

Andrew Tedstone

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<i>Research interests</i>	Greenland Ice Sheet mass balance, albedo, hydrology and dynamics, particularly in connection to responses to climate change.
<i>Employment</i>	School of Geographical Sciences, University of Bristol, UK. 2016–. Research Associate. <i>BLACK and BLOOM - controls on the albedo of the Greenland Ice Sheet.</i> Remote sensing of albedo; modelling the effects of albedo upon surface mass balance.
<i>Education</i>	School of GeoSciences, University of Edinburgh, UK. 2011–2015. Ph.D. <i>Hydrological controls on Greenland Ice Sheet motion.</i> Principal Supervisor: Prof. Peter Nienow. Awarded: 26 November 2015. Funded by the Natural Environment Research Council (NERC), UK. Scott Polar Research Institute, University of Cambridge, UK. 2010–2011. M.Phil. Polar Studies (with Distinction). Funded by the Fitzwilliam Graduate Scholarship. Thesis: <i>Sediment plumes as indicators of Greenland Ice Sheet runoff.</i> Fitzwilliam College, University of Cambridge, UK. 2007–2010. B.A. Hons. Geography (1 st Class). Dissertation: <i>The subglacial drainage system of Hagafellsjökull-Eystri, Iceland.</i>
<i>First Author Publications</i>	Tedstone, A. , J. Bamber, J. Cook, C. Williamson, X. Fettweis, A. Hodson & M. Tranter (in review). Dark ice dynamics of the south-west Greenland Ice Sheet. <i>The Cryosphere Discussions</i> . DOI: 10.5194/tc-2017-79. Tedstone, A. , P. Nienow, A. Dehecq, N. Gourmelen, D. Goldberg & E. Hanna. Decadal slowdown of a land-terminating sector of the Greenland Ice Sheet despite warming (2015). <i>Nature</i> , 526, 692–695. DOI: 10.1038/nature15722. Tedstone, A. , P. Nienow, N. Gourmelen & A. Sole (2014). Greenland Ice Sheet motion insensitive to spatial variations in subglacial hydraulic structure. <i>Geophys. Res. Lett.</i> , 41(24), 8910–8917. DOI: 10.1002/2014GL062386. Tedstone, A. , P. Nienow, A. Sole, D. Mair, T. Cowton, I. Bartholomew & M. A. King (2013). Greenland Ice Sheet motion insensitive to exceptional meltwater forcing. <i>Proc. Nat. Acad. Sci.</i> , 110 (49), 19719–19724. DOI: 10.1073/pnas.1315843110. Tedstone, A. & N. Arnold (2012). Automated remote sensing of sediment plumes for identification of runoff from the Greenland Ice Sheet. <i>Journal of Glaciology</i> , 58 (210), 699–712. DOI: 10.3189/2012JoG11J204.
<i>Co-authored Publications</i>	Hofer, S., A. Tedstone , X. Fettweis & J. Bamber (2017). Decreasing cloud cover drives the recent mass loss on the Greenland ice sheet. <i>Science Advances</i> . DOI: 10.1126/sciadv.17005844. Kohler, T., J. Žárský, J. Yde, G. Lamarche-Gagnon, J. Hawkings, A. Tedstone , J. Wadham, J. Box, A. Beaton & M. Stibal (2017). Carbon dating reveals a seasonal progression in the source of particulate organic carbon exported from the Greenland Ice Sheet. <i>Geophysical Research Letters</i> . DOI: 10.1002/2017GL073219.

Cook, J., A. Hodson, A. Gardner, M. Flanner, **A. Tedstone**, C. Williamson, T. Irvine-Fynn, J. Nilsson, R. Bryant & M. Tranter (2017). Quantifying bioalbedo: A new physically-based model and critique of empirical methods for characterizing biological influence on ice and snow albedo. *The Cryosphere Discussions*. DOI: 10.5194/tc-2017-73.

Musilova, M., M. Tranter, J. Wadham, J. Telling, **A. Tedstone** & A.M. Anesio (2017). Microbially driven export of labile organic carbon from the Greenland ice sheet. *Nature Geoscience*. DOI: 10.1038/ngeo2920.

Linhoff, B., M. Charette, P. Nienow, J. Wadham, **A. Tedstone** & T. Cowton (2017). Utility of ^{222}Rn as a passive tracer of subglacial distributed system drainage. *Earth and Planetary Science Letters*. DOI: 10.1016/j.epsl.2016.12.039.

Hawkings, J., J. Wadham, L. Benning, K. Hendry, M. Tranter, **A. Tedstone**, P. Nienow & R. Raiswell (2017). Ice sheets as a missing source of silica to the polar oceans. *Nature Communications*. DOI:10.1038/ncomms14198.

