

## Lindsay O. Prothro

Department of Earth, Environmental, and Planetary Science • Rice University  
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### EDUCATION

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**Ph.D. Earth Science** 2013-2018\*

Rice University, Houston, TX, USA. Dissertation: *“Glacial retreat patterns and processes on Antarctic continental margins”* [Advisor: J.B. Anderson]

**B.Sc. (Magna cum laude) Geology and Geophysics** 2009-2013

Louisiana State University, Baton Rouge, LA, USA. Honors Thesis: *“Reinterpreting the stratigraphy of the Florissant Fossil Beds National Monument through correlation by magnetic susceptibility and geochemical comparison”* [Advisor: B.B. Ellwood]

\*December 2018

### RESEARCH INTERESTS

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Glacial Geology and Sedimentology, Marine Geology and Geophysics, Stratigraphy, Geomorphology, Quaternary Geology, Paleoclimate, Sea Level Change

### RESEARCH EXPERIENCE

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**Research Assistant** 2013-present

Rice University, Houston, TX, USA. *Glacial sedimentology*

**Undergraduate Researcher** 2009-2013

Louisiana State University, Baton Rouge, LA, USA. *Sample preparation and measurement of low-field magnetic and thermomagnetic susceptibility to solve stratigraphic problems, under supervision of Brooks Ellwood*

### PUBLICATIONS

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#### Published manuscripts

Greenwood, S.L., Simkins, L.M., Halberstadt, A.R.W., **Prothro, L.O.**, Anderson, J.B., 2018. Holocene reconfiguration and readvance of the East Antarctic Ice Sheet, *Nature Communications* 9, doi: 10.1038/s41467-018-05625-3

**Prothro, L.O.**, Simkins, L.M., Majewski, W. and Anderson, J.B., 2018. Glacial retreat patterns and processes determined from integrated sedimentology and geomorphology records. *Marine Geology*, 395, pp.104-119, doi: 10.1016/j.margeo.2017.09.012.

Simkins, L.M., Anderson, J.B., Greenwood, S.L., Gonnermann, H.M., **Prothro, L.O.**, Halberstadt, A.R.W., Stearns, L.A., Pollard, D. and DeConto, R.M., 2017. Anatomy of a meltwater drainage system beneath the ancestral East Antarctic ice sheet. *Nature Geoscience*, 10(9), pp.691-697, doi: 10.1038/NGEO3012.

Yokoyama, Y., Anderson, J.B., Yamane, M., Simkins, L.M., Miyairi, Y., Yamazaki, T., Koizumi, M., Suga, H., Kushara, K., **Prothro, L.**, Hasumi, H., Southon, F.R., Ohkouchi, N. 2016. Widespread

collapse of the Ross Ice Shelf during the late Holocene. Proceedings of the National Academies of Sciences 113: 2354-2359.

### Submitted manuscripts

Halberstadt, A.R.W., Simkins, L.M., Anderson, J.B., **Prothro, L.O.**, Bart, P., Characteristics of the deforming bed: Till properties on the deglaciated Antarctic continental shelf, *under revision for Journal of Glaciology*

### Manuscripts in preparation

**Prothro, L.O.**, Majewski, W., Yokoyama, Y., Simkins, L.M., Anderson, J.B., Yamane, M., Ohkouchi, N., The dynamic retreat of the East Antarctic Ice Sheet: An assessment of timing, pathways, and forcings, *in prep for Quaternary Science Reviews*

**Prothro, L.O.**, Anderson, J.B., Yokoyama, Y., Majewski, W., The role of subglacial meltwater in grounding-line retreat through Marguerite Bay, Antarctica, *in prep*

### Other publications

**Prothro, L.O.**, Ice-induced plowing of the seafloor. In: Cochran, K., Bokuniewicz, H., Yager, P.L, eds. Encyclopedia of Ocean Sciences, *in press for 2019 edition*

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### TEACHING EXPERIENCE

#### Instructor of record

<i>Freshman Seminar in Local Environmental Science Research, Rice University</i>	Fall 2017
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#### Laboratory Instructor

<i>Earth Systems Evolution and Cycles, upper division course, Rice University</i>	Fall 2014
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#### Guest lecturer

