TREVOR RAY HILLEBRAND
Curriculum Vitae
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Education

University of California – Berkeley
B.A. Geology & Music 2012. GPA: 3.79
Advisors: Dr. Kurt Cuffey and Dr. David Shuster
Honors Thesis: A comparison of tectonics of the eastern Sierra Nevada, CA in the vicinity of Mt. Whitney and Lee Vining, using (U-Th)/He and $^{4}He/^{3}He$ thermochronometry: Preliminary results and thermal modeling

University of Washington
PhD Candidate in Earth and Space Sciences
Started Sept. 2013. GPA: 3.79
Advisor: Dr. John Stone
Committee: Dr. Howard Conway, Dr. Michelle Koutnik, Dr. Bernard Hallet, Dr. David Battisti (GSR)
Dissertation: Quaternary grounding-line fluctuations in Antarctica

Publications & Manuscripts in Preparation

Balco, G., Todd, C., Huybers, K., Campbell, S., Vermeulen, M., Hegland, M., ... & **Hillebrand, T. R.** (2016). Cosmogenic-nuclide exposure ages from the Pensacola Mountains adjacent to the Foundation Ice Stream, Antarctica. *American Journal of Science*, *316*(6), 542-577.

Hillebrand, TR & 9 others. Manuscript in preparation. Holocene grounding-line retreat and deglaciation of the Darwin-Hatherton glacier system, Antarctica

King, C., B Hall, J Stone, & **TR Hillebrand**. Manuscript in prep. The use of radiocarbon dating to reconstruct the Last Glacial Maximum and deglacial extent of Hatherton Glacier in the Lake Wellman region, Antarctica

King, C, **TR Hillebrand,** B Hall, & J Stone. Manuscript in prep. Deglaciation history of upper Hatherton Glacier, Britannia Range, Antarctica

Martín, C., **T. R. Hillebrand**, H. Conway, J. P. Winberry, M. Koutnik, H. F. J. Corr, K.W. Nicholls, C.L. Stewart, J. Kingslake, A. Brisbourne. Manuscript in prep. Radar polarimetry at Crary Ice Rise, Antarctica, reveals details of ice-flow reorganization over the last millennium

Presentations

Spector, P, J Stone, **TR Hillebrand**, & J Gombiner (2017). Selecting Antarctic sites for subglacial bedrock recovery to test for past ice-sheet collapse, an example from the Pirrit Hills. Oral presentation at Geological Society of America (GSA) meeting in Seattle, WA

Hillebrand, TR & 9 others (2017). Holocene grounding-line retreat and deglaciation of Darwin and Hatherton glaciers, Antarctica. Poster presentation at the West Antarctic Ice Sheet (WAIS) Workshop in Camp Casey, WA

Conway, H, **TR Hillebrand** & 4 others (2017). The grounding and formation of Crary Ice Rise. Oral presentation at the West Antarctic Ice Sheet Workshop in Camp Casey, WA

Gombiner, J & 6 others (**TR Hillebrand** is 7th author) (2017). Optical dating of past ice-free conditions in West Antarctica. Poster presentation at the West Antarctic Ice Sheet Workshop in Camp Casey, WA

Stone, JO, P Spector, **TR Hillebrand** & 8 others (2017). West Antarctic Ice Sheet history from subglacial bedrock core. Invited oral presentation at the West Antarctic Ice Sheet Workshop in Camp Casey, WA

Hillebrand, TR & 9 others (2017). Delayed deglaciation of Darwin and Hatherton glaciers, Antarctica. Poster presentation at Past Antarctic Ice Sheet Dynamics conference in Trieste, Italy

Hillebrand, TR & 8 others (2017). Delayed deglaciation of Darwin Glacier, Antarctica. Oral presentation at UW Earth and Space Sciences Graduate Research Gala in Seattle, WA

Martin, C, **TR Hillebrand** & 8 others (2017). Radar polarimetry at Crary Ice Rise, Antarctica, reveals details of ice-flow reorganization over the last millennium. Oral presentation at EGU General Assembly in Vienna.

