

## Douglas Reed MacAyeal

Department of the Geophysical Sciences

The University of Chicago

5734 S. Ellis Ave. HGS 424

Chicago, IL

Phone: (773) 702-8027 (o)

(773) 752-6078 (h)

(773) 702-9505 (f)

(224) 500-7775 (c)

[drm7@midway.uchicago.edu](mailto:drm7@midway.uchicago.edu)

[drm7@icloud.com](mailto:drm7@icloud.com)

last updated: May 2017

## Education

|      |                                     |                                                                                |
|------|-------------------------------------|--------------------------------------------------------------------------------|
| 1983 | Ph.D.<br>Geophysical Fluid Dynamics | Princeton University, Princeton, NJ<br>advisor: Kirk Bryan                     |
| 1979 | M.S.<br>Physics/Glaciology          | University of Maine, Orono, ME<br>advisor: Robert Thomas                       |
| 1976 | Sc.B.<br>Physics                    | Brown University, Providence, RI<br><i>Magna cum laude</i> , honors in physics |

## Personal

Birth Date: 8 December, 1954; Age: 62

Birth Place: Boston, MA, USA

Marital Status: Married, Linda A. MacAyeal (Sparks)

Children: Leigh C. (MacAyeal) Kasten (Brown U., Sc.B.; Cornell U., DVM), Hannah R. MacAyeal (U. Penn, B.S., U. Penn Veterinary Medicine, DVM), Evan C. MacAyeal (Carleton College, B.A., Columbia University, Financial Engineering, M.S.)

## Research Interests

The focus of my research is to understand the physical processes that determine the evolution of ice and climate on Earth over the past, present and future.

## Employment

Department of the Geophysical Sciences, University of Chicago

1983-Present

*Professor (Asst. until 1987, Assoc. until 1992 and Full until present)*

Prior to 1983: I was a graduate student at Princeton University and at University of Maine.

## Awards and Honors

- 2013 Nye Lecture, American Geophysical Union, Fall Meeting

- 2010 Goldthwait Award (Polar Medal) of the Byrd Polar Research Center, Ohio State University
- 2005 Provost's Teaching Award of the University of Chicago
- 2002 Quantrell Teaching Award of the University of Chicago
- 1997 Richardson Medal of the IGS
- 1988 James Macelwane Medal of the AGU
- 1988 Fellow of the AGU
- Antarctic geographic names: MacAyeal Ice Stream, MacAyeal Peak

## Teaching Experience

- GeoSci 242: Geophysical Fluid Dynamics, I. - Foundations
- GeoSci 353: Oceanic and Atmospheric Waves
- Granular Fluid Mechanics
- Glacial Isostasy
- Physical Science 108: The Earth
- Physical Science 109: Ice Age Earth
- Physical Science 132: Dynamic Environment and Emergence of Humankind
- Physical Science 133: Dynamic Environment and Settlement Systems
- Physical science 134: Global Warming: Understanding the Forecast
- GeoSci 235: Introduction to Inverse Methods in Geophysical Sciences
- GeoSci 233: Physical Oceanography
- GeoSci 212: Introduction to Seismology
- GeoSci 232: Introduction to Glaciology

## PhD advisor for:

- Grant Macdonald, PhD candidacy exam completed in 2016.
- Andrew Malone, PhD expected May 2016 (Thesis title: Glaciers and Climate in the High Andes)
- L. Mac Cathles, PhD 2011 (Thesis topic: radiation/surface roughness feedbacks)
- K. M. Brunt, PhD 2008 (Thesis topic: Tidal influences on Ross Ice Shelf flow.)
- I. D. Turnbull, PhD 2008 (Thesis topic: Inverse barometer effect and icebergs.)
- Olga V. Sergienko, PhD 2005 (Thesis topic: Surface melting of ice shelves and icebergs.)
- Christina L. Hulbe, PhD 1998 (Thesis topic: West Antarctic ice-sheet modeling.)
- Charles S. Jackson, PhD 1998 (Thesis topic: Ice-sheet topography effects on atmospheric circulation.)
- Dean Lindstrom, PhD 1990 (Thesis topic: Model of the Eurasian Ice Sheet at the Last Glacial Maximum)
- Robert W. Grumbine, PhD 1989 (Thesis title: Effect of coastal polynyas on the thermohaline circulation of the Antarctic continental shelves.)

