

Dr Joel Fiddes

Geoscientist

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Currently

I am a geoscientist with over 15 years of interdisciplinary experience working across research institutions, international organisations, government institutions and donor projects. My main interest is in the quantification of high mountain processes related to water resources and natural hazards, to better understand and mitigate impacts upon downstream communities. I use and develop geoscientific models and other datascience tools in combination with field campaigns to understand these processes and improve mapping and forecasting methods. Increasingly I am working with government institutions to support updating of hydro-meteorological forecasting procedures, particularly with respect to the cryosphere. I am currently working at the WSL Institute for Snow and Avalanche Research, based in Davos, Switzerland.

Education

2009-13	University of Zurich PhD Geoscience. Thesis: Subgrid Simulation of Land Surface Variables in Heterogeneous and Remote Environments: Application to Mountain Permafrost. Online pdf.
2006-07	University of Edinburgh MSc Environment & development. Thesis: Impact of climate change on snow-based water resources in Afghanistan.
2001-04	University of Aberdeen BSc Tropical Environmental Science. Thesis: Sustainability of subsistence hunting on Neotropical mammal species in North-East Peruvian Amazon.

Employment & Projects

current	WSL Institute for Snow and Avalanche Research SLF (since 2018) Research scientist. Investigating snow processes in High Asia using models, EO data and field measurements under SNF project "From Cloud to Ground: Snow Accumulation in Extreme Environments". SDC funded projects in Central Asia "Cryosphere Observations and Modelling for Improved Adaptation in Central Asia"(CROMO-ADAPT 2021-2025) and "Water, Weather and Climate Services" with CARITAS CH (WWCS 2021-2025). Both projects focus on mountain related water and hazards nexus and collaborate with an extensive network of regional partners. I am a Member of the Swiss Polar Institute flagship project "PAMIR" and contribute to data sharing projects of the WMO such as "Global Cryosphere Watch"
2022	World Meteorological Organization Consultant Analysis and inventory of existing mountain observation and data sources related to snow, glaciers, permafrost, discharge, and ancillary data in Central Asia (Afghanistan, Tajikistan, Kyrgyzstan, Uzbekistan and Kazakhstan)
2021-23	FutureWater Consultant Developing a Glacio-Hydrological Model and IWRM Plan for a Selected Sub-basin in the Central Himalayas, Uttarakhand, India financed by the Swiss Agency Development Cooperation (www.futurewater.eu).
2021	World Bank Consultant Assessment Of Contributing Factors Of The May 2021 Disasters In Tajikistan. A forensic study under the Strengthening Critical Infrastructure against Natural Hazards Project (SCINHP, P158298)
2020-21	Permian Global Consultant. Supporting carbon prospecting projects through remote sensing analysis, code routines for carbon models. Tools for automated retrieval and analysis of remote sensing datasets to estimate deforestation rates.
2018-20	Landell Mills Ltd Consultant Zarafshan River Basin Programme, EU TA project with Ministry of Energy and Water Resources, Tajikistan. Develop pilot routines for monitoring and modelling snow based water resources.
2017-18	University of Oslo Scientist Swiss National Science Foundation research scholar. Developing data assimilation and uncertainty framework for large area snowpack simulations in mountain regions.
2017-18	World Meteorological Organization Consultant for the WMO programme Global Cryosphere Watch. Developing a global solution for interoperability of CryoNet monitoring stations and GCW datportal.
2014-17	WSL Institute for Snow and Avalanche Research SLF Data scientist. Developing and managing data systems for the SwissEx/ OSPER project a large interdisciplinary environmental data acquisition and management project with multiple ETH domain partners. The WSL/ SLF is a leading federal institute in Switzerland for both hydrology and natural hazard assessments.
