Matt Tomkins

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Training and Teaching

2019 - 2020

Lecturer in Physical Geography, The University of Manchester, UK
Responsible for undergraduate supervision and teaching as an academic advisor and through leading tutorial groups, seminars and lectures.

2016 - 2019

PhD in Physical Geography, The University of Manchester, UK
"Climatic, lithological and glaciological drivers of mountain erosion over the last glacial cycle: Case studies from the NE Atlantic margin". Supervised by Dr. Jason Dortch, Dr. Philip Hughes and Dr. Jonny Huck (Submitted on 06.09.19; Pass, subject to minor corrections, on 07.01.20).

- Project incorporating geomorphological mapping, compilation and normalisation of cosmogenic nuclide data, relative age dating and geomorphometric analysis of topography to quantify rates of glacial and hillslope erosion in a crystalline bedrock setting.
- Thesis includes a review of glacial erosion and the key contributing factors at a range of scales (e.g. thermal regime, debris flux, lithology, tectonic and glacial histories, glacier configuration).
- Grants obtained from the Royal Geographical Society, the Quaternary Research Association and the British Society for Geomorphology.

2015 - 2016

MSc (by research) in Environmental Science (Distinction), Lancaster University, UK
"Tracking retreat processes at the Falljökull glacier, Iceland". Supervised by Dr. Mike James, Dr. Peter Wynn and Dr. Jez Everest (BGS).

- Analysed five years of time-lapse photography, meteorological data, and LiDAR digital elevation models from the British Geological Survey Observatory at Virkisjökull-Falljökull.
- Investigated the role of subglacial and supraglacial processes in controlling rates of basal sliding and internal and subglacial deformation.

2012 - 2015

BSc (Hons) in Physical Geography (1st Class), The University of Manchester, UK

- Received the Percy Crowe award for best overall performance in Geography (83%) and was in the top 0.5% of Manchester graduates in 2015; one of only 36 students to receive an Outstanding Achievement Award.
- Dissertation nominated for the Alfred Steers Dissertation Prize from the Royal Geographical Society and the Marjorie Sweeting Dissertation Prize from the British Society for Geomorphology.

Current research

2018 -

Can we reduce/account for scatter in moraine exposure age datasets?

- Geomorphic processes can profoundly influence the distribution of moraine exposure age datasets e.g. boulder exhumation, erosion, shielding, inheritance.
- Quantitative methods which address these issues can improve the chronological utility of the moraine record.
- ***Approach 1***: Combining ^{10}Be dating of Pyrenean moraines with analysis of boulder characteristics to test existing and develop new criteria for sample selection.
- Principal investigator (*PI*), collaborating with researchers from Spain (Raimon Pallàs, Ángel Rodés, Laura Rodríguez-Rodríguez, Vincent Jomelli), France (Didier Bourlès, Vincent Rinterknecht) and Andorra (Ramon Copons).
- ***Approach 2***: Using probability-based interpretation of cosmogenic ages to isolate dataset skew using a Monte-Carlo approach.
- Collaboration with researchers from North America (Jason Dortch *PI*, Lindsay Schoenbohm, Sourav Saha, Douglas Curl) and Germany (Madhav Murari).

2018 -

How erosive was the last glacial cycle in the Wicklow Mountains, Ireland?

- Did the growth of a component ice cap at the LGM create or destroy relief?
- Combining in-situ ^{14}C and ^{10}Be dating of summits, cirques and catchment outlets to estimate erosion rates for each land system.
- Completed preliminary sampling for ^{10}Be (n = 33).

2018 -

Ice dynamics in the Durmitor massif, Montenegro

- Surface exposure ages (^{10}Be, ^{36}Cl) from the Mediterranean region record marked variability in the timing of maxima between regions, but with poor dating control from the Balkans.
- Sampling for ^{36}Cl and U-series dating in the Velica Kalica catchment to constrain glacier oscillations after MIS 6.
- Collaboration with fellow ECRs, experts in fluvial (Jamie Woodward) and glacial geomorphology (Philip Hughes) and cosmogenic analysis (David Fink, ANSTO).

2017 -

The last glacial-interglacial transition on the Isle of Arran, Scotland

- Ongoing debate regarding the extent of glaciers in the British Isles during the Younger Dryas chronozone and the preceding interstadial.
- Dating of glacial (^{10}Be) and glaciofluvial deposits (OSL) with researchers at the University of Derby (Richard Pope and Toby Tonkin).

Selected publications

2019

- Barr, I.D., Ely, J.C., Spagnolo, M., Evans, I.S. and **Tomkins, M.D.** (2019). The dynamics of mountain erosion: cirque growth slows as landscapes age, ***Earth Surface Processes and Landforms***, Early View, https://doi.org/10.1002/esp.4688.

2018

- **Tomkins, M. D.,** Dortch, J. M., Hughes, P. D., Huck, J. J., Tonkin, T. N. and Barr, I. D. (2018). Timing of glacial retreat in the Wicklow Mountains, Ireland, conditioned by glacier size and topography, ***Journal of Quaternary Science***, 33: 611-623. https://doi.org/10.1002/jqs.3040.
- **Tomkins, M. D.,** Dortch, J., Hughes, P., Huck, J., Stimson, A., Delmas, M., Calvet, M., and Pallàs, R. (2018). Rapid age assessment of glacial landforms in the Pyrenees using Schmidt hammer exposure dating (SHED), ***Quaternary Research***, 90(1), 26-37. https://doi.org/10.1017/qua.2018.12.
- **Tomkins, M.D.,** Huck, J.J., Dortch, J.M., Hughes, P.D., Kirkbride, M.K., and Barr, I.D. (2018). Schmidt Hammer exposure dating (SHED): Calibration procedures, new exposure age data and an online calculator, ***Quaternary Geochronology***, 44, 55-62. https://doi.org/10.1016/j.quageo.2017.12.003.

Skills

Technical

- Currently assisting with **sample preparation for ^{10}Be and ^{36}Cl** in Manchester (crushing, cleaning, density, leaching, dissolution, AMS preparation).
- Widely read regarding ongoing developments in erosion research, for example the integration of short-lived nuclides (^{14}C) or alternative techniques (OSL), or inverse modelling approaches.
- Expertise in **quantitative geomorphology** e.g. landscape hypsometry, SWATH profile analysis, cirque mapping and morphometry, catchment and trunk stream extraction.
- Skilled in standard GIS software (**QGIS, ArcMap**) including processing LiDAR data, spatial analysis, working with projections and topology.
- Regular user of **R** for data analysis and visualisation, proficient in **MATLAB** and teaching experience with **Python.**
- Good knowledge of core **statistics**, through teaching UG Quantitative Methods course.
- Experience of **fieldwork** in mountainous environments (Pyrenees, Montenegro, Scotland).

Teamwork and Communication

- Active member of two research groups: Quaternary Environments and Geoarchaeology (**QEG**) and Cryosphere Research at Manchester (**CRAM**).
- Successful collaboration with colleagues at the University of Manchester and a strong collaboration record for my career stage involving researchers across the UK, Europe and North America.

Mentoring

- Extensive teaching experience including laboratory work, computer practicals, guest lectures, seminars and fieldwork.
- Informal mentoring of UG dissertations and MSc projects as a PhD student.

Referees

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