Wadham, J., J. Hawkings, J. Telling, D. Chandler, J. Alcock, E. O'Donnell, P. Kaur, E. Bagshaw, M. Tranter, **A. Tedstone** & P. Nienow (2016). Sources, cycling and export of nitrogen on the Greenland Ice Sheet. *Biogeosciences*. DOI: 10.5194/bg-13-6339-2016.

de Fleurian, B., M. Morlighem, H. Seroussi, E. Rignot, M. R. van den Broeke, P. K. Munneke, J. Mouginot, P. C. J. P. Smeets & **A. Tedstone** (2016). A modeling study of the effect of runoff variability on the effective pressure beneath Russell Glacier, West Greenland. *Journal of Geophysical Research: Earth Surface*. DOI: 10.1002/2016JF003842.

Hawkings, J., J. Wadham, M. Tranter, J. Telling, E. Bagshaw, A. Beaton, S-L. Simmons, D. Chandler, **A. Tedstone** and P. Nienow (2016). The Greenland Ice Sheet as a hotspot of phosphorus weathering and export in the Arctic. *Global Biogeochemical Cycles*. DOI: 10.1002/2015GB005237.

Hawkings, J., J. Wadham, M. Tranter, E. Lawson, A. Sole, T. Cowton, **A. Tedstone**, I. Bartholomew, P. Nienow and D. Chandler (2015). The effect of a warming climate on nutrient and solute export from the Greenland Ice Sheet. *Geochemical Perspectives Letters*, 1, 94-104. DOI: 10.7185/geochemlet.1510.

Hawkings, J., J. Wadham, M. Tranter, R. Raiswell, L. Benning, P. Statham, **A. Tedstone**, P. Nienow, K. Lee & J. Telling (2014). Ice sheets as a significant source of highly reactive nanoparticulate iron to the oceans. *Nat. Comm.*, 5, 3929. DOI: 10.1038/ncomms4929.

Sole, A., P. Nienow, I. Bartholomew, D. Mair, T. Cowton, **A. Tedstone**, & M. King (2013). Winter motion mediates dynamic response of the Greenland Ice Sheet to warmer summers. *Geophys. Res. Lett.*, 40, 3940–3944. DOI: 10.1002/grl.50764.

Skills

Geospatial data analysis: Remotely sensed data (MODIS, Landsat, MISR, SAR interpretation, feature tracking), GDAL, kinematic GPS deployment and processing (TEQC/TRACK), ArcGIS, QGIS, automated processing chains, lab-based sensor calibrations, climate simulations using the Modèle Atmosphérique Régionale (MAR).

Scientific Programming: Python (advanced) and Matlab (intermediate). Git version-control. Super-computer deployments. My GeoRaster Python package is available on conda-forge and PyPI.

IT: Windows, Unix, Microsoft Office, \LaTeX , vector and raster image editing, VirtualBox, Vagrant.

Web development: xHTML, CSS, PHP, MySQL, Javascript, jQuery, Apache, Zope, Wordpress.

Fieldwork

South-west Greenland ablation zone July 2017. Surface reflectance measurements using ASD FieldSpec and unmanned aerial system with RedEdge camera.

South-west Greenland ablation zone August 2016. Albedo measurements of the ice sheet surface. Organisation of field logistics for the 15-person, 6-week campaign consisting of three work packages spread across five institutions. Coordination and procurement of several tonnes of outbound freight and multiple helicopter flights.

Leverett Glacier, south-west Greenland May 2015: hydrological gauging for the University of Bristol.

Leverett Glacier, south-west Greenland May–August 2012 & May 2013: Dye dilution river discharge gauging, ablation measurements and SF_6 gas tracer sampling at a remote ice-marginal field camp. Deployment of differential GPS units, meteorological sensors and time lapse cameras along a 115 km transect.

Hagafellsjökull-Eystri, Iceland July–August 2009 (2 weeks). Hydrological measurements (stage, salt dilution gauging and hydrochemistry).

Recent Presentations

Data Intensive Research in Environment: Challenges and Opportunities for the GW4 Alliance, University of Exeter, May 2017. *Talk: Challenges in projecting the sea level rise contribution of the Greenland Ice Sheet.*

University of Aberystwyth Physical Geography Seminar Series, February 2017. *Talk: What controls dark ice on the Greenland Ice Sheet?*

AGU Fall Meeting, San Francisco, December 2016. *Talk: Physical controls on dark ice presence in south-west Greenland.*

1st MAR User Workshop, June 2016. *Presentation: Microbial and particulate controls on the albedo of the Greenland Ice Sheet.*

Bristol Geography Python Group. March 2016: *Raster Processing*, May 2016: *The xarray package - faster access to netCDF files.*

Chartered Institution of Water and Environmental Management (CIWEM), South-West Branch. April 2016. *Presentation: The Greenland Ice Sheet hydrological system and potential impacts upon sea level rise.*

University of Bristol Glaciology Group, February 2016. *Presentation: Hydrological controls on Greenland Ice Sheet motion.* (Invited)