## **MS advisor for:**

- Honyu Xiao 2016 (Thesis topic: Neural network earthquake warning systems)
- Marie Bergelin 2016 (Thesis topic: Landsat detection of snow facies in Greenland)
- Christopher Oster 2015 (Thesis topic: Glacial Lake Outburst Floods of Nepal)
- Yitan Wang, MS 2014 (Thesis topic: Ambient noise correlation analysis on an iceberg)
- Kristopher Darnell, MS 2011 (Thesis topic: supraglacial lake ogives)
- Marianne H. Okal, MS 2005 (Thesis topic: Characteristics of Iceberg Collisions.)
- Young-Jin Kim, MS 2004 (Thesis topic: Tidal motions of icebergs.)
- Leila Zajac, MS 2002 (Thesis topic: North American biomes.)
- Theodore L. Gotis, MS 1999 (Thesis topic: Normal modes of the Great Lakes and World Ocean.)
- Katsumi Matsumoto, MS 1996 (Thesis topic: Ice-rafted debris in the North Atlantic.)
- Hailing Wang, MS 1993 (Thesis topic: Ice-sheet thermodynamics.)
- Shinya Kakuta, MS 1992 (Thesis topic: Surface temperature history of Prudhoe Bay derived from borehole temperature profiles using control methods.)
- Cynthia J. Engberts, MS 1991 (Thesis title: Evaluation of the precipitation patterns over Antarctica.)

## **Students at Other Universities Advised**

- John W. Jenson, PhD Oregon State University, 1993 (Thesis topic: Subglacial till deformation and Lake Michigan ice-lobe modeling.)
- John Firestone, PhD University of Washington, 1992 (Thesis topic: Borehole paleothermometry inverse methods.)

## **Postdoctoral Scholars**

- Alison Banwell, 2012 – 2013 (now a Fellow at Scott Polar Research Institute, Cambridge, UK)
- Justin Burton 2010 – 2013 (now a professor at Emory University, shared mentoring with Prof. Sidney Nagel, Physics Department)
- Mac Cathles, 2012 – 2013 (now a Miller Fellow at U. Michigan)
- Jason Amundson, 2010-2011 (now on faculty of U. Alaska SE)
- Jeremy Bassis, 2006-2009 (now on faculty of U. Michigan)

## **Field Experience**

- 13 field seasons in Antarctica (Ross Ice Shelf, Siple Coast Ice Streams, Icebergs of the Ross Sea, Meltponds of the McMurdo Ice Shelf)

## Editorships

- Co-Chief Scientific Editor, *Annals of Glaciology*, No. 66, Themes on Glaciers in a Warming Climate, Beijing, China, 2013.
- Associate Scientific Editor, *Annals of Glaciology*, No. 60, Themes on Ice/Ocean Interaction, La Jolla, California, USA, 2011.
- Co-Chief Scientific Editor, *Annals of Glaciology*, No. 58, Themes on Snow, Ice and Humanity in a Changing Climate, Sapporo, Japan, 2010.
- Associate Scientific Editor, *Annals of Glaciology*, No. 53, IGS symposium on Snow and Avalanches, Manali, India, 2009.
- Chief Editor, *Annals of Glaciology*, Vol. 40, IGS symposium on Ice and Water Interactions, 2004.
- Chief Editor, *Journal of Glaciology*, Vols. 37 – 43, 1991 – 1998.
- Associate Scientific Editor, *Journal of Glaciology*, Vol. 36, 1990.
- Chief Editor, *Annals of Glaciology*, Vol. 14, IGS symposium on Ice and Climate, 1990.

## Scientific Community Activities

- President, International Glaciological Society (IGS), 2011-2017.
- Committee of Visitors, Office of Polar Programs (Arctic Program), National Science Foundation, 2013.
- GLISN (Greenland Ice Sheet Seismic Network) board of advisors, 2010-2012.
- IRIS/PASSCAL (Program for Array Seismic Studies of Continental Lithosphere) Instrument Center Standing Committee, 2009-2012.
- Polar Icebreakers in a Changing World: an Assessment of U.S. Needs, National Research Council, 2005-2006.
- Committee of Advisors, Office of Polar Programs, National Science Foundation, 1999-2002.

## Most Recent Research Grants

- PI: NSF 1443126 “Impact of Supraglacial Lakes on Ice-Shelf Stability”, 2015-2017.
- PI: NSF 0907834 “Model Studies of Surface Meltwater Lakes of the Greenland Ice Sheet” 2009 – 2012.
- PI: NSF ANT0944248 “Antarctic Surface Melting Processes and Models” 2010-2013.
- PI: NSF ANT 0944193 “Disintegration Processes of Ice Shelves” 2010-2013. Prof. Wendy Zhang, U. Chicago Physics Department is co-PI.

## Publications in Review or in Advance Stage of Preparation

Macdonald, G., A. F. Banwell, and D. R. **MacAyeal**, submitted. Seasonal evolution of supraglacial lakes on a floating ice tongue, Petermann Glacier, Greenland. *Annals of Glaciology*.

## Publications Since 2010 (20 out of 120 total)

Banwell, A. F., I. C. Willis, R. Goodsell, G. J. Macdonald, D. Mayer, A. Powell and D. R. **MacAyeal**, 2017. Ice-Shelf Calving and Rifting][Calving and Rifting on McM Ice Shelf, Antarctica. *Annals of Glaciology*, 75, in press.

Banwell, A. F., and D. R. **MacAyeal**, 2015. Ice-shelf fracture due to viscoelastic flexure stress induced by fill/drain cycles of supraglacial lakes, *Antarctic Science*, doi:10.1017/S0954102015000292.