2016	Himalaya Permafrost ETH SEED Scientist Establishment of high altitude permafrost monitoring sites Langtang, Nepal. Training young Nepalese scientists. International permafrost and data tools workshop with participants from Afghanistan, India and Nepal.
2014	University of Zurich Scientist. Managing PERMOS network of ground and rock temperature measurements at Jungfraujoeh, Schilthorn, Piz Corvatsch. Including extensive fieldwork and rope-access work. Processing GST, meteorological station and borehole data (www.permos.ch).
2014	University of Zurich Scientist. Swiss Development Cooperation/DEZA funded climate change adaptation programme (www.ihcap.in). Developing baseline maps for key land surface variables in the Indian Himalaya with direct coordination with several Indian Government agencies (lead Department of Science & Technology).
2012	Afghanistan Research Evaluation Unit Consultant. Remote sensing analysis of water availability in irrigated zones in Sar-i-Pul River Basin.
2011	GIZ/ Hydroc Consultant. Disaster risk management project in Badakhshan, Afghanistan for GIZ. Component avalanche hazard risk zones.
2011	Afghanistan Research Evaluation Unit Consultant. Remote sensing analysis of water availability in irrigated zones in Panj Amu River Basin.
2010-11	Landell Mills Ltd. Consultant. As part of Panj-Amu River Basin Programme (P-ARBP) in north-east Afghanistan developed a strategy together with a range of tools to improve water resource management. Training the first government team in snow sampling techniques (training course Wakhan Corridor). Establishment of high altitude field sites.
2009	Agha Khan Foundation Consultant. Project "PMIS": Remote sensing analysis of irrigated zones in Baghlan NE Afghanistan. GIS & Remote Sensing – Applications in Social Water Management.
2009-13	University of Zurich Scientific researcher/ PhD Candidate. National science foundation funded research undertaken to develop and test tools that enable efficient application of numerical models driven by climate datasets in complex terrain. Work resulted in three first author publications. Oral and poster presentations at several international conferences. Supervision of MSc. and BSc. students. Fieldwork in high mountain environments. Large-scale deployment of temperature sensors.
2009	Agha Khan Foundation Consultant. Training in GIS systems and geospatial survey for AKF project engineers in Puli Khumri NE Afghanistan.
2007-17	Independent Consultant Projects mainly in field of water resources include: Environmental change analysis, capacity building, surveying / mapping, technical training. Clients include: multinational/ national donors, development consultancies, NGOs, e.g. European Commission, Landell Mills Ltd. Agha Khan Foundation, GIZ, Concern Worldwide.
2008	Welt Hunger Hilfe Consultant. Upper catchment protection project "PEEP": training in geospatial survey and GIS systems for PEEP project staff.
2008	Concern Worldwide/ Welt Hunger Hilfe Consultant. Social water management and upper catchment protection projects "SWIM/SMILE": Established GIS systems and conducted training in geospatial surveys for project staff. Surveying of irrigation channels and infrastructure.
2008	Concern Worldwide Consultant. Market analysis for natural resource based products in Takhar NE Afghanistan.
2007	Landell Mills Ltd. Consultant. Environmental screening report for irrigation rehabilitation component of Kunduz River Basin Programme. Additionally provided concept note on methods in snow and ice monitoring.
2007	Mercy Corps Researcher. Author of a policy document for global humanitarian agency Mercy Corps. Construction and analysis of a 30 year satellite data record to assess possible changes in snowcover area (SCA) over this period and implications for water resources of Northern Afghanistan. Collaboration with the Landell Mills led European Commission Kunduz River Basin Programme.
1999-04	Formative research expeditions Gulf apex predator prey project (University Alaska Fairbanks, Alaska, 2004). Subsistence hunting study (University of Aberdeen/ Royal Geographical Society, Peruvian Amazon, 2003), Coral reef biodiversity monitoring (Greenforce/ University of Malaysia, Borneo, 2001), Tian Shan biodiversity study (BSES/CEH, Kyrgyzstan, 1999).