University of Edinburgh GeoSciences Hutton Club, November 2015. *Presentation: Hydrological controls on Greenland Ice Sheet motion.* (Invited)

SURGE V (SAGES), Aberdeen. November 2015. *Presentation: Decadal slowdown of a land-terminating sector of the Greenland Ice Sheet despite warming.*

International Glaciological Society British Branch (IGS-BB) meeting, Durham. September 2015. *Presentation: Decadal slowdown of the south-west Greenland Ice Sheet during climate warming.*

Université de Savoie, Annecy, France. January 2015. *Seminar: Coupled melting and ice motion in south-west Greenland.*

AGU Fall Meeting, San Francisco, December 2013. *Poster: Greenland Ice Sheet motion insensitive to exceptional meltwater forcing.*

NERC Arctic Conference, University of Cambridge. September 2013. *Presentation: Greenland Ice Sheet motion insensitive to exceptional meltwater forcing.*

- Service* **Reviewer** for Journal of Glaciology, Annals of Glaciology, The Cryosphere.
Convenor of the Edinburgh GeoSciences Hutton Club seminar series for 2013–14.
Vice-President of the Edinburgh GeoSciences GradSchool (2012–2013)
 Co-organiser for the School’s annual 3-day conference for 120 delegates.
Research Group Website design and development of the Edinburgh Cryosphere website, 2012–2015.
Vice-President of Cambridge University Geographical Society (2009–2010).
- Impact* **Social media outreach:** creation of short films for social media networks. Film segments featured in NERC-produced films.
Lothians Equal Access Programme 2013: Developed and delivered lectures and practical workshops for students with no family university background.
On Thin Ice? Public outreach exhibition at Dynamic Earth, Edinburgh, 2011.
Geography Ambassador with the Royal Geographical Society, 2010-2011.
- Teaching* **Python for Environmental Sciences** 3-day practical course (October 2016) for new PhD students at the University of Bristol. Created and led data analysis tutorials.
Student supervision: Stefan Hofer (*M.Res.*, then *Ph.D.*, 2016–); Thomas Gribbin (undergraduate dissertation, 40 credits).
Field: Iceland Undergraduate Elective, 2013, 2014 and 2015 — *10-day intensive field course in south Iceland. Supervision of student projects, equipment and food logistics; co-leadership of the 2014 Elective.* Cairngorms, Scotland, short courses 2011, 2013, 2014, 2015 — *glacial geomorphology.*
Tutoring and Demonstrating: Geomorphology, 2012–15; Environment Sensitivity and Change, 2011–2012; Plotting in Python, 2012; Quantitative Methods in Geography, 2011.
Feedback Award nominee, Edinburgh University Student Association, 2013.
- Selected Funding* Scottish Alliance for Geoscience, Environment and Society (SAGES). Postdoctoral and Early Career Researcher Exchange program. £2375. 2014.
 University of Edinburgh Mackay Greenland Fund. £600. 2013.
 University of Edinburgh Moss Scholarship. £5000. 2012.
 Natural Environment Research Council PhD studentship. £68k. 2011.
- Courses attended* Publishing Research Software, UoB, Nov 2016
 Developing your research career strategy, UoB, June 2016
 Statistics: a refresher course for Science researchers, UoB, May 2016
 How to peer-review research manuscripts for journals, UoB, Feb 2016
 Karthaus Course on Glaciers and Ice sheets in the Climate System, September 2014 (Institute for Marine and Atmospheric Research, Utrecht)
 Science communication, 2 days, October 2012 (SAGES/Glasgow University)

Expedition First Aid, March 2012 and Fieldwork First Aid, December 2011 (Marlin)
 Presentation Skills (Island 41)
 Python and Subversion, 5 hours Jan 2012 (Edinburgh University)
 MATLAB, 10 hours Dec 2010 (Cambridge University)

Awards Best 3rd year presentation, Edinburgh GeoSciences GradSchool Conference, 2014.
 Nominated for Best Feedback award, Edinburgh University Student Association Teaching Awards, 2013.
 Runner-up in British Hydrological Society Student Dissertation Awards, 2010.
 1912 Senior Scholar, Fitzwilliam College, 2010–2011.
 Cockle Prize, Fitzwilliam College, 2010–2011.

Other Experience **Web Developer**, NERC E³ Doctoral Training Partnership. July–September 2015.
Scout Leader at Avon District Explorers (2016–), 1st Histon Scout Group, Cambridge (2010–2011) and 1st Purton & Lydiard Scout Group, Wiltshire (2004–, including web and advertising).
Activities Instructor at Bonaly Scout Activity Centre, Edinburgh (2013–2015)
Technical Director for student theatre productions in Cambridge (2007–2010)
Sales Assistant, Millets (outdoor equipment retailer) (2006–2010)
 Advising customers; covering supervisory duties; occasional store management.