

## Gordon R. M. Bromley

CLIMATE CHANGE INSTITUTE & SCHOOL OF EARTH AND CLIMATE SCIENCES  
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### Appointments

#### UNIVERSITY OF MAINE

2014–present                      Research Assistant Professor  
2014–present                      Professor/preceptor, Honors College  
2012–14                              Postdoctoral Research Associate

#### LAMONT-DOHERTY EARTH OBSERVATORY OF COLUMBIA UNIVERSITY

2011–2012                      Lamont Doherty Postdoctoral Fellowship

### Education

#### UNIVERSITY OF MAINE

2010      Ph.D., Earth Sciences  
            Thesis: *A glacial-geologic approach to investigating climate and ice fluctuations in the Southern Hemisphere.*

#### UNIVERSITY OF MAINE

2005      M.Sc., Quaternary and Climate Studies

#### UNIVERSITY OF ST ANDREWS

2003      B.Sc. (Hons.), Geography

### Honours and Awards

2017      Marie Sklodowska-Curie Actions Seal of Excellence  
2011      Outstanding Ph.D. Award, College of Nat. Sci., Forestry & Ag. (U. Maine)  
2006      Geologic Society of America Research Grant Outstanding Mention  
2006      Elected to Sigma Xi Associate Membership  
2003      Mathieson Prize for Excellence in Geography, University of St Andrews

### Publications

Spector, P., Stone, J., Cowdery, S.G., Hall, B., Conway, H., **Bromley, G.** Rapid Early-Holocene Deglaciation in the Ross Sea, Antarctica. Submitted to *Geophysical Research Letters*, May 2017.

Hall, B.L., Borns, H.W., **Bromley, G.R.M.**, Lowell, T.V. Age of the Pineo Ridge System: Implications for behavior of the Laurentide Ice Sheet in eastern Maine, U.S.A., during the last deglaciation. In press, *Quaternary Science Reviews*.

**Bromley, G.R.M.**, Borns, H.W., Putnam, A.E., Lowell, T.V., Sandford, T., Barrell, D. Early rise and Younger Dryas demise of Scotland's last ice fields. Submitted to *GSA Bulletin*, October 2016.

**Bromley, G.R.M.**, Putnam, A.E., Lowell, T.V., Hall, B.L., Schaefer, J.M., 2016. Comment on 'Was Scotland deglaciated during the Younger Dryas?' by Small and Fabel (2016). *Quaternary Science Reviews* 152, 203–206.

**Bromley, G.R.M.**, Schaefer, J.M., Hall, B.L., Rademaker, K.M., Putnam, A.E., Todd, C.E., Hegland, M., Winckler, G., Jackson, M.S., Strand, P.D., 2016. A cosmogenic <sup>10</sup>Be chronology for the local last glacial maximum and termination in the Cordillera Oriental, southern Peruvian Andes: Implications for the tropical role in global climate. *Quaternary Science Reviews* 148, 54–67.

Hall, B., **Bromley, G.**, Stone, J., Conway, H., 2016. Holocene ice recession at Polygon Spur, Reedy Glacier, Antarctica. *The Holocene*, doi: 10.1177/0959683616652708.