Hillebrand, TR & 6 others (2016). Structure of Crary Ice Rise, Antarctica revealed by ultra-high frequency radio echo sounding. Poster presentation at WAIS Workshop in Sterling, VA

Hillebrand, TR & 8 others (2016). High frequency radio echo sounding of Crary Ice Rise, Antarctica. Oral presentation at UW Earth and Space Sciences Graduate Research Gala in Seattle, WA

King, C, B Hall, JO Stone, **TR Hillebrand** (2016). Radiocarbon chronology of the local Last Glacial Maximum and subsequent recession alongside Hatherton Glacier, Antarctica. Poster presentation at WAIS Workshop in Sterling, VA

Hillebrand, TR & 5 others (2015). Holocene deglaciation of the Darwin-Hatherton glacier system and the Ross Embayment, Antarctica. Oral presentation at WAIS Workshop in Loveland, CO

Hillebrand, TR & 5 others (2015). Holocene deglaciation of the Ross Sea, Antarctica. Oral presentation at UW Earth and Space Sciences Graduate Research Gala in Seattle, WA

King, C, B Hall, JO Stone, **TR Hillebrand** (2015). The timing of the Last Glacial Maximum in the Lake Wellman region, Hatherton Glacier, Antarctica. Oral presentation at WAIS Workshop in Loveland, CO

Koutnik, M, H Conway, **TR Hillebrand**, JO Stone, & P Spector (2015). Assimilating geochronological data into ice-flow models to constrain the deglaciation of Transantarctic outlet glaciers. Poster presentation at WAIS Workshop in Loveland, CO

Hillebrand, TR & 5 others (2014). Late Quaternary ice elevations of Hatherton Glacier, Antarctica. Oral presentation at GSA General Meeting in Vancouver, BC

Hillebrand, TR, Barker, A.D., & Hallet, B. (2013). Surface evolution of Khumbu Glacier, Nepal. Oral presentation at Northwest Glaciologists Meeting at Simon Fraser University, BC

Field Experience

Nov. 2016 – Feb. 2017: Pirrit Hills, West Antarctica

We retrieved the first long (8m) subglacial bedrock core from beneath 150m of the West Antarctic Ice Sheet (WAIS) in order to test for past exposure to light and cosmic rays. We also collected a 5m core of the overlying ice to provide an age constraint. Such measurements will help answer the question of whether the WAIS has disappeared under warmer climates in the last few million years. We conducted ice-penetrating radar and GPS strain rate surveys to target the ideal drilling location. We also collected samples of glacial erratics and bedrock for cosmic ray-produced isotope measurements determine how much thicker the ice has been during glacial periods. Analysis of the bedrock core, ice core, and surface rock samples are ongoing. I am currently using a 3D ice-sheet model to test sensitivities of our drilling site to large-scale ice-sheet changes over the past five million years.

July – Aug. 2016: Teanaway River, WA

I assisted with tree coring, radiocarbon sampling, and geomorphic mapping that will provide constraints on the amount and timing of recent river incision due to logging and agricultural practices in the Teanaway Valley.

Nov. – Dec. 2015: Crary Ice Rise, Antarctica

Ice rises are locally grounded spots in otherwise floating ice shelves found around Antarctica. They play a key role in stabilizing the ice sheet; however, their formation, evolution, and longevity are not well understood. At the Crary Ice Rise, I collected 450 km of ultra-high frequency (750 MHz center frequency) ice-penetrating radar data in order to map basal topography and internal ice structures. We also collected GPS and repeat phase sensitive radar measurements to gain an understanding of the current ice-flow field in three dimensions.

