union General Assembly (EGU).
- (2) Local and technical organizer of the IAHS “Predictions in Ungauged Basins (PUB)” Symposium held 10/2012 in Delft (>150 international participants).
- (3) Since 2013 (co-)organizer of some 10 smaller (<25 participants), inter-institutional workshops
- (4) (Co-)Organizer of the Earth Science/ Research Days of the Faculty of Civil Engineering and Geosciences, held 04/2014 and 10/2019 at TU Delft (>75 participants)

Committee memberships

- (1) American Geophysical Union (AGU) Surface Water Technical Committee (since 2016)
- (2) American Geophysical Union (AGU) Horton Research Grant Committee
- (3) International Association of Hydrological Sciences (IAHS) Panta Rhei working group “Measurements & Observations in the 21st Century” (MOXXI)
- (4) IAHS Panta Rhei working group “Natural and man-made control systems in water resources”
- (5) Onderdeelcommissie OdC-CiTG, TU Delft (since 2016)
- (6) Faculty strategy development team, CiTG, TU Delft (since 2019)

Awards

Awards:

- (1) *Early Career Scientist Award 2015* of the International Union of Geodesy and Geophysics (IUGG)
- (2) *Best Teacher Award “Water Management” 2019*, TU Delft
- (3) *Kubiena Award 2005* of the Austrian Soil Sciences Society