- Rademaker, K., Hodgins, G., Moore, K., Zarrillo, S., Miller, C., **Bromley, G.R.M.**, Leach, P., Reid, D.A., Yépez Álvarez, Sandweiss, D.H., 2016. Cuncaicha Rockshelter, a key site for understanding Colonization of the high Andes: Reply to Capriles et al. *Current Anthropology* 57, 101-103.
- Bromley, G.R.M.**, Hall, B.L., Thompson, W.B., Kaplan, M.R., Garcia, J.L., Schaefer, J.M., 2015. Late glacial fluctuations of the Laurentide Ice Sheet in the White Mountains of Maine and New Hampshire, U.S.A. *Quaternary Research* 83, 522-530.
- Rademaker, K., Hodgins, G., Moore, K., Zarrillo, S., Miller, C., **Bromley, G.R.M.**, Leach, P., Reid, D.A., Yépez Álvarez, Sandweiss, D.H., 2014. Paleoindian settlement of the high-altitude Peruvian Andes. *Science* 346, 466-469.
- Bromley, G.R.M.**, Winckler, G., Schaefer, J.M., Kaplan, M., Licht, K., Hall, B.L., 2014. Pyroxene separation by HF leaching and its impact on helium surface-exposure dating. *Quaternary Geochronology* 23, 1-8.
- Bromley, G.R.M.**, Putnam, A.E., Rademaker, K.M., Lowell, T.V., Schaefer, J.M., Hall, B.L., Winckler, G., Birkel, S.D., Borns, H.W., Jr., 2014. Younger Dryas Deglaciation Of Scotland Driven By Warming Summers. *PNAS* 111, 6215-6219.
- Rademaker, K., **Bromley G.R.M.**, Sandweiss, D.H., 2013. Peru Archaeological Radiocarbon Database, 13,000-7000 14C B.P. *Quaternary International* 301, 34-45.
- Hall, B.L., Porter, C.T., Denton, G.H., Lowell, T.V., **Bromley, G.R.M.**, 2013. Extensive recession of Cordillera Darwin glaciers in southernmost South America during Heinrich Stadial 1. *Quaternary Science Reviews* 62, 49-55.
- Bromley, G.R.M.**, Hall, B.L., Stone, J.O., Conway, H., 2012. Late Pleistocene evolution of Scott Glacier, southern Transantarctic Mountains: Implications for the Antarctic contribution to deglacial sea level. *Quaternary Science Reviews* 50, 1-13.
- Rademaker, K., Reid, D.A., **Bromley, G.R.M.**, 2012. Connecting the Dots: Least-Cost Analysis, Paleogeography, and the Search for Palaeoindian Sites in Southern Highland Peru. In D.A. White and S. Surface-Evans (eds.) *Least Cost Analysis of Social Landscapes: Archaeological Case Studies*, University of Utah.
- Bromley, G.R.M.**, Hall, B.L., Rademaker, K.M., Todd, C.E., Racoviteanu, A.E., 2011. Late Pleistocene snowline fluctuations at Nevado Coropuna (15S), southern Peruvian Andes. *Journal of Quaternary Science* 26, 305-317.
- Bromley, G.R.M.**, Hall, B.L., Schaefer, J.M., Winckler, G., Todd, C.E., Rademaker, K.M., 2011. Glacier fluctuations in the southern Peruvian Andes during the late-glacial period, constrained with cosmogenic <sup>3</sup>He. *Journal of Quaternary Science* 26, 37-46.
- Bromley, G.R.M.**, Hall, B.L., Stone, J.O., Conway, H., Todd, C.E., 2010. Late Cenozoic deposits at Reedy Glacier, Transantarctic Mountains: implications for former thickness of the West Antarctic Ice Sheet. *Quaternary Science Reviews* 29, 384-398.
- Todd, C.E., Stone, J.O., Conway, H., Hall, B.L., **Bromley, G.R.M.**, 2010. Late-Quaternary evolution of Reedy Glacier. *Quaternary Science Reviews* 29, 1328-1341.
- Bromley, G.R.M.**, Schaefer, J.M., Winckler, G., Hall, B.L., Todd, C.E., Rademaker, K.M., 2009. Relative timing of last glacial maximum and late glacial events in the tropical Andes. *Quaternary Science Reviews* 28, 2514-2526.

### Grants Awarded

- 'Resolving the impact of so-called "Heinrich Stadial 1" on the terrestrial cryosphere of the North Atlantic region': Awarded to **G. Bromley**, Comer Family Foundation grant, 2016.
- 'Blowing Hot or Cold? Resolving the terrestrial impact of North Atlantic stadials': Awarded to **G. Bromley**, National Geographic/WAITT Grants Program, 2016.
- 'Research Experiences for Undergraduates (REU) Supplement': PI and student thesis advisor: **G. Bromley**, NSF (PLR), 2016.