**MacAyeal**, D. R., O. V. Sergienko and A. F. Banwell, 2015. A model of viscoelastic ice-shelf flexure, *Journal of Glaciology*, 61(228), doi: 10.3189/2015JoG14J169.

**MacAyeal**, D. R., Y. Wang and E. A. Okal, 2015. Ambient seismic, hydroacoustic and flexural-gravity wave noise on a tabular iceberg, *Journal of Geophysical Research Earth Surf.*, 120, 200–211, doi: 10.1002/2014JF003250.

Brunt, K. M. and **D. R. MacAyeal**, 2014. Tidal modulation of ice-shelf flow: a viscous model of the Ross Ice Shelf, *Journal of Glaciology*, 60(221), 500-508.

Cathles, L. M., D. S. Abbot and **D. R. MacAyeal**, 2014. Intra-surface radiative transfer limits the geographic extent of snow penitents on horizontal snow fields, *Journal of Glaciology*, 60(219), 147-154.

Banwell, A. F., M. Cabellero, N. S. Arnold, N. F. Glasser, M. L. Cathles and **D. R. MacAyeal**, 2014. Supraglacial lakes on the Larsen B ice shelf, Antarctica, and at Paakitsoq, Greenland: a comparative study, *Annals of Glaciology*, 55(66), doi: 10.3189/2014AoG66A049

Banwell, A. F., **D. R. MacAyeal**, and O. V. Sergienko, 2013. Break-up of the Larsen B Ice Shelf triggered by chain-reaction drainage of supraglacial lakes, *Geophysical Research Letters*, 40, doi:10.1002/2013GL057694. See also Research Highlight in *Nature*: <http://www.nature.com/nature/journal/v503/n7477/full/503441d.html>

Darnell, K., L. M. Cathles, J. M. Amundson, D. S. Abbot, and **D. R. MacAyeal**, 2013. The morphology of supraglacial lake ogives, *Journal of Glaciology*, 59(215), 533-544.

Scambos, T. A., R. Ross, T. Haran, R. Bauer, D. G. Ainley, K.-W. Seo, M. de Keyser, A. Behar and **D. R. MacAyeal**, 2013. A camera and multi-sensor automated station design for polar physical and biological systems monitoring: AMIGOS, *Journal of Glaciology*, 59 (214), 303-314.

**MacAyeal**, **D. R.**, and O. V. Sergienko, 2012. The flexural dynamics of melting ice shelves, *Ann. Glaciol.*, 54(63), 1-10.

- LaBarbera, C. H., and **D. R. MacAyeal**, 2011. Traveling supraglacial lakes on George VI Ice Shelf, Antarctica, *Geophys. Res. Lett.*, 38, L24501, doi:10.1029/2011GL049970.
- Freed-Brown, J., W. W. Zhang, J. M. Amundson and **D. R. MacAyeal**, 2012. Blocking a wave: frequency band gaps in ice shelves with periodic crevasses, *Ann. Glaciol.*, 54(60), 85-89.
- MacAyeal, D. R.**, J. Freed-Brown, W. W. Zhang and J. M. Amundson, 2012. The influence of ice mélange on fjord seiches, *Ann. Glaciol.*, 54(60), 45-49.
- Burton, J. C., J. M. Amundson, D. S. Abbot, A. Boghosian, L. M. Cathles, S. Correa-Legis, K. N. Darnell, N. Guttenberg, D. M. Holland, and **D. R. MacAyeal**, 2012. Laboratory investigations of iceberg-capsize dynamics, energy dissipation and tsunamigenesis. *J. Geophys. Res.*, F01007, doi:10.1029/2011JF002055.
- Leonard, K. C., L.-B. Tremblay, J. E. Thom and **D. R. MacAyeal**, 2012. Drifting snow threshold measurements near McMurdo Station, Antarctica: a sensor comparison study, *Cold Regions Science and Technology*, 70, 71-80.
- Brunt, K. M., E. A. Okal and **D. R. MacAyeal**. 2011. Ice-shelf calving triggered by the Honshu earthquake and tsunami, March 2011, *J. Glaciol.*, 57(205), 785-788.
- Guttenberg, N., D. S. Abbot, J. M. Amundson, J. C. Burton, L. M. Cathles, **D. R. MacAyeal** and W. W. Zhang. 2011. A computational investigation of iceberg capsize as a driver of explosive ice-shelf disintegration. *Ann. Glaciol.*, 52(59), 51-59.
- Cathles, L. M., D. S. Abbot, J. N. Bassis and **D. R. MacAyeal**, in press. Modeling the evolution of surface ablation features. *Ann. of Glaciol.*, 59.
- MacAyeal, D. R.**, D. S. Abbot and O. V. Sergienko. 2011. Iceberg capsize tsunamigenesis. *Ann. Glaciol.*, 52(58), 51-56. See News and Views in 6 April, 2011, issue of *Nature*.