<i>The Cryosphere, upper-division and graduate course, Rice University</i>	Spring 2018
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*"Ice shelves and sea ice"*

<i>Freshman Seminar in Local Environmental Science Research, Rice University</i>	Spring 2017
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*"Antarctic research at sea and in the laboratory"*

<i>GIS for Geoscientists, upper-division and graduate course, Rice University</i>	Spring 2016
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*"Applications of raster datasets for geomorphology and sedimentology"*

<i>The Cryosphere, upper-division and graduate course, Rice University</i>	Spring 2016
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*"Glacial erosion, transport, and sediments"*

<i>Earth Systems Evolution and Cycles, upper division course, Rice University</i>	Fall 2015
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*"Glacial sedimentology"*

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### FIELD EXPERIENCE

**Scientist:** Cruise NBP1502 to the Ross Sea, Antarctica, Multibeam bathymetric mapping, subbottom profiling, and sediment core collection (January 23-March 20 2015, RVIB *Nathaniel B. Palmer*)

**Scientist:** Detailed stratigraphic fieldwork/sampling at Florissant Fossil Beds National Monument, CO for magnetic susceptibility and geochemical work (July 2012)

**Field Assistant:** Stratigraphic fieldwork/sampling/magnetic susceptibility analysis of marine Eocene-Oligocene boundary sections at St. Stephens and Red Stick Quarries, AL and Chickasawhay River, MS (April 2011)

## AWARDS

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### Travel awards

South-Central Section Student Travel Grant, GSA Annual Fall Meeting, Seattle, WA	2017
South-Central Section Student Travel Grant, GSA Annual Fall Meeting, Baltimore, MD	2015
Student Travel Grant, WAIS Workshop, Loveland, CO	2015
South-Central Section Student Travel Grant, GSA Annual Fall Meeting, Denver, CO	2013

### Academic awards

Torkild Rieber Award for Excellence in Geology, Rice University (\$2000)	2018
Student First Author Paper Award, Rice University (\$1000)	2017
2 <sup>nd</sup> Place—Industry-Rice Earth Science Symposium (IRESS) Student Poster Session	2017
Honors College Outstanding Thesis Award, LSU	2013
Most Outstanding Senior, Geology, LSU	2012-2013
Jules and Olga Braunstein Memorial Scholarship Senior Award (NOGS)	2012-2013
“Golden Hammer” award for best-in-class final grade at Senior Field Camp, LSU	2012
Harriet Belchic Memorial Field Camp Scholarship, LSU	2012
Most Outstanding Junior, Geology, LSU	2011-2012
Jules and Olga Braunstein Memorial Scholarship Junior Award (NOGS)	2011-2012
Most Outstanding Sophomore, Geology, LSU	2010-2011
Sophomore Honors Distinction, LSU	2011
Patrick F. Taylor Scholar, Geology, LSU	2010-2013

## PROFESSIONAL AFFILIATIONS

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American Geophysical Union, Geological Society of America, AAPG Student Chapter at Rice University

## SERVICE

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### Conference recruiting

GSA Annual Fall Meeting—recruiting for Rice University	2017
GSA Annual Fall Meeting—recruiting for Rice University	2015

### Outreach

<i>Co-creator and exhibitor</i> World Oceans Day, Houston Museum of Natural Science —“The Texas coast and its response to sea level change’.	2017
<i>Judge</i> , Rice University Undergraduate Research Symposium.	2017
<i>Judge</i> , Rice University Undergraduate Research Symposium.	2016
<i>Organizer</i> for Geology Club demonstrations, Louisiana Sea Grant’s “Ocean Commotion” event at LSU.	2012
<i>Organizer</i> for Geology Club demonstrations, Super Science Saturday (over 1100 students reached) at LSU.	2012
<i>Developer and exhibitor</i> of “Minerals in our Lives” demonstration for Geoscience educational outreach, 2011-2013.	2011-2013

<i>College leader/Geology workshop leader, Focusing on College and Unlimited Success (FOCUS) program for 10<sup>th</sup> grade students from under-resourced high schools</i>	2011
<i>Participant in LSU Honors College Coastal Restoration Service Project with the Barataria-Terrebonne National Estuary Program</i>	2010