- 'Collaborative Research: Potential direct geologic constraints on ice-sheet thickness in the central Transantarctic Mountains during the Pliocene warm period': PI: **G. Bromley**; Co-PI: G. Balco, NSF (PLR), 2015. (see <https://umaine.edu/news/blog/2015/09/15/what-happens-in-antarctica-does-not-stay-in-antarctica/>, <https://wabi.tv/2015/09/28/umaine-research-professor-headed-to-antarctica/>, <https://cosmognosis.wordpress.com/2016/09/01/possibly-the-most-he-3-ever-observed-in-a-terrestrial-sample/>)
- 'The last glaciation of Scotland: Implications for our understanding of abrupt climate change'. Awarded to **G. Bromley**. University of Maine Faculty Research Fund, 2015.
- 'Constraining late Quaternary glacier and environmental change in the high Colombian páramo'. Awarded to **G. Bromley**, D. Ruiz Carrascal, Institute for Latin American Studies (ILAS) grant, 2012.
- 'Building Peruvian capacity for monitoring and modeling the effects of climate change on the Coropuna Glacier and associated watersheds in Arequipa, Peru': Written by **G. Bromley** and K. Kraft (Assoc. Sust. Development, Arequipa). USAID-NSF (PEER program), 2012.
- 'The Loch Lomond Readvance in Scotland: constraint and calibration': PIs: **G. Bromley**, A. Putnam. Lamont Climate Ctr., 2011.
- 'Rapid deglaciation and volcanism': PI: **G. Bromley**, Lamont Climate Center, 2011.
- 'Collaborative Research: Timing and structure of the last glacial maximum and termination in southern Peru: Implications for the role of the tropics in climate change': Developed and written by **G. Bromley** (as Ph.D. student). PIs: B. Hall, J. Schaefer, G. Winckler. National Science Foundation 'Paleo Perspectives on Climate Change (P2C2)', 2010.
- 'A Late Pleistocene chronology of glacier fluctuation in the tropical Andes': PI: **G. Bromley**, Comer Science and Education Foundation Grant, 2009.
- 'Late Pleistocene climate and glacier fluctuations in the tropical Andes': Awarded to **G. Bromley**, Sigma Xi Grant-in-aid-of-Research, 2006.
- 'Reconstructing the Late Quaternary glacial history of the Cordillera Ampato, Peru': Awarded to **G. Bromley**, Geological Society of America Student Research Grant, 2006.
- 'Reconstructing the Late-Quaternary glacial and environmental history of Nevado Firura, Peru': Awarded to **G. Bromley**, PRIME Lab Seed Grant, 2006.

### Grants Submitted

- 'Collaborative Research: Fire and Ice: Potential magmatic and glacial-geomorphic constraints on the role of deglaciation in magma evolution': PIs: C. Deering, **G. Bromley**. Submitted to NSF CH. *Pending*.
- 'Collaborative Research: A tropical multi-disciplinary approach to testing climate sensitivity to CO<sub>2</sub>': PI: **G. Bromley**; Co-PIs: M. Kelly, A. Doughty. Submitted to NSF P2C2, October 2016. *In preparation for 2017 resubmission*.
- 'Círculo de investigación sobre Criosfera y Cambio Climático en los Andes Centrales (CRYOPERU)': PIs: J. Úbeda, **G. Bromley**. Submitted to Círculos de Investigación en Ciencia y Tecnología (Peru), September 2015. *In preparation for 2017 resubmission*.

### Selected Abstracts

- Bromley, G.**, Restrepo, S., Kelly, M., Ruiz, D., Doughty, A., 2016. Using cosmogenic Be-10 to determine climate sensitivity to carbon dioxide. *Workshop de Isotopía Cosmogénica y Paleo-glaciología/Paleo-climatología Tropical*, EAFIT, Medellín, Colombia.
- Bromley, G.**, Schaefer, J., Hall, B., Rademaker, K., Todd, C., Winckler, G., 2016. A glacier-derived record of tropical temperature during Termination 1 from the Cordillera Oriental, southern Perú. *Northeastern GSA Meeting*, Albany, New York.
- Bromley, G.**, 2014 (invited talk). The tropics: Passive beast or driver of global climate? Colby College, Maine.