## **Publications 2000 – 2010 (37 total)**

- Bromirski, P. D., O. V. Sergienko and **D. R. MacAyeal**, 2010. Transoceanic Infragravity Waves Impacting Antarctic Ice-Shelves. *Geophysical Research Letters*, 37, L02502, doi: 10.1029/2009/GL041488.
- Martin, S., R. Drucker, R. C. Aster, F. J. Davey, E. A. Okal, T. Scambos and **D. R. MacAyeal**, 2010. Kinematic and seismic analysis of giant tabular iceberg breakup. *Journal of Geophysical Research*, 115, doi:10.1029/2009JB006700, in press.
- Brunt, K. M., M. A. King, H. A. Fricker and **D. R. MacAyeal**, 2010. Flow of the Ross Ice Shelf, Antarctica, is modulated by ocean tide. *Journal of Glaciology*, 56 (195), 157-161.
- Sergienko, O. V., R. A. Bindshadler and **D. R. MacAyeal**, 2009. Stick/Slip behavior of ice streams: Modeling investigations. *Annals of Glaciology*, 50(52), 87-94.
- Cathles, L. M., E. A. Okal and **D. R. MacAyeal**, 2009. Sea-swell arrival at the front of the Ross Ice Shelf, Antarctica, observed in a 2-year seismometer record. *Journal of Geophysical Research*, 114, F02015, doi:10.1029/2007JF000934.

- MacAyeal, D. R.**, E. A. Okal, R. C. Aster and J. N. Bassis, 2009. Seismic Observations of Glaciogenic Ocean Waves (Micro-Tsunamis) on Icebergs and Ice Shelves. *Journal of Glaciology*, **55**(190), 193-206.
- Sergienko, O. V., R. A. Bindschadler, P. L. Vornberger and **D. R. MacAyeal**, 2008. Ice stream basal conditions from block-wise surface data inversion and simple regression models of ice stream flow: Application for Bindschadler Ice Stream. *Journal of Geophysical Research*, **113**, F04010, doi:10.1029/2008JF001004.
- MacAyeal, D. R.**, E. A. Okal, R. C. Aster and J. N. Bassis, 2008. Seismic and hydroacoustic tremor generated by colliding icebergs. *Journal of Geophysical Research*, **113**, F03011, doi: 10.1029/2008JF001005.
- Arbic, B. K., J. X. Mitrovica, **D. R. MacAyeal** and G. A. Milne, 2008. On the factors behind large Labrador Sea tidal elevations during the last glacial cycle, and the potential implications for Heinrich events. *Paleoceanography*, **23**, PA3211, doi: 10.1029/2007PA001573.
- Sergienko, O. V., **D. R. MacAyeal** and J. E. Thom, 2007. Reconstruction of snow/firn thermal properties from observed temperature variation: Application to iceberg C16 (Ross Sea, Antarctica), 2004-2007. *Annals of Glaciology*, **49**, 91-95.
- Leonard, K. C., L.-Bruno Tremblay, **D. R. MacAyeal**, and S. S. Jacobs, 2008. Interactions of wind-transported snow with a rift in the Ross Ice Shelf, Antarctica, *Geophys. Res. Lett.*, **35**, L05501, doi:10.1029/2007GL033005.
- MacAyeal, D. R.**, M. H. Okal, J. E. Thom, K. M. Brunt, Y.-J. Kim and A. K. Bliss, 2008. Tabular iceberg collisions within the coastal regime. *Journal of Glaciology*, **54**(118), 371-386.
- Sergienko, O. V., **D. R. MacAyeal** and R. A. Bindschadler, 2007. Causes of sudden, short term changes in ice-stream surface elevation. *Geophysical Research Letters*, **34**, L22503, doi: 10.1029/2006GL027235.
- Okal, E. A. and **D. R. MacAyeal**, 2006. Seismic recording on drifting icebergs: Catching seismic waves, tsunamis and storms from Sumatra and elsewhere. *Seismological Research Letters*. **77**(6): 659-671.
- MacAyeal, D. R.**, E. A. Okal, R. C. Aster, *et al.*, 2006. Transoceanic wave propagation links iceberg calving margins of Antarctica with storms in tropics and Northern Hemisphere. *Geophysical Research Letters*, **33**(17): L17502
- Joughin, I., J. L. Bamber, T. Scambos, S. Tulaczyk, M. Fahnestock and **D. R. MacAyeal**, 2006. Integrating satellite observations with modeling: Basal shear stress of the Filchner-Ronne ice streams, Antarctica. *Philosophical Transactions of the Royal Society, A – Mathematical and Physical and Engineering Sciences*, **364**(1844): 1795-1814.
- Brunt K.M., O. Sergienko and **D. R. MacAyeal**, 2006. Observations of unusual fast-ice conditions in the southwest Ross Sea, Antarctica: Preliminary analysis of iceberg and storminess effects. *Annals of Glaciology*, **44**, 183-18.
- Committee on the Assessment of U. S. Coast Guard Polar Icebreaker Roles and Future Needs, National Research Council (including **D. R. MacAyeal**), 2006. *Polar Icebreakers in a Changing World: An Assessment of U. S. Needs*. The National Academies Press.

- Sergienko, O. V., and **D. R. MacAyeal**, 2005. Surface melting on Larsen Ice Shelf, Antarctica. *Annals of Glaciology*, 40: 215-218.
- Fricker, H. A., J. N. Bassis, B. Minster and **D. R. MacAyeal**, 2005. ICESat's new perspective on ice shelf rifts: The vertical dimension. *Geophysical Research Letters*, 32(23), L23S08.
- Parizek, B. R., R. B. Alley and **D. R. MacAyeal**, 2005. The PSU/UofC finite-element thermomechanical flowline model of ice-sheet evolution. *Cold Regions Science and Technology*, 42(2): 145-168.
- Scambos, T., O. Sergienko, A. Sargent, **D. R. MacAyeal** and J. Fastook, 2005. ICESat profiles of tabular iceberg margins and iceberg breakup at low latitudes. *Geophysical Research Letters*, 32: L23S09.
- Joughin, I., and **D. R. MacAyeal**, 2005. Calving of large tabular icebergs from ice shelf rift systems. *Geophysical Research Letters*, 32(2): L02501.
- Joughin, I., S. Tulaczyk and **D. R. MacAyeal**, 2004. Melting and freezing beneath the Ross ice streams, Antarctica. *Journal of Glaciology*, 50(168):96-108.
- Arbic, B. K., **D. R. MacAyeal**, J. X. Mitrovica, *et al.*, 2004. Paleoclimate – Ocean tides and Heinrich events. *Nature*, 432(7016), 460.
- Joughin, I., **D. R. MacAyeal** and S. Tulaczyk, 2004. Basal shear stress of the Ross ice streams from control method inversions. *Journal of Geophysical Research-Solid Earth*, 109(B9): B09405.
- MacAyeal, D. R.**, T. A. Scambos, C. L. Hulbe, *et al.*, 2003. Catastrophic ice-shelf break-up by an ice-shelf-fragment-capsize mechanism. *Journal of Glaciology*, 49(164), 22-36.
- Hulbe, C. L., **D. R. MacAyeal**, G. H. Denton, *et al.*, 2004. Catastrophic ice shelf breakup as the source of Heinrich event icebergs. *Paleoceanography*, 19(1): PA1004.
- Schmeltz, M., E. Rignot, T. K. Dupont and **D. R. MacAyeal**, 2002. Sensitivity of Pine Island Glacier, West Antarctica, to changes in ice-shelf and basal conditions: a model study. *Journal of Glaciology*, 48(163): 552-558.
- MacClune, K. L., A. G. Fountain, J. S. Kargel and **D. R. MacAyeal**, 2003. Glaciers of the McMurdo dry valleys: Terrestrial analog for Martian polar sublimation. *Journal of Geophysical Research-Planets*, 108(E4), 5031.
- Cutler, P. I., D. M. Mickelson, P. M. Colgan, **D. R. MacAyeal** and B. R. Parizek, 2001 Influence of the Great Lakes on the dynamics of the Southern Laurentide ice sheet: Numerical experiments. *Geology*, 29(11): 1039-1042.
- E. Rignot, D.G. Vaughan, M. Schmeltz, T.K. Dupont and **D.R. MacAyeal**, 2001. Acceleration of Pine Island and Thwaites Glaciers, West Antarctica. *Annals of Glaciology*, 34, 189-194.
- Schmeltz, M., E. Rignot and **D. R. MacAyeal**, 2001. Ephemeral grounding as a signal of ice-shelf change. *Journal of Glaciology*, 47(156), 71-77.
- Schmeltz, M., E. Rignot and **D.R. MacAyeal**, 2001. Tidal flexure along ice-sheets margins: Comparison of InSAR with an elastic plate model. *Annals of Glaciology*, 34, 202-208.

- Joughin, I., M. Fahnestock, **D. R. MacAyeal**, J. L. Bamber and P. Gogineni, 2001. Observation and analysis of ice flow in the largest Greenland ice stream. *Journal of Geophysical Research*, 106(D24), 34021-342001.
- Cutler, P. M., **D. R. MacAyeal**, D. M. Mickelson, et al., 2000. A numerical investigation of ice-lobe-permafrost interaction around the southern Laurentide ice sheet. *Journal of Glaciology*, 46(153):311-325.
- Rignot, E., L. Padman, **D. R. MacAyeal** and M. Schmeltz, 2000. Observation of ocean tides below the Filchner and Ronne Ice Shelves, Antarctica, using synthetic aperture radar interferometry: Comparison with tide model predictions. *Journal of Geophysical Research—Oceans*, 105(C8), 19615-19630.