### Leadership positions

<i>Secretary, Geology Club at LSU</i>	2011-2013
<i>Representative, LSU Honors College Student Council</i>	2010-2013

### PRACTICAL AND ANALYTICAL PROFICIENCY

**Software:** *ArcGIS, Adobe Illustrator, JMP stats package, Caris (novice), Microsoft Office Suite, IHS Kingdom (novice)*

**Laboratory/field techniques and skills:** *Malvern Mastersizer 2000 laser particle-size analyzer, Vibra-coring, Magnetic Susceptibility (Williams susceptibility bridge, KLY-3S Kappa Bridge, Bartington field probe), 2-D seismic interpretation, sequence stratigraphic interpretation*

### SCIENTIFIC PRESENTATIONS AND ABSTRACTS

- Prothro, L.O.**, Majewski, W., Yokoyama, Y., Simkins, L.M., Anderson, J.B., Yamane, M., Ohkouchi, N. Duration of the maximum extent of the East Antarctic Ice Sheet grounding line in the Ross Sea, Antarctica, and subsequent complex retreat. American Geophysical Union, Annual Meeting, 12/2018. (talk, pending acceptance)
- Anderson, J.B., **Prothro, L.O.**, Majewski, W., Yokoyama, Y., Simkins, L.M., Halberstadt, A.R., Greenwood, S., Yamane, M., Ohkouchi, N. LGM and post-LGM paleodrainage reconstruction and timing of retreat in the western Ross Sea. West Antarctic Ice Sheet Annual Workshop, 9/2018. (talk)
- Demianiuk, E.J., Majewski, W., Baca, M., Popovic, D., **Prothro, L.O.**, Simkins, L.M., Anderson, J.B., Angeles, I.B. Complimentary eDNA and micropaleontological foraminiferal record from glacier-proximal settings in western Ross Sea. Open Science Conference at Polar2018, 6/2018. (poster)
- Prothro, L.**, Yokoyama, Y., Simkins, L.M., Anderson, J.B., Majewski, W., Yamane, M., Ohkouchi, N., Marine evidence of a deconvolving Antarctic Ice Sheet during post-LGM retreat of the Ross Sea sector. American Geophysical Union, Annual Meeting, 12/2017. (poster)
- Yokoyama, Y. Anderson, J.B., Yamane, M. Simkins, L., Miyairi, Y., Suga, H., **Prothro, L.**, Okuno, J., and Ohkouchi, N. Holocene sea level change and Antarctic ice shelf retreats. PALSEA2 Workshop, 11/2017. (talk)
- Prothro, L.**, Simkins, L.M., Majewski, W., Anderson, J.B. Sedimentary processes at paleo-grounding lines: Glacial and oceanographic interactions during ice-sheet retreat. Geological Society of America, Annual Meeting, 10/2017. (talk)
- Anderson, J.B., Simkins, L., Greenwood, S., Demet, B., Halberstadt, A.R.H., **Prothro, L.**, Role of grounding zone wedges in grounding line stabilization. Geological Society of America, Annual Meeting, 10/2017. (talk)
- Prothro, L.**, Yokoyama, Y., Simkins, L.M., Anderson, J.B., Majewski, W., Yamane, M., Ohkouchi, N. Timing and sea level contributions of the deconvolving Antarctic Ice Sheet during post-LGM retreat of the Ross Sea sector. Geological Society of America, Annual Meeting, 10/2017. (poster)