- Bromley, G.**, 2013. The Younger Dryas stadial in Scotland. *Comer Abrupt Climate Change Meeting*, Soldiers Grove, Wisconsin.
- Bromley, G.**, Hall, B., Thompson, W., Garcia, J., Kaplan, M., Schaefer, J., 2013. Age of the Androscoggin Moraine, western Maine and eastern New Hampshire, from <sup>10</sup>Be surface-exposure age dating. *Northeastern GSA Meeting*, Bretton Woods, New Hampshire.
- Bromley, G.**, 2012 (invited talk). Reconstructing late-Quaternary tropical glacier change through surface-exposure dating. *Escuela de Ingeniería de Antioquia*, Medellín, Colombia.
- Bromley, G.**, Hall, B., Schaefer, J., Winckler, G., Rademaker, K., Todd, C., 2010. A late-glacial advance in the arid tropical Andes: Cosmogenic He-3 data from Nevado Coropuna, Peru. *Geological Society of America Annual Meeting*, Denver, Colorado.
- Bromley, G.**, 2010. Exploring patterns of glaciation in the tropical Andes since the Last Glacial Maximum. *Comer Abrupt Climate Change Meeting*, Soldiers Grove, Wisconsin.

### Teaching and Synergistic Activities

- 2014–present Preceptor: HON 111 and 112 'Civilizations', Honors College, UMaine.
- 2014 Lecturer: ERS 201 'Global Environmental Change', ERS 369 'Climate and Energy', UMaine.
- 2014 Lecturer: 'From snow to glaciers: Unlocking the secrets of our climate system', Maine School of Science and Mathematics.
- 2010–13 Lecturer: 'Ice Age Earth', 'Footprints of Climate Change', Penobscot Valley Senior College; 'Impacts of Climate Change on Maine', Belfast Senior College.
- 2007–13 Lecturer: GES 441 'Glaciers & Climate'; Co-lecturer: ANT 170 'Popular Archaeology', ANT 475 'Environmental Archaeology', ERS 527 'Isotope Geology', UMaine.

**Field geologist:** Antarctica (2003-05, 2007-09, 2010, 2015, 2016), Colombia (2012-13), Greenland (2014), Maine (2010-12), Patagonia (2007), Peru (2005-2013), Scotland (2010-17).

- 2007–present Mentoring undergraduate and graduate students in Antarctic, Andean, Greenlandic field and lab (including cosmogenic nuclide lab) work, University of Maine.
- 2014–present Masters thesis advisor for A. Balter (UMaine), Masters thesis committee member for: P. Strand, C. Dowey, and Jill Pelto (UMaine) and L. Farnsworth (Dartmouth College); Honors thesis committee member for L. Saco, E. Veitch, E. Kane, and M. Thompson (UMaine); Undergraduate thesis advisor for Z. Mason and H. Thomas (UMaine)
- 2016-17 Conducted Antarctic and climate science outreach discussions and demonstrations in Maine elementary and middle schools.
- 2015 Participated in outreach articles for the Center for the Study of the First Americans (Dycus, K., 2015. Reaching new heights in the Peruvian Andes. *Mammoth Trumpet* 30, 12–16; Dycus, K., 2016. Reaching new heights in the Peruvian Andes II. *Mammoth Trumpet* 31, 10–14)
- 2013 Developed educational outreach video for Columbia Earth Institute (<http://www.ideo.columbia.edu/news-events/climate-peruvian-andes-early-humans-modern-challenges>).
- 2012 Coordinator for the Lamont Geochemistry Seminar series.
- 2011 Maintained research blog for Columbia Earth Institute 'State of the Planet' series (<http://blogs.ei.columbia.edu/2011/06/17/to-the-tip-of-the-andes/>).
- 2007–10 NSF-sponsored outreach, 'The Science of Climate Change: Journey to Reedy Glacier, Antarctica', Acadia National Park.

2009–present     Reviewer for: *Nature*; *Geophysical Research Letters*; *Quaternary Science Reviews*; *Quaternary Research*; *Quaternary Geochronology*; *Geomorphology*; *Journal of Geophysical Research*; *Scientific Reports*; *Journal of Quaternary Science*; *National Science Foundation*; *Austrian Science Fund*; *NERC*; *Deutsche Forschungsgemeinschaft (DFG)*.

Active member of Sigma Xi, American Geophysical Union, Geological Society of America, Royal Geographic Society.

### **Non-Academic Activities**

Landscape artist and photographer ([www.gordonbromleyartofscience.com](http://www.gordonbromleyartofscience.com))

2015 – present     Independent consultant for hydroelectric development, Dundonnell Estate, Scotland.

2014–present     Freelance science editor for Stallard Scientific Editing, New Zealand.

2013–14            Orono Land Trust Board Member.