

Curriculum Vitae

Dr. Ruth Helen Mottram

Date of birth: 9th February 1978

Nationality: British

Current position: Climate scientist at the Danish Climate Centre, Danish Meteorological Institute

I currently work on the interface between climate modelling and ice sheet modelling, coupling the regional climate model (HIRHAM) constructed and run at DMI, with an ice sheet model (PiSM), using an energy balance model to derive the mass budget of the Greenland ice sheet. As part of the Ice2Sea project (EU funded), we aim to constrain estimates of sea level rise derived from ice sheet run off and dynamical changes to the Greenland ice sheet over the next two hundred years. We ultimately aim to have a fully integrated earth system model including atmosphere, ocean, sea ice, surface snow, ice sheet and fjord processes.

Academic Work History

2008-2009 Project Researcher in Glaciology at the Geological Survey of Denmark and Greenland.

A post-doctoral position, working on a consultancy basis for a wide range of glaciologically focused projects in Greenland, requiring application of glaciological, geophysical and numerical techniques to resolve issues mainly related to resource use.

2003-2007 PhD Glaciology, School of Geography and Geosciences, St Andrews University. Thesis title: 'Processes of Crevasse Formation and the Dynamics of Calving Glaciers: A Study at Breiðamerkurjökull, Iceland'. (Awarded January 2008). I used field data and existing remote-sensing measurements to test models of fracture processes and apply them in a new model of ice dynamics applied to fast moving calving glaciers.

2000-2001 MRes in the Natural Environment (Distinction). Department of Geology, University of Edinburgh. Thesis title: 'Mechanics of the Formation of Tors and Estimates of the Exposure Age on the Cairngorm Plateau, Scotland: An approach using in-situ produced cosmogenic isotopes Beryllium-10 and Aluminium-26.' My Masters degree was research focused but also included a broad range of taught courses, including: non-linear dynamics, meteorology, environmental issues, GIS, Holocene environmental change and isotope geology

1996-2000 MA Geography (1st class), Department of Geography, University of Edinburgh. Dissertation: 'Late-Glacial Fluctuations of the North Patagonian Icefield, Chilean Patagonia'.

Research Skills

- Ice dynamic modelling using 1D and 3D models
- Energy balance modelling of surface mass balance in Greenland
- Spatial downscaling of regional climate model (HIRHAM) output
- Geostatistical interpolation techniques (kriging) to create digital elevation models
- Geographical Information Science (GIS) analysis and application
- Fracture mechanics modelling in 1D and 2D applied to ice
- Deployment, processing and analysis of ground penetrating radar (GPR)
- Differential GPS recording, processing and interpretation
- Programming languages: FORTRAN 77/90, IDL, MATLAB, LINUX, HTML/CSS/XML, PYTHON
- Software packages: ArcGIS, REFLEXW (Radar/seismic interpretation software), Rivertools (hydrological analysis), Surfer, standard office applications.
- Fieldwork skills: Ice radar operation, surveying with laser theodolite, strain rate and stress tensor analysis from marker stakes, meteorological station set-up for mass balance calculations, geomorphological mapping, sampling techniques for isotope geology, field safety training

- Fieldwork experience includes:
 - Greenland: 2 week field season in East Greenland, Summer 2008
 - Svalbard: 2 field seasons of 4 weeks each in Summer and Winter 2006
 - Iceland: 3 field seasons of 5 weeks, 2 weeks and 7 weeks over the course of 2004 and 2005
 - Norway: Trip leader for four 10 day field trips to the Jostedal area in 2004, 2005, 2006, 2009
 - Scotland: Geomorphological and geological sampling in the Cairngorms over 4 weeks in 2001
 - Patagonia: 4 weeks fieldwork in 1999 for MA dissertation

Conferences, Workshops and Summer Schools

- 2009 **Oral presentation:** IASC Network on Arctic Glaciology, Calgary, Canada
- 2009 **Oral presentation:** European Geosciences Union Spring meeting, Vienna
- 2009 **Oral presentation:** IGS Symposium on Glaciology in the International Polar Year
- 2009 **Oral presentation:** Changes to the Greenland Cryosphere, Nuuk Climate Days, Greenland
- 2008 **Poster:** American Geophysical Union Fall Meeting, USA
- 2008 **Oral presentation:** Nordic Branch of the International Glaciological Society, Helsinki, Finland
- 2008 **Oral presentation:** Symposium on radioglaciology, International Glaciological Society, Madrid, Spain
- 2007 **Invited oral presentation:** Glaciology group seminar series, Swansea University, UK
- 2006 **Oral presentation:** British Branch of the International Glaciological Society, Keele University, UK
- 2006 **Oral presentation:** Cryospheric indicators of climate change, International Glaciological Society, Cambridge, UK
- 2005 **Summer School Participant:** Ice Sheets and Glaciers in the Climate System, Karthaus, Italy
- 2005 **Organiser:** School of Geosciences Annual Postgraduate Conference, University of St Andrews, UK
- 2004 **Summer School Participant:** Earth System Science, Natural Environment Research Council, UK
- 2004 **Participant:** IGS symposium on Ice-water-ice: Interactions across the phase boundary, Portland, USA

Funding Awarded: (Total: £66,250, approximately €83,670)

1. Monitoring calving activity with a pressure sensor, March 2005, Russell Trust of the University of St Andrews. Amount: £750
2. Monitoring calving activity with a pressure sensor, March 2005, Royal Scottish Geographical Society fieldwork grants. Amount: £500
3. Geophysical Equipment Facility, Natural Environment Research Council, DGPS equipment loan 2004-5. Monetary equivalent: £5700
4. PhD studentship (including fees, subsistence grant, training and conference attendance and fieldwork costs), Natural Environment Research Council, 2003 – 2006. Amount: £49,200
5. MRes studentship (including fees, subsistence and laboratory consumables), Natural Environment Research Council, 2000-2001. Amount: £10,100

Teaching

- 2006-2007 Numerical aspects of glaciology: Course lecturer and assessor for practical classes on numerical modelling techniques in glaciology, University of St Andrews.
- 2005 Researcher in Residence, Anderson High School, Lerwick, Shetland; teaching and mentoring school pupils to encourage interest in science careers.
- 2004-2005 Undergraduate BSc Honours: Co-supervisor of six dissertations involving fieldwork in Iceland
- 2003-2007 Climatic Hazards: First year module tutor
- 2003-2007 Glacial Geomorphology: Second year module tutor and demonstrator

Languages

English, native speaker; French, almost fluent; Dutch, intermediate; Danish, intermediate; German/Spanish, conversational.

List of Publications

Peer reviewed

- Mottram, R., Nielsen, C., Ahlstrøm, A.P., Stendel, M., Christensen, J.H., Reeh, N.* Assessing the hydropower potential of the Greenland ice sheet: A case study at Paakitsoq, West Greenland. (2009). *Hydrological Processes* (in review)
- Mottram, R., Nielsen, C., Ahlstrøm, A.P., Reeh, N., Kristensen, S.S., Christensen, E.L., Forsberg, R., Stenseng, L.* (2008) A new regional high-resolution map of basal topography for the Greenland ice sheet margin at Paakitsoq, West Greenland. *Annals of Glaciology*, 51, (In press).
- Mottram, R., Benn, D.I.* 2008 Testing crevasse depth models: A field study at Breiðamerkurjökull. *Journal of Glaciology*, (in press)
- Mottram, R.*, Processes of Crevasse Formation and the Dynamics of Calving Glaciers (2007). PhD Thesis, University of St Andrews.
- Benn, D.I., Warren, C.R., Mottram, R.* (2007) Calving Processes and the dynamics of calving glaciers. *Earth Science Reviews* doi:10.1016/j.earscirev.2007.02.002
- Benn, D.I., Hulton, N., Mottram, R.* (2006) 'Calving Laws', 'Sliding Laws' and the stability of tidewater glaciers. *Annals of Glaciology*, 46, pp.123 -130
- Phillips, W., Hall, A., Mottram, R., Sugden, D.E., Fifield, K.* (2005) Age and Glacial Modification of Tors, Cairngorm Plateau Scotland. *Geomorphology* 73, pp. 222-245

Non-Peer reviewed

- Citterio, M., Mottram, R.* 2008 Glaciological Investigations at Malmbjerg, Stauning Alper, East Greenland: Technical Report GEUS report 2008/--
- Citterio, M., Mottram, R.* 2008 Glaciological Investigations at Malmbjerg, Stauning Alper, East Greenland: Field Report and Results of GPR Surveys GEUS report 2008/--
- Mottram, R., Citterio, M.* 2008 Predicted evolution of waste rock deposits on Arcturus Glacier, Stauning Alper, East Greenland: GEUS report 2008/52
- Ahlstrøm, A., Mottram, R., Reeh, N., Nielsen, C., Andersen, S.B.* 2008: Evaluation of the future hydropower potential at Paakitsoq, Ilulissat, West Greenland: Technical Report. GEUS Report 2008/37
- Ahlstrøm, A., Mottram, R., Nielsen, C., Reeh, N., Andersen, S.B.* Evaluation of the future hydropower potential at Paakitsoq, Ilulissat, West Greenland: Summary Report. GEUS Report 2008/31
- Mottram, R.* 2001. Mechanics of the Formation of Tors and Estimates of the Exposure Age on the Cairngorm Plateau, Scotland: An approach using in-situ produced cosmogenic isotopes Beryllium-10 and Aluminium-26. Unpublished MRes thesis, University of Edinburgh, UK 150pp