## **Publications Prior to 2000 (63 total)**

- Lazzara, M.A., K.C. Jezek, T.A. Scambos, **D.R. MacAyeal** and C.J. van der Veen, 1999. On the Calving of Icebergs from the Ross Ice Shelf. *Polar Geography*, 23(3), 201-212.
- Hulbe, C. L. and **D. R. MacAyeal**, 1999. A new numerical model of coupled inland ice sheet, ice stream and ice shelf flow and its application to the West Antarctic Ice Sheet. *Journal of Geophysical Research*, 104 (B11), 349-366.
- MacAyeal, D. R.**, E. Rignot and C. L. Hulbe, 1998. Ice-shelf dynamics near the front of Filchner-Ronne Ice Shelf, Antarctica, revealed by SAR interferometry: model/interferogram comparison. *Journal of Glaciology*, 44, 419-428.
- Rignot, E. and **D. R. MacAyeal**, 1998. Ice-shelf dynamics near the front of Filchner-Ronne Ice Shelf, Antarctica, revealed by SAR interferometry. *Journal of Glaciology*, 44, 405-418.
- Hulbe, C. L., E. Rignot and **D. R. MacAyeal**, 1998. Comparison of ice-shelf creep flow simulations with ice-front motion of Filchner-Ronne Ice Shelf, Antarctica, detected by SAR interferometry. *Annals of Glaciology*, 27, 182-186.
- Licciardi, J. M., P. U. Clark, J. W. Jenson and **D. R. MacAyeal**, 1998. Deglaciation of a soft-bedded Laurentide Ice Sheet. *Quaternary Science Reviews*, 17, 427-448.
- Rommelaere, V. and **D. R. MacAyeal**, 1997. Large-scale rheology of the Ross Ice Shelf, Antarctica, computed by a control method. *Annals of Glaciology*, 24, 43-48.
- MacAyeal, D. R.**, V. Rommelaere, P. Huybrechts, C. L. Hulbe, J. Determann, and C. Ritz, 1996. An Ice-Shelf Model Test Based on the Ross Ice Shelf. *Annals of Glaciology*, 23, 46-51.
- Clark, P. U., J. M. Licciardi, **D. R. MacAyeal** and J. W. Jenson 1997. Numerical reconstruction of a soft-bedded Laurentide Ice Sheet during the last glacial maximum: Reply. *Geology*, 25, 380-381.

- Clark, P. U., J. M. Licciardi, **D. R. MacAyeal** and J. W. Jenson, 1996. Numerical reconstruction of a soft-bedded Laurentide Ice Sheet during the last glacial maximum. *Geology*, 23, 679-682.
- Jenson, J. W., **D. R. MacAyeal**, P. U. Clark, C. Ho and J. C. Vela, 1996. Numerical modeling of subglacial sediment deformation: Implications for the behavior of the Lake Michigan Lobe, Laurentide Ice Sheet. *Journal of Geophysical Research*, 101, 8717-8728.
- Huybrechts, P., T. Payne, and 14 others (incl. **D. R. MacAyeal**), 1996. The EISMINT benchmarks for testing ice-sheet models. *Annals of Glaciology*, 23, 1-12.
- Greve, R. and **D. R. MacAyeal**, 1996. Dynamic/thermodynamic simulations of Laurentide ice-sheet instability. *Annals of Glaciology*, 23, 328-335.
- MacAyeal, D. R.**, 1995. Challenging an ice-core paleothermometer (Perspectives). *Science*, 270(5235), 444-445.
- Jenson, J. W., P. U. Clark, **D. R. MacAyeal**, C. L. Ho and J. C. Vela, 1995. Numerical modelling of advective transport of saturated deforming sediment beneath the Lake Michigan Lobe, Laurentide Ice Sheet. *Geomorphology*, 14, 157-166.
- MacAyeal, D. R.**, R. A. Bindshadler and T. A. Scambos, 1995. Basal friction of ice stream E, West Antarctica. *Journal of Glaciology*, 41(138), 247-262.
- Alley, R. B., and **D. R. MacAyeal**, 1994. Ice-rafted debris associated with binge/purge oscillations of the Laurentide ice sheet. *Paleoceanography*, 9, 503-511.
- Lindstrom, D. R., and **D. R. MacAyeal**, 1993. Death of an ice sheet. *Nature*, 365, 214-215.
- MacAyeal, D. R.**, 1993. A low-order model of the Heinrich Event cycle. *Paleoceanography*, 8, 767-774.
- MacAyeal, D. R.**, 1993. Binge/Purge oscillations of the Laurentide Ice Sheet as a cause of the North Atlantic's Heinrich Events. *Paleoceanography*, 8, 775-784.
- MacAyeal, D. R.**, J. Firestone and E. Waddington, 1993. Paleothermometry Redux. *Journal of Glaciology*, 39, 423-431.
- MacAyeal, D. R.**, 1993. A tutorial on the use of control methods in ice sheet modelling. *Journal of Glaciology*, 39, 91-98.
- Barcilon, V., and **D. R. MacAyeal**, 1993. Steady flow of a viscous ice stream across a no-slip/free-slip transition at the bed. *Journal of Glaciology*, 39, 167-185.
- MacAyeal, D. R.**, 1992. Irregular oscillations of the West Antarctic ice sheet. *Nature*, 359, 29-32.

