ELLYN M. ENDERLIN, PhD

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EDUCATION

The Ohio State University Columbus, OH
Ph.D. Earth Sciences July 2013
Advisor: Dr. Ian Howat
Dissertation: Observations and modeling of Greenland outlet glacier dynamics

The Ohio State University Columbus, OH
M.S. Geological Sciences March 2010
Advisor: Dr. Ian Howat
Thesis: Controls on west Greenland outlet glacier sensitivity to climate forcing

Lehigh University Bethlehem, PA
B.S. Environmental Science January 2008
Advisor: Dr. Joan Ramage Macdonald
Honors Thesis: Landsat TM and ETM+ derived snowline altitudes in the Cordillera Huayhuash and Cordillera Raura, Peru, 1986-2005

RESEARCH EXPERIENCE

Research Interests

- Controls of tidewater glacier dynamics
- Explaining variability in glacier response to climate forcing
- Ice-ocean interactions
- Improving the ability of numerical ice flow models to simulate glacier behavior

The Ohio State University Columbus, OH
NASA Earth and Space Science Fellow September 2010 - August 2013

- Used satellite-derived digital elevation models and surface speeds calculated from feature tracking to estimate grounding line discharge for 13 tidewater glaciers in Greenland
- Estimated average melt season submarine melt rates beneath the floating termini of 13 tidewater glaciers in Greenland to quantify mass loss from submarine melting
- Developed a one-dimensional numerical ice flow in Matlab for analysis of tidewater glacier behavior
- Assessed the influence of glacier shape on dynamic change following a change in climate forcing using a numerical ice flow model to improve the current understanding of variability in glacier dynamics
- Investigating glacier sensitivity to variations in effective viscosity using a numerical ice flow model to improve the validity of prognostic models of glacier dynamics

The Ohio State University Columbus, OH
Graduate Research Assistant June 2008 - September 2010

- Analyzed changes in terminus positions and surface elevations for 59 tidewater outlet glaciers in west Greenland using satellite imagery obtained from 2000-2009
- Examined speed change relative to terminus position and elevation change for glaciers with >2 km of retreat in west Greenland from 2000-2009 to determine the magnitude and timing of changes in glacier dynamics
- Compared changes in glacier dynamics with concurrent air and ocean temperature changes in west Greenland from 2000-2009 to examine whether changes in climate forcing can fully explain changes in tidewater glacier dynamics on a regional spatial scale
- Assisted another graduate student with analyzing terminus positions, surface elevations, and speeds for tidewater glaciers in east Greenland

Lehigh University Bethlehem, PA
Undergraduate Research Assistant June 2005 - May 2008

- Determined the location of modern snowlines in the Cordillera Huayhuash and Cordillera Raura, Peru using satellite imagery to be used as a proxy of air temperature change in a region with sparse meteorological data

FIELD EXPERIENCE

Breiðamerkurjökull, Iceland April 2012

PI: Dr. Ian Howat (OSU)

- Collected conductivity, temperature, and depth transects in the glacier lagoon (Jokulsarlon) of the Vatnajökull Ice Cap with a Masters student for a portion of her thesis research
- Serviced a tide gauge installed in Jokulsarlon for detection of calving events
- Installed a wind turbine to a time-lapse camera unit that was installed on the Last Glacial Maximum moraines near the glacier terminus for calving event detection

Russell Glacier and Jakobshavn Isbræ, Greenland July 2010

Co-I: Dr. Ian Howat (OSU), Dr. Paul Morin (University of Minnesota)

- Collected high-accuracy static global positioning system (GPS) points with colleagues from the University of Minnesota Polar Geospatial Center for high-resolution digital elevation model (DEM) calibration in west Greenland
- Post-processed GPS data to minimize error and improve accuracy for DEM calibration
- Worked with field collaborators and helicopter pilots to ensure safety conditions while collecting GPS data on a highly-crevassed glacier terminus

Breiðamerkurjökull, Iceland March 2008, June 2008, April 2009

PI: Dr. Ian Howat (OSU)

- Installed 12 high-accuracy GPS stations on the glacier terminus and one off-ice GPS base station that were used to calculate surface velocities and strain rates during the melt season
- Serviced each GPS station to ensure mounting system stability and a constant power supply

Quelccaya Ice Cap and Hualcan Glacier, Peru June 2008

PI: Dr. Lonnie Thompson (OSU)

- Assisted in snowpit sampling for stable isotope analysis and collected paleo plant samples from the ice margin on the Quelccaya Ice Cap
- Assisted in snowpit sampling and shallow ice core collection for ice core drill site reconnaissance on Hualcan Glacier

Cordillera Huayhuash, Peru June 2005

PI: Dr. Joan Ramage Macdonald (Lehigh)

- Collected quartzite samples for cosmogenic isotope analysis for constraining regional Last Glacial Maximum deglaciation dates

GRANTS AWARDED

- NASA Earth and Space Sciences Fellowship (2010-2013), $90,000, 3 years, NASA, Co-PI: Ian Howat (OSU/BPRC)

GRANTS APPLIED FOR BUT NOT AWARDED

- NOAA Climate and Global Change Postdoctoral Fellowship Program (2013), Co-PI: Gordon Hamilton (UMaine)

PUBLICATIONS (*née E. M. McFadden)

Enderlin, E. M., I. M. Howat, and A. Vieli (2013). The sensitivity of tidewater glacier flowline models to parameter uncertainty, *The Cryosphere Discuss*., *7*, 2567-2593. (doi:10.5194/tcd-7-2567-2013.)

Enderlin, E.M., I.M. Howat, and A. Vieli (2013). High sensitivity of tidewater glacier dynamics to shape. *The Cryosphere*, **7**, 1007-1015. (doi:10.5194/tc-7-1007-2013.)

Enderlin, E. M. and I. M. Howat (2013). Submarine Melt Rate Estimates for Floating Termini of Greenland Outlet Glaciers (2000-2010). *J. Glaciology*, **59**(213), 67-75. (doi:10.3189/2013JoG12J049)

Walsh, K. M., I. M. Howat, Y. Ahn, and **E. M. Enderlin** (2012). Changes in the marine-terminating glaciers of central east Greenland, 2000-2010, *Cryosphere* **6,** 211-220. (doi:10.5194/tc-6-211-2012.)

***McFadden, E. M.**, I. M. Howat, I. Joughin, B. E. Smith, and Y. Ahn (2011). Changes in the dynamics of marine-terminating outlet glaciers in west Greenland (2000-2009). *J. Geophysical Research*, **116**(F2), F02022. (doi:10.1029/2010JF001757)

***McFadden, E. M.**, J. Ramage, and D. T. Rodbell (2011). Landsat TM and ETM+ derived snowline altitudes in the Cordillera Huayhuash and Cordillera Raura, Peru, 1986-2005. *The Cryosphere*, **5**, 419-430. (doi:10.5194/tc-5-419-2011)

Howat, I. M., J. E. Box, Y. Ahn, A. Herrington, and ***E. M. McFadden** (2010). Seasonal variability in the dynamics of marine-terminating outlet glaciers in Greenland. *J. Glaciol*ogy **56**(198), 601-613.

ABSTRACTS (*née E. M. McFadden)

Posters

Enderlin, E. M. and I. M. Howat, 2013. Re-examining the timing and magnitude of recent dynamic changes in NW Greenland, *U.S. CLIVAR International Workshop: Understanding the response of Greenland's marine-terminating glaciers to oceanic and atmospheric forcing*.

Enderlin, E. M., I. M. Howat, and A. Vieli, 2012. High sensitivity of tidewater glacier dynamics to shape, *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C23C-0662.

Howat, I. M. and **E. M. Enderlin**, 2012. Submarine melt rate estimates for floating termini of Greenland outlet glaciers (2000-2010). *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C43D-0640.

Enderlin, E. M., I. M. Howat, and A. Vieli, 2012. Assessing Glacier Sensitivity to Differences in Outlet Width Using a Numerical Ice Flow Model. *Glaciers and Ice Sheets in a Warming Climate, Int. Glac. Soc.* Abstract 63A253.

***McFadden, E. M.** and I. M. Howat, 2011. Assessing Geometric Controls on Tidewater Glacier Dynamics Using a Numerical Ice Flow Model. *International Symposium on Interactions of Ice Sheets and Glaciers with the Ocean, Int. Glac. Soc.* Abstract 60A011.

Howat, I. M., ***E. M. McFadden**, Y. Ahn, I. R. Joughin, and B. E. Smith, 2010. Extreme Short-term Variability in Southeast Greenland Outlet Glacier Dynamics. *Eos Transactions AGU*, Fall Meet. Suppl., Abstract C23B-0622.

***McFadden, E. M.** and I. M. Howat, 2010. Assessing Geometric Controls on Tidewater Glacier Sensitivity to Frontal Perturbations Using a Numerical Ice Flow Model. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C23B-0616.

Talks

Enderlin, E. M., 2013. Submarine melt rates for Greenland outlet glaciers. *Program for Regional Climate Assessment (PARCA),* NASA Polar Initiative Meeting.

Enderlin, E. M., 2012. Do Variations in Outlet Width Influence Dynamic Sensitivity? *Tidewater Glaciers Workshop, Svalbard, Norway.*

Enderlin, E. M., I. M. Howat, and A. Vieli, 2012. Assessing Glacier Sensitivity to Differences in Outlet Width Using a Numerical Ice Flow Model. *Applications of radar data from ice sheets to understand ice flow processes, Stability and Variations in Arctic Land Ice (SVALI) Ph.D. Workshop.*

Enderlin, E. M., 2012. Observations and Modeling of Greenland Outlet Glacier Dynamics. *Program for Regional Climate Assessment (PARCA),* NASA Polar Initiative Meeting.

*__McFadden, E. M.__, I. M. Howat, and A. Vieli, 2011. Assessing How Marine-Terminating Glacier Geometry Controls Dynamic Sensitivity to Calving Using a Numerical Ice Flow Model. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C31C-06.

Howat, I. M., Y. Ahn, and ***E. M. McFadden** (invited), 2011. Regional Shifts in Greenland Outlet Glacier Acceleration. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C42B-01.

***McFadden, E. M**., I. M. Howat, Y. Ahn, I. R. Joughin, B. E. Smith, and W. Maslowski, 2010. West Greenland Outlet Glacier Sensitivity (2000-2009). *International Symposium of Earth's Disappearing Ice: Drivers, Responses and Impacts*, *Int. Glac. Soc.* Abstract 59A005.

***McFadden, E. M.**, I. M. Howat, Y, Ahn, I. R. Joughin, and W. Maslowski, 2009. West Greenland Outlet Glacier Sensitivity (2000-2009). *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C11A-06.

***McFadden, E. M.,** I. M. Howat, Y. Ahn, and I. R. Joughin, 2008. Controls on West Greenland Outlet Glacier Sensitivity to Climate Forcing: A Comparative Approach. *Changes of the Greenland Cryosphere Workshop, DTU Space.*

***McFadden, E. M.**, I. M. Howat, Y. Ahn, and I. Joughin, 2008. Controls on Greenland Outlet Glacier Sensitivity to Climate Forcing: A Comparative Approach. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C32B-05.

TEACHING EXPERIENCE

Teaching Interests

- Glaciology
- The Cryosphere
- Climatology & Paleoclimatology
- Geomorphology
- Remote Sensing
- Introductory Earth & Environmental Sciences

Substitute Lecturer ES121
The Dynamic Earth September 2012

- Lectured on mineral identification, silicate structure, magma, and igneous rocks to ~150 students for Dr. Ian Howat

Lab Instructor ES550
Geomorphology Spring 2011, Spring 2012

- Developed 9 new 2-hour laboratory exercises designed for a class of ~25 undergraduate students from multiple disciplines
- Revised laboratory exercised annually to improve the quality of student learning
- Taught introductory material for laboratory exercises using illustrations, demonstrations, and examples to ensure students were prepared with the appropriate background knowledge
- Assisted students with questions throughout laboratory exercises by providing one-on-one instruction on difficult concepts or exercises
- Encouraged student participation in laboratory exercises by varying the type of activity (computer-based vs. hands-on) and by developing a good rapport with students
- Obtained honest, positive feedback from anonymous student surveys regarding the quality of the laboratory exercises, the skills and techniques learned in the exercises, and the effectiveness of my teaching

Student EduPL 894.32
Higher Education Group Study: Course Design Winter 2012

- Attended weekly 3-hour lectures on course design using the backwards design principle
- Applied backwards design to the development of an undergraduate Geomorphology course open to Earth Sciences majors and students from other disciplines
- Developed a Geomorphology course description and course syllabus used to convey the course goals and objectives to administrators and students, respectively
- Created a major scaffolded assignment and grading rubric for the Geomorphology course

HONORS

- **Distinguished Senior Ph.D. Student Award,** The Ohio State University, 2013
- **Michael Johnson Graduate Scholarship**, The Ohio State University, 2012
- **Rick Toracinta Graduate Scholarship**, The Ohio State University, 2010
- **University Fellowship**, The Ohio State University, 2008-2009
- **Rhodes Scholarship Nominee**, Lehigh University, 2008
- **Presidential Scholar**, Lehigh University, 2008
- **Class of 1904 Scholarship**, Lehigh University, 2007-2008
- **Eckardt College Scholar**, Lehigh University, 2004-2008

PROFESSIONAL SERVICE AND OUTREACH

- Peer-reviewer: Geophysical Research Letters, Journal of Geophysical Research, Geology, Inverse Problems, Journal of Glaciology
- Glaciology Group Outreach Coordinator/Chair, 2011- 2013
- Prospective Graduate Student Coordinator, School of Earth Sciences, The Ohio State University, 2013
- Graduate Student Representative, School of Earth Sciences Activity Committee, The Ohio State University, 2012 - 2013
- Graduate Student Representative, School of Earth Sciences Diversity Committee, The Ohio State University, 2012 - 2013
- School of Earth Sciences Graduate Student Representative, The Ohio State University Council of Graduate Students, 2011 - 2012
- Guest speaker, 9th grade Physical Science, December 2011
- Guest speaker, Columbus Ohio Center of Science and Industry, December 2011
- Guest speaker, 8th grade Earth Science, April 2011
- Interviewee for a local news segment on climate change, April 2010
- Water, Climate, and the Environment Division Representative, School of Earth Sciences Graduate Studies Committee, 2009 - 2010

WORKSHOPS

- Tidewater Glaciers Workshop 2012 (selected participant), Svalbard, Norway, August 2012
- Stability and Variations in Arctic Land Ice (SVALI) Ph.D. workshop: Applications of radar data from ice sheets to understand ice flow processes, Copenhagen, Denmark, March 2012
- Karthaus Summer School on Ice Sheets and Glaciers in the Climate System (selected participant), Karthaus, Italy, September 2009

PROFESSIONAL AFFILIATIONS

- American Geophysical Union
- European Geosciences Union
- International Glaciological Society
- Association for Polar Early Career Scientists (APECS)
- Earth Science Women's Network
- Phi Beta Kappa
- Sigma Xi