Dec. 2014 – Jan. 2015: Darwin and Hatherton Glaciers, Antarctica

Nov. 2013 – Jan. 2014: Hatherton Glacier, Antarctica

We spent two field seasons mapping and dating glacial deposits from the last two glaciations in the Transantarctic Mountains in order to understand the pattern and timing of ice-sheet retreat from glacial to interglacial conditions. Our results show that these glaciers thinned much later than other glaciers nearby, suggesting some local control on ice thickness not present elsewhere in the region. I am currently using a 3D ice sheet model and a simplified, 1.5D glacier flow model to understand how our results from this location are connected with the ice sheet at large.

April – May 2013: Khumbu Glacier, Everest Region, Nepal

I assisted with a field campaign to measure ice velocities and supraglacial pond temperatures on the Khumbu Glacier, which drains the Western Cwm of Mt. Everest. Debris-covered glaciers like the Khumbu and its neighbors have undergone phenomenal thinning in the last century, despite the thick layer of debris that has been theorized to insulate and the ice and protect it from melting.

March 2013: Kennicott Glacier, AK

We conducted ice-penetrating radar and GPS surveys in order to understand how annual subglacial lake drainage affects the subglacial environment and ice velocity. With each drainage event, the hydrology at the bed of the glacier becomes more efficient, and thus does less to oppose the overburden stress. This effectively decreases basal lubrication and slows down the glacier.

May – Sept. 2012: Eastern Sierra Nevada, CA

The Eastern Sierra Nevada exhibit a remarkable variation in morphology from relatively gentle slopes in the north near Mono Lake to extremely high relief and shear rock faces in the south near Mt. Whitney. I collected and analyzed granitic rock samples for (U-Th)/He thermochronometry, in order to understand how this portion of the range has evolved over the Cenozoic. I showed that the Mt. Whitney area underwent rapid uplift initiating ~15 million years ago, contemporaneous with the onset of extensional faulting in the Basin and Range province to the east.

July - Aug. 2011: Pioneer Mountains, MO

As part of the UC Berkeley field geology camp, I mapped an anticline-syncline complex in the Pioneer Mountains in an area shown on previously published geologic maps as simply Quaternary alluvium.

Awards and Fellowships

Scientific Committee on Antarctic Research travel grant to attend Past Antarctic Ice Sheet conference in Trieste, Italy, July 2017
UW Quaternary Research Center Award, June 2017
On the Surface Award - Best talk in surface processes at the ESS Research Gala, April 2016
Inquisitive Graduate Student Support Fund Fellowship, June 2015
Jody Bourgeois Graduate Student Support Fund Fellowship, June 2015
Peter Misch Fellowship, June 2014
UC Berkeley High Honors in Geology, Dec. 2012
UC Berkeley Distinction in General Scholarship, Dec. 2012
UC Berkeley Dean's Honors List, Dec. 2012
Charles Ramsden Undergraduate Research Fellowship, Feb. 2012

Service Activities

Graduate student representative to ESS Preliminary Exams, 2016 to present
Outreach Coordinator for UW Dept. of Earth and Space Sciences Rockin' Out K-12 outreach program. Sept. 2015 - Sept. 2016. Acting coordinator March 2017
Volunteer Instructor/Presenter for Rockin' Out at various elementary and middle school science nights, classroom visits, and fieldtrips. Spring 2014 to present
Volunteer Presenter at UW glaciology exhibit at annual Polar Science Weekend. Spring 2014 to present

Teaching experience

Teaching Assistant: Earth Materials, Introduction to Earth Sciences, The Great Ice Age, Economic Geology

Previous Employment

May – Aug. 2010: UCSB Institute for Crustal Studies – Research Assistant
May – Aug. 2011: Berkeley Geochronology Center – Research Assistant
May – Aug. 2012: US Forest Service – Physical Science Technician
Sept. – Dec. 2012: Berkeley Geochronology Center – Research Assistant
June – Sept. 2013: UW Cosmogenic Nuclide Lab – Research Assistant/ Lab Technician