

CURRICULUM VITAE
Dr. Michael A. Rawlins

Extension Associate Professor, Department of Geosciences
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Professional History

Education

- Ph.D., 2006 University of New Hampshire, Durham. Earth and Environmental Sciences.
M.S., 2001 University of Delaware, Newark. Geography.
B.S., 1996 University of Delaware, Newark. Environmental Science, Minor: Mathematics.

Professional Experience

- 2016– **Extension Associate Professor**, Department of Geosciences, University of Massachusetts, Amherst, MA.
2010–2016 **Extension Assistant Professor**, Department of Geosciences, University of Massachusetts, Amherst, MA.
2009–2010 **Visiting Assistant Research Professor**, Department of Earth Sciences, Dartmouth College, Hanover, NH.
2007–2009 **NASA Postdoctoral Fellow**, Water and Carbon Cycles Group, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA.
2000–2007 **Research Scientist**, Complex Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH.
1999–2000 **Scientist**, Raytheon ITSS, Marshall Space Flight Center, Huntsville, AL.

Research

Refereed Publications

- Rawlins, M. A.**, Bradley, R. S., Diaz, H. F., Kimball, J. S., and Robinson, D. A., 2016. Future Decreases in Freezing Days Across North America. *Journal of Climate*, 29(19), doi: 10.1175/JCLI-D-15-0802.1
- Dass, P., **Rawlins, M. A.**, Kimball, J. S., and Kim, Y, 2016. Environmental controls on the increasing GPP of terrestrial vegetation across northern Eurasia, *Biogeosciences*, 13(1), 45-62, doi:10.5194/bg-13-45-2016

- Rawlins, M. A.**, McGuire, A. D., Kimball, J. S., Dass, P., Lawrence, D., Burke, E., Chen, X., Delire, C., Koven, C., MacDougall, A., Peng, S., Rinke, A., Saito, K., Zhang, W., Alkama, R., Bohn, T. J., Ciais, P., Decharme, B., Gouttevin, I., Hajima, T., Ji, D., Krinner, G., Lettenmaier, D. P., Miller, P., Moore, J. C., Smith, B., and Sueyoshi, T., 2015. Assessment of model estimates of land-atmosphere CO₂ exchange across northern Eurasia, *Biogeosciences*, 12, 4385-4405, doi:10.5194/bg-12-4385-2015
- Fan, F., Bradley, R. S., and **Rawlins, M. A.**, 2015. Climate change in the Northeast United States: an analysis of the NARCCAP multimodel simulations. *Journal of Geophysical Research*, 120, <http://dx.doi.org/10.1002/2015JD023073>
- Yi, Y., Kimball, J. S., **Rawlins, M. A.**, Moghaddam, M., and Euskirchen, E. S., 2015: The role of snow cover affecting boreal-arctic soil freeze–thaw and carbon dynamics, *Biogeosciences*, 12, 5811-5829, doi:10.5194/bg-12-5811-2015.
- Bohn, T. J., Melton, J. R., Ito, A., Kleinen, T., Spahni, R., Stocker, B. D., Zhang, B., Zhu, X., Schroeder, R., Glagolev, M. V., Maksyutov, S., Brovkin, V., Chen, G., Denisov, S. N., Eliseev, A. V., Gallego-Sala, A., McDonald, K. C., **Rawlins, M.A.**, Riley, W. J., Subin, Z. M., Tian, H., Zhuang, Q., and Kaplan, J. O., 2015. WETCHIMP-WSL: intercomparison of wetland methane emissions models over West Siberia, *Biogeosciences*, 12, 3321-3349, doi:10.5194/bg-12-3321-2015
- Fan, F., R. S. Bradley, **M. A. Rawlins**, 2014. Climate change in the northeastern US: regional climate model validation and climate change projections, *Climate Dynamics*, 1-17, doi:10.1007/s00382-014-2198-1
- Rawlins, M. A.**, D. J. Nicolsky, K. C. McDonald, V. E. Romanovsky, 2013. Simulating soil freeze/thaw dynamics with an improved pan-Arctic water balance model, *Journal of Advances in Modeling Earth Systems*, doi:10.1002/jame.20045
- Ye, H., J. Cohen, **M. A. Rawlins**, 2013. Discrimination of Solid from Liquid Precipitation over Northern Eurasia Using Surface Atmospheric Conditions, *Journal of Hydrometeorology*, 14, 1345–1355, doi: <http://dx.doi.org/10.1175/JHM-D-12-0164.1>
- Rawlins, M. A.**, R. S. Bradley, H. F. Diaz, 2012. Assessment of regional climate model simulation estimates over the Northeast US, *Journal of Geophysical Research*, 117, D23112, doi:10.1029/2012JD018137
- Clilverd, H. M., D. M. White, A. C. Tidwell, **M. A. Rawlins**, 2011. The Sensitivity of Northern Groundwater Recharge to Climate Change: A Case Study in Northwest Alaska, *Journal of the American Water Resources Association*, 1-13. DOI: 10.1111/j.1752-1688.2011.00569.x
- Rawlins, M. A.**, M. Steele, M. M. Holland, J. C. Adam, J. E. Cherry, J. A. Francis, P. Y. Groisman, L. D. Hinzman, T. G. Huntington, D. L. Kane, J. S. Kimball, R. Kwok, R. B. Lammers, C. M. Lee, D. P. Lettenmaier, K. C. McDonald, E. Podest, J. W. Pundsack, B. Rudels, M. C. Serreze, A. Shiklomanov, O. Skagseth, T. J. Troy, C. J. Vörösmarty, M. Wensnahan, E. F. Wood, R. Woodgate, D. Yang, K. Zhang, T. Zhang, 2010. Analysis of the Arctic System for Freshwater Cycle Intensification: Observations and Expectations, *Journal of Climate*, 23, 5715–5737, doi:10.1175/2010JCLI3421.1