- MacAyeal, D. R.**, 1992. The basal stress distribution of ice stream E, Antarctica, inferred by control methods. *Journal of Geophysical Research*, 97(B1), 595-603.
- MacAyeal, D. R.**, J. Firestone and E. Waddington, 1991. Paleothermometry by control methods. *Journal of Glaciology*, 37(127), 326-338.
- MacAyeal, D. R.**, and D. R. Lindstrom, 1990. Effects of glaciation on Methane hydrate stability. *Annals of Glaciology*, 14, 183-185.
- Bindschadler, R. A., E. P. Roberts and **D. R. MacAyeal**, 1989. Distribution of net mass balance in vicinity of Crary Ice Rise, Antarctica. *Journal of Glaciology*, 35(121), 370-377.
- MacAyeal, D. R.**, 1989. Ice-shelf response to ice-stream discharge fluctuations: III. The Ross Ice Shelf. *Journal of Glaciology*, 35(119), 38-42.
- Lindstrom, D. R. and **D. R. MacAyeal**, 1989. Scandinavian, Siberian and Arctic Ocean glaciation: Effect of Holocene atmospheric CO<sub>2</sub> variations. *Science*, 245, 628-631.
- MacAyeal, D. R.**, 1989. Large-scale ice flow over a viscous basal sediment: Theory and application to ice stream B, Antarctica. *Journal of Geophysical Research*, 94(B4), 4071-4088.
- Lange, M. A. and **D. R. MacAyeal**, 1989. Numerical models of ice-shelf flow: Ideal/real. *Annals of Glaciology*, 12, 97-103.
- Lange, M. A. and **D. R. MacAyeal**, 1988. Numerical models of idealized ice shelf flow. In *Numerical Methods in Geomechanics*, G. Swoboda, ed., A. A. Balkema Press, Rotterdam, 713-717.
- Lange, M. A. and **D. R. MacAyeal**, 1988. Numerical models of steady-state thickness and basal ice configurations of the central Ronne Ice Shelf. *Annals of Glaciology*, 11, 64-70.
- MacAyeal, D. R.**, R. A. Bindschadler, K. C. Jezek and S. Shabtaie, 1988. Can relict crevasse plumes on Antarctic ice shelves reveal a history of ice-stream fluctuation? *Annals of Glaciology*, 11, 77-82.
- Bindschadler, R. A., P. L. Vornberger, S. N. Stephenson, E. P. Roberts, S. Shabtaie and **D. R. MacAyeal**, 1988. Ice shelf flow at the boundary of Crary Ice Rise. *Annals of Glaciology*, 11, 8-13.
- Shabtaie, S., C. R. Bentley, R. A. Bindschadler and **D. R. MacAyeal**, 1988. Mass balance studies of ice streams A, B and C, and possible surging behavior of ice stream B. *Annals of Glaciology*, 11, 137-149.
- MacAyeal, D. R.**, and V. Barcilon, 1988. Ice-shelf response to ice-stream discharge fluctuation: I. Unconfined ice tongues. *Journal of Glaciology*, 34(116), 121-127.

**MacAyeal, D. R.**, and M. A. Lange, 1988. Ice-shelf response to ice-stream discharge fluctuation: II. Ideal rectangular ice shelf. *Journal of Glaciology*, 34(116), 128-35.

Lindstrom, D. R., and **D. R. MacAyeal**, 1987. Environmental Constraints on West Antarctic Ice Sheet Formation. *Journal of Glaciology*, 33(115), 1 - 11.

**MacAyeal, D. R.**, R. A. Bindschadler, S. Shabtaie, S. Stephenson, and C. R. Bentley, 1987. Force, mass and energy budgets of the Crary Ice Rise complex, Antarctica. *Journal of Glaciology*, 33(114), 218 - 230. (See also correction, 1989, *Journal of Glaciology*, pp. 151-152.)

Bindschadler, R. A., S. N. Stephenson, **D. R. MacAyeal** and S. Shabtaie, 1987. Ice dynamics at the mouth of Ice Stream B, Antarctica. *Journal of Geophysical Research*, 92(B9), 8885 - 8894.

**MacAyeal, D. R.**, 1987. Ice-Shelf back pressure: Form drag vs. dynamic drag. In *Dynamics of the West Antarctic Ice Sheet*, C. J. van der Veen and J. Oerlemans, eds., D. Reidel, Dordrecht, 141-160.

Bindschadler, R. A., **D. R. MacAyeal** and S. N. Stephenson, 1987. Ice stream-Ice shelf interaction in West Antarctica. In *Dynamics of the West Antarctic Ice Sheet*, C. J. van der Veen and J. Oerlemans, eds., D. Reidel, Dordrecht, 161-180.

Jacobs, S. S., **D. R. MacAyeal** and J. L. Ardai, Jr., 1986. On the recent advance of the Ross Ice Shelf, Antarctica. *Journal of Glaciology*, 32(112), 464-474.