- Prothro, L.**, Anderson, J.B., Simkins, L.M., Majewski, W. Glaciomarine sediment facies: Using geomorphic contexts and multi-proxy analysis to build ice-sheet retreat models. Industry-Rice Earth Science Symposium, 2/2017. (poster)
- Yokoyama, Y., Anderson, J.B., Yamane, M., Simkins, L., Miyairi, Y., Yamazaki, T., Koizumi, M., Kusahara, K., Suga, H., **Prothro, L.O.**, Hasumi, H., Southon, J.R., Ohkouchi, N. Widespread collapse of the Ross Ice Shelf during the late Holocene reconstructed from compound specific C-14 and meteoric Be-10. American Geophysical Union, Annual Meeting, 12/2016. (talk)
- Prothro, L.**, Anderson, J.B., Simkins, L.M., Majewski, W. Glaciomarine sediment facies: Using geomorphic contexts and multi-proxy analysis to build ice-sheet retreat models. American Geophysical Union, Annual Meeting, 12/2016. (poster)
- Greenwood, S.L., Simkins, L.M., Halberstadt, A.R.W., **Prothro, L.O.**, Anderson, J.B. Holocene reconfiguration and readvance of the East Antarctic Ice Sheet. American Geophysical Union, Annual Meeting, 12/2016. (talk)
- Halberstadt, A.R., Simkins, L.M., Anderson, J.B., **Prothro, L.O.**, Demet, B.P., Greenwood, S.L., Yokoyama, Y. Post-LGM retreat history in Ross Sea reflects changing controls on marine ice sheet behavior. American Geophysical Union, Annual Meeting, 12/2016. (poster)
- Anderson, J.B., Simkins, L.M., **Prothro, L.O.** Sedimentological fingerprint of modern and ancient meltwater outbursts across Antarctic continental shelves and slopes. American Geophysical Union, Annual Meeting, 12/2016. (talk)
- Prothro, L.O.**, Demet, B.P., Simkins, L.M., Halberstadt, A.R., Anderson, J.B., Majewski, W. Contribution of localized processes to large-scale ice-margin instability. William Smith Meeting, London, England, 6/2016 (talk)
- Prothro, L.**, Simkins, L., Halberstadt, A.R., Anderson, J.B., Yokoyama, Y., Majewski, W., Demet, B.P. Controls on ice-margin instability and onset of deglaciation following the Last Glacial Maximum. Rice University Department of Earth Science, Departmental Research Seminar, 2/2016. (talk)
- Prothro, L.**, Simkins, L., Halberstadt, A.R., Anderson, J.B., Yokoyama, Y., Majewski, W., Demet, B.P., Greenwood, S. Controls on ice-margin instability and onset of deglaciation following the Last Glacial Maximum. Industry-Rice Earth Science Symposium 2/2016 (poster)
- Demet, B.P., Anderson, J.B., Nittrouer, J.A., Simkins, L., Halberstadt, A.R., **Prothro, L.O.** Sedimentary processes of unstable ice sheet grounding zones: Comparing polar and temperate grounding zone wedges using marine geophysical data and outcrop studies. American Geophysical Union, Annual Meeting, 12/2015. (poster)
- Halberstadt, A.R., Anderson, J.B., Simkins, L., **Prothro, L.O.**, Bart, P.J. Ross sea till properties: Implications for ice sheet bed interaction. American Geophysical Union, Annual Meeting, 12/2015. (poster)
- Simkins, L., Greenwood, S., Anderson, J.B., **Prothro, L.O.**, Halberstadt, A.R., Stearns, L.A., Demet, B.P. Geologic evidence of a leaky Antarctic Ice Sheet: Tracking meltwater influence on ice-sheet retreat in the Ross Sea, Antarctica since the Last Glacial Maximum. American Geophysical Union, Annual Meeting, 12/2015. (talk)
- Prothro, L.**, Simkins, L., Anderson, L., Halberstadt, A.R., Yokoyama, Y., Majewski, W., and Minzoni, R. Refining our understanding of sediment retreat facies and geomorphology for an accurate deglacial history of the Ross Sea. Geological Society of America, Annual Meeting, 10/2015. (poster)
- Prothro, L.**, Simkins, L., Anderson, L., Halberstadt, A.R., Yokoyama, Y., Majewski, W., and Minzoni, R. Refining our understanding of sediment retreat facies and geomorphology for an accurate deglacial history of the Ross Sea. West Antarctic Ice Sheet Annual Workshop, 9/2015. (poster)

**Prothro, L.** Subglacial meltwater and its role in ice sheet retreat. Rice University Department of Earth Science, Departmental Research Seminar, 4/2015. (talk)

**Prothro, L.O.,** Ellwood, B.B., Meyer, H., Ratcliffe, K.T., Tomkin, J.H., and Abbott, L.D., 2013. Reinterpreting the stratigraphy of Florissant Fossil Beds National Monument through correlation by magnetic susceptibility and geochemical comparison. Geological Society of America, Annual Meeting, 10/2013. (poster)