Core competences

Tech	Hydro-meteorological climate service development and delivery. Data systems, data sharing from technology to politics of data./ Land-surface glacio-hydrological modelling and model development with focus on mountain environments. Environmental analysis using climate data and other large datasets. Remote sensing services, analysis of environmental change, snow cover, drought conditions, cropping patterns etc. strategic documents, Proposal writing and Project management.
Field	Establishment of field monitoring tools, deployment of sensors/ stations. Scientific expedition planning and leadership. Impact of climate change in mountain regions and implications for development activities/ communities.
Training	Development of project specific modelling tools. Workshops and lectures. Field training in glacio-hydrological methods.

Technical skills

- Geospatial analysis
- Numerical models

- Remote sensing / image processing
- Statistical analysis
- Data exchange systems
- Large data processing
- SQL / Postgres
- Database management
- Server admin
- Cluster/HPC computing
- Linux
- R
- Python
- AWK
- Bash
- LaTeX

Publications

Peer reviewed	2024	González-Herrero, S., Sigmund, A., Haugeneder, M., Hames, O., Huwald, H., Fiddes, J. , Lehning, M. (2024) "Using the sensible heat flux eddy covariance-based exchange coefficient to calculate latent heat from moisture mean gradients on snow." Boundary Layer Meteorology.
	2023	Filhol, Simon, Fiddes, J. and Aalstad, K. 2023. "TopoPyScale: A Python Package for Hillslope Climate Downscaling." Journal of Open Source Software 8 (86): 5059.
	2022	Alonso-González, Esteban, Kristoffer Aalstad, Mohamed Wassim Baba, Jesús Revuelto, Juan Ignacio López-Moreno, Joel Fiddes , Richard Essery, and Simon Gascoin. 2022. "The Multiple Snow Data Assimilation System (MuSA v1.0)." Geoscientific Model Development 15 (24): 9127–55. Martin, L. C. P., Westermann, S., Magni, M., Brun, F., Fiddes, J. , Lei, Y., Kraaijenbrink, P., Mathys, T., Langer, M., Allen, S., and Immerzeel, W. W.: Recent ground thermo-hydrological changes in a Tibetan endorheic catchment and implications for lake level changes, Hydrol. Earth Syst. Sci. Discuss. [preprint], https://doi.org/10.5194/hess-2022-241 , in press, 2022. Fiddes, J. , K. Aalstad, and M. Lehning, 2022: TopoCLIM: rapid topography-based downscaling of regional climate model output in complex terrain v1.1. Geosci. Model Dev., 15, 1753–1768. Kronenberg, Marlene, Ward van Pelt, Horst Machguth, Joel Fiddes , Martin Hoelzle, and Felix Pertziger. 2022. "Long-Term Firn and Mass Balance Modelling for Abramov Glacier in the Data-Scarce Pamir Alay." The Cryosphere 16 (12): 5001–22.. Kruyt, B., R. Mott, J. Fiddes , F. Gerber, V. Sharma, and D. Reynolds, 2022: A Downscaling Intercomparison Study: The Representation of Slope- and Ridge-Scale Processes in Models of Different Complexity. Front Earth Sci., 10, 789332.
	2021	Shugar, D. H., et al. "A massive rock and ice avalanche caused the 2021 disaster at Chamoli, Indian Himalaya." Science (New York, NY) 373.6552 (2021): 300-306.
	2020	Barandun, Martina, Joel Fiddes , Martin Scherler, Tamara Mathys, Tomas Saks, Dmitry Petrakov, and Martin Hoelzle. 2020. "The State and Future of the Cryosphere in Central Asia." Water Security 11 (December): 100072. Bavay, M., Fiddes, J. and Godøy, Ø., 2020. Automatic Data Standardization for the Global Cryosphere Watch Data Portal. Data Science Journal, 19(1), p.6. DOI: 10.5334/dsj-2020-006 Bender, Esther, Michael Lehning, and Joel Fiddes . 2020. "Changes in Climatology, Snow Cover, and Ground Temperatures at High Alpine Locations." Frontiers in Earth Science 8: 100. Philipson, Christopher D., Mark E. J. Cutler, Philip G. Brodrick, Gregory P. Asner, Doreen S. Boyd, Pedro Moura Costa, Joel Fiddes , et al. 2020. "Active Restoration Accelerates the Carbon Recovery of Human-Modified Tropical Forests." Science 369 (6505): 838–41.
	2019	Fiddes, J. , Aalstad, K., and Westermann, S.: Hyper-resolution ensemble-based snow reanalysis in mountain regions using clustering, Hydrol. Earth Syst. Sci., 23, 4717–4736, 2019, 10.5194/hess-23-4717-2019
	2016	Allen, SK., Fiddes, J. , Linsbauer, A., Randhawa, S.S., Salzmann, N. 2016: Indo-Swiss partnership initiates first local permafrost studies in the Indian Himalaya. Current Science, 11, 3, 550-553, Researchgate
	2015	Fiddes, J. , Endrizzi, S., and Gruber, S.: Large-area land surface simulations in heterogeneous terrain driven by global data sets: application to mountain permafrost, The Cryosphere, 9, 411-426, doi:10.5194/tc-9-411-2015, 2015. 10.5194/tc-9-411-2015
	2014	Fiddes, J. & Gruber, S. 2014: TopoSCALE v.1.0: downscaling gridded climate data in complex terrain, Geoscientific Model Development, 7, 387-405, 10.5194/gmd-7-387-2014
	2013	Habib, H., Anceno, A. J., Fiddes, J. , Beekma, J., Ilyuschenko, M., Nitivattananon, V., & Shipin, O. V. (2013). Jumpstarting post-conflict strategic water resources protection from a changing global perspective: Gaps and prospects in Afghanistan. Journal of environmental management, 129, 244-259. Researchgate
	2012	Fiddes, J. & Gruber, S. 2012: TopoSUB: a tool for efficient large area numerical modelling in complex topography at sub-grid scales, Geoscientific Model Development, 5, 1245–1257, 10.5194/gmd-5-1245-2012 Schmid, M.-O., Gubler, S., Fiddes, J. & Gruber, S. 2012: Inferring snow pack ripening and melt out from distributed ground surface temperature measurements, The Cryosphere, 6, 1127–1139, 10.5194/tc-6-1127-2012
	2011	Gubler, S., Fiddes, J. , Keller, M., & Gruber, S. 2011. Scale-dependent measurement and analysis of ground surface temperature variability in alpine terrain. The Cryosphere, 5(2), 431-443, 10.5194/tc-5-431-2011
	2010	Matthias Keller, Guido Hungerbuehler, Oliver Knecht, Suhel Sheikh, Jan Beutel, Stefanie Gubler, Joel Fiddes , and Stephan Gruber. 2010. iAssist: rapid deployment and maintenance of tiny sensing systems. In Proceedings of the 8th ACM Conference on Embedded Networked Sensor Systems (SenSys '10). ACM, New York, NY, USA, 401-402. 10.1145/1869983.1870043
Non-peer reviewed	2021	Bellprat, O., Spirig, C., Flubacher, M., Grandjean, J., Roulet Y.-A., Moret, L., Bavay, M., Fiddes, J. , Orlowsky, B., Kassam, S., Kalandarov, H., Yatimov, S., Akmal, A., Strohmeier, S. M., Sharma, R., Haddad, M., Govind, A., Fatih, K., and Berod, D.: A low-cost approach to develop Weather, Water and Climate Services (WWCS) in rural areas of Tajikistan, EMS Annual Meeting 2022, Bonn, Germany, 5–9 Sep 2022, EMS2022-476, https://doi.org/10.5194/ems2022-476 , 2022. Allen, S., H. Frey, and J. Fiddes , 2021: Assessment of Contributing Factors of the May 2021 Disasters in Tajikistan : A Forensic Study Under the Strengthening Critical Infrastructure Against Natural Hazards Project.
	2019	Muccione, V. and Fiddes, J. "State of the Knowledge on Water Resources and Natural Hazards under Climate Change in Central Asia and South Caucasus." Managing Disaster Risks and Water under Climate Change. 2019. reliefweb The Status and Role of the alpine Cryosphere in Central Asia(Book Chapter). Martin Hoelzle, Martina Barandun, Tobias Bolch, Joel Fiddes , Abror Gafurov, Veruska Muccione, Tomas Saks and Maria Shaghedanova in The Aral Sea Basin: Water for Sustainable Development in Central Asia eds.Stefanos Xenarios, Dietrich Schmidt-Vogt, Manzoor Qadir, Barbara Janusz-Pawletta, Iskandar Abdullaev, 2019, Routledge ISBN 9781138348882. Chapter 8 open access
	2018	Muccione, Veruska; Huggel, Christian; Salzmann, Nadine; Fiddes, Joel ; Nussbaumer, Samuel U; Novikov, Viktor; Hughes, Geoff (2018). Climate-cryosphere-water nexus: Central Asia outlook. Zoi Environment Network. doi: 10.5167/uzh-161876. Mathias Bavay, Joel Fiddes , Charles Fierz, Michael Lehning, Fabiano Monti, Thomas Egger. The MeteorIO pre-processing library for operational applications. Proceedings, International Snow Science Workshop, Innsbruck, Austria, 2018 Montana Library.
	2014	Fiddes, J. T. (2014). Subgrid Simulation of Land Surface Variables in Heterogeneous and Remote Environments: Application to Mountain Permafrost (Doctoral dissertation). ETH library.
	2011	Beekma, J. and Fiddes, J. 2011. Floods and droughts: The Afghan water paradox. Centre for Policy and Human Development, Afghanistan Human Development Report 2011. online version
	2010	Keller, M., Hungerbuehler, G., Knecht, O., Sheikh, S., Beutel, J., Gubler, S., Fiddes, J. and Gruber, S. (2010). iAssist: rapid deployment and maintenance of tiny sensing systems. In Proceedings of the 8th ACM Conference on Embedded Networked Sensor Systems (pp. 401-402). ACM.
		Fiddes, J. (2010). Climbs and expeditions: Asia, Afghanistan, Hindu Kush, Koh-i-Befey. American Alpine Journal. 52, 84, pp.255. online version BBC article
	2007	Fiddes, J. (2007). Afghanistan: Implications Of Climate Change For Water Resources In The Kunduz River Basin in Climate Challenges: Bridging the Knowledge Gap.Mercy Corps Climate change unit. online version

Grants & Awards

2022	Cryospheric Observation and Modelling for improved Adaptation in Central Asia (CROMO-ADAPT) (Co-PI) (1.3Mio CHF)
2021	Swiss Agency for Development and Cooperation cryospheric Observation and Modelling for improved Adaptation in Central Asia (CROMO-ADAPT) Opening phase CROMO-ADAPT (Co-PI) (120k CHF)
2019	Expedition to install permafrost monitoring network in Northern Alai Range Tajikistan, Mount Everest Foundation (4K CHF)
2017	TopoSAT: High resolution surface modelling of the Himalayan cryosphere with satellite data assimilation. Swiss National Science Foundation Post-doc mobility (120K CHF)
2015	Data and monitoring tools for improved water resource management in Afghanistan. SEED Grant (10K CHF)
2001	Prince of Wales Student Scholarship (Tuition fees)

Professional memberships

- International Association of Cryospheric Sciences
- European Geosciences Union

Reviewer for

- The Cryosphere
- Geoscientific Model Development
- Remote Sensing
- Journal of Climatology
- Geographica Helvetica
- Environmental Earth Sciences
- Annals of Glaciology
- Journal of Geophysical Research

Languages

- English (Mother tongue)
- German (Intermediate)
- Romansh (Basic)
- Dari (Basic)

Country experience

- Afghanistan
- Borneo
- Kyrgyzstan
- India
- Nepal
- Norway
- Peru
- Switzerland
- Tajikistan

References

Available on request.
Short CV