**MacAyeal, D. R.**, and G. Holdsworth, 1986. An investigation of low-stress ice rheology on the Ward-Hunt Ice Shelf. *Journal of Geophysical Research*, 91(B6), 6347-6358.

**MacAyeal, D. R.**, S. Shabtaie, C. R. Bentley and S. King, 1986. Formulation of Ice Shelf dynamic boundary conditions in terms of a Coulomb Rheology. *Journal of Geophysical Research*, 91(B8), 8177-8191.

Lange, M. A., and **D. R. MacAyeal**, 1986. Numerical models of the Filchner-Ronne Ice Shelf: An assessment of re-interpreted ice thickness distributions. *Journal of Geophysical Research*, 91(B10), 10457-10462.

Lindstrom, D. R., and **D. R. MacAyeal**, 1986. Paleoclimatic constraints on the maintenance of possible ice-shelf cover in the Norwegian and Greenland Seas, *Paleoceanography*, 1(3), 313-337.

**MacAyeal, D. R.**, 1985. Evolution of tidally triggered meltwater plumes below ice shelves. In *Oceanology of the Antarctic Continental Shelves*. S. Jacobs, ed., *Antarctic Research Series*, 43, 109-132, AGU, Washington, DC.

**MacAyeal, D. R.**, 1985. Tidal rectification below the Ross Ice Shelf, Antarctica. *In Oceanology of the Antarctic Continental Shelves*. S. Jacobs, ed., *Antarctic Research Series*, 43, 133-144, AGU, Washington, DC)

**MacAyeal, D. R.**, 1985. Optimal measurement of ice-sheet deformation from surface-marker arrays. *Journal of Glaciology*, 31(107), 54-59.

**MacAyeal, D. R.**, and R. H. Thomas, 1985. The effects of basal melting on the present flow of the Ross Ice Shelf. *Journal of Glaciology*, 32(110), 72-86.

Thomas, R. H., **D. R. MacAyeal**, D. H. Eilers and D. R. Gaylord, 1984. Glaciological studies on the Ross Ice Shelf, Antarctica, 1973-1978. *In The Ross Ice Shelf: Glaciology and Geophysics*. C. R. Bentley and D. E. Hayes, eds., *Antarctic Research Series*, 42, 21-53, AGU, Washington DC.

**MacAyeal, D. R.**, 1984. Numerical simulations of the Ross Sea Tides. *Journal of Geophysical Research*, 89(C1), 607-615.

**MacAyeal, D. R.**, 1984. Thermohaline circulation below the Ross Ice Shelf: a consequence of tidally induced vertical mixing and basal melting. *Journal of Geophysical Research*, 89(C1), 597-606.

**MacAyeal, D. R.**, and R. H. Thomas, 1982. Numerical modeling of ice shelf motion. *Annals of Glaciology*, 3, 189-193.

Thomas, R. H., and **D. R. MacAyeal**, 1982. Derived characteristics of the Ross Ice Shelf, Antarctica. *Journal of Glaciology*, 28(100), 397-412.

**MacAyeal, D. R.**, and R. H. Thomas, 1980. Ice-shelf grounding: Ice and bedrock temperature changes. *Journal of Glaciology*, 25(93), 397-400.

Thomas, R. H., **D. R. MacAyeal**, C. R. Bentley and J. L. Clapp, 1980. The creep of ice, geothermal heat flow, and Roosevelt Island. *Journal of Glaciology*, 25(91), 47-60.

**MacAyeal, D. R.**, 1979. A catastrophe model of the paleoclimate. *Journal of Glaciology*, 24(90), 245-257.

**MacAyeal, D. R.**, and R. H. Thomas, 1979. Ross Ice Shelf temperatures support a history of ice-shelf thickening. *Nature*, 282(5740), 703-705.

Williams, A., and **D. R. MacAyeal**, 1979. Acoustic reflection from a sea bottom with linearly increasing sound speed. *Journal of the Acoustical Society of America*, 66(6), 1836-1841.

## **Theses, Select Abstracts and Unpublished Lecture Notes**

**MacAyeal, D. R.**, 1997. *Lessons in Ice Sheet Modeling*. (428 pages, available on website)

**MacAyeal, D. R.**, and V. Barcilon, 1998. *Finding Connection between Data and Theory: Applications in Geophysical Sciences*. (227 pages, available on website)

**MacAyeal, D. R.**, 1983. *Rectified Tidal Currents and Tidal-Mixing Fronts: Controls on the Ross-Ice Shelf Flow and Mass Balance*. PhD Dissertation, Princeton University, 287 pp., June 1983.

**MacAyeal, D. R.**, 1979. *Transient Temperature-Depth Profiles of the Ross Ice Shelf*. MS Thesis, University of Maine at Orono, May 1979.

**MacAyeal, D. R.**, 1983. Preventing a collapse of the West Antarctic Ice Sheet: Civil Engineering on a continental scale (abstract only). *Annals of Glaciology*, 4, 302.