- Schroeder R., **M. A. Rawlins**, K. C. McDonald, E. Podest, R. Zimmermann, and M. Kueppers, 2009. Satellite microwave remote sensing of North Eurasian inundation dynamics: development of coarse-resolution products and comparison with high-resolution synthetic aperture radar data, *Environmental Research Letters*, 5, 015003 (7pp), doi: 10.1088/1748-9326/5/1/015003
- Rawlins, M. A.**, M. C. Serreze, R. Schroeder, X. Zhang, K. C. McDonald, 2009. Diagnosis of the Record Discharge of Arctic-Draining Eurasian Rivers in 2007, *Environmental Research Letters*, 4, 045011, doi: 10.1088/1748-9326/4/4/045011
- Rawlins, M. A.**, H. Ye, D. Yang, A. Shiklomanov, K. C. McDonald, 2009. Shifts in Seasonal Hydrology Across Eurasia: Emerging Trends and Water Cycle Linkages, *Journal of Geophysical Research*, 114, D18119, doi:10.1029/2009JD011747
- Rawlins, M. A.**, M. Steele, M. C. Serreze, C. J. Vörösmarty, W. Ermold, R. B. Lammers, K. C. McDonald, T. M. Pavelsky, A. Shiklomanov, and J. Zhang, 2009. Tracing Freshwater Anomalies through the Air-Land-Ocean System: A Case Study from the Mackenzie River Basin and the Beaufort Gyre. *Atmosphere-Ocean*, **47**(1), pp. 79–97, doi:10.3137/OC281.2009
- McGuire, A. D., J. Walsh, J. Kimball, J. Clein, S. Euskirchen, S. Drobot, U. Herzfeld, J. Maslanik, R. Lammers, **M. Rawlins**, C. Vorosmarty, T. Rupp, W. Wu, and M. Calef, 2008. The Western Arctic Linkage Experiment (WALE): Overview and synthesis. *Earth Interactions*, 12, paper 7, 13 pages, doi:10.1175/2008EI239.1
- Shiklomanov, A., R. B. Lammers, **M. A. Rawlins**, L. C. Smith, and T. M. Pavelsky, 2007. Temporal and spatial variations in maximum river discharge from a new Russian data set. *Journal of Geophysical Research*, 112, G04S53, doi:10.1029/2006JG000352
- Rawlins, M. A.**, M. Fahnestock, S. Frolking, and C. J. Vörösmarty, 2007. On the evaluation of snow water equivalent estimates over the terrestrial Arctic drainage basin. *Hydrological Processes*, 21(12), pp. 1616-1623, DOI: 10.1002/hyp.6724
- Rawlins, M. A.**, R. B. Lammers, S. Frolking, and C. J. Vörösmarty, 2006. Effects of uncertainty in climate inputs on simulated evapotranspiration and runoff in the western Arctic. *Earth Interactions*, 10(18), doi:10.1175/EI182.1
- Rawlins, M. A.**, C. J. Willmott, A. Shiklomanov, E. Linder, S. Frolking, R. B. Lammers, and C. J. Vörösmarty, 2006. Evaluation of trends in derived snowfall and rainfall across Eurasia and linkages with discharge to the Arctic Ocean. *Geophysical Research Letters*, 33, L07403, doi:10.1029/2005GL025231
- Rawlins, M. A.**, K. C. McDonald, S. Frolking, R. B. Lammers, M. Fahnestock, J. S. Kimball, and C. J. Vörösmarty, 2005. Remote sensing of snow thaw at the pan-Arctic scale using the SeaWinds scatterometer. *Journal of Hydrology*, 312(1–4), pp. 294–311
- Xiao, X., Z. Qingyuan, B. Stephen, **M. A. Rawlins**, and B. Moore III, 2004. Mapping snow cover in the pan-Arctic zone, using multi-year (1998–2001) images from optical VEGETATION sensor. *International Journal of Remote Sensing*, 25(24), 5731–5744

Rawlins, M. A., R. B. Lammers, S. Frolking, B. Fekete, and C. J. Vörösmarty, 2003. Simulating pan-Arctic runoff with a macro-scale terrestrial water balance model. *Hydrological Processes*, 17, 2521–2539

Rawlins, M. A. and C. J. Willmott, 2003. Winter air-temperature change across the terrestrial Arctic, 1961–1990. *Arctic, Antarctic and Alpine Research*, 35(4), 530–537

Flynn, L. E., G. J. Labow, R. A. Beach, **M. A. Rawlins**, and D. E. Flittner, 1996. Estimation of ozone with total ozone portable spectroradiometer instruments. I. Theoretical model and error analysis. *Applied Optics*, 35(30), 6076–6083

Labow, G. J., L. E. Flynn, **M. A. Rawlins**, R. A. Beach, C. A. Simmons, and C. M. Schubert, 1996. Estimation of ozone with total ozone portable spectroradiometer instruments. II. Practical operation and comparisons. *Applied Optics*, 35(30), 6084–6089

Books

Shiklomanov A., T. J. Bohn, D. P. Lettenmaier, R. Lammers, J. C. Adam, P. Romanov, and M. Rawlins, 2009. Interactions between Land Cover/Use Change and Hydrology in *Arctic Land Cover and Land Use Change in a Changing Climate*, G. Gutman; Reissell, Anni (Eds.). 1st Edition., 2011, XXIII, 306 p., Springer-Verlag, ISBN 978-90-481-9117-8.

Grants and Contracts

- Massachusetts Department of Transportation (UMass): Development of Pilot Extreme Flood Vulnerability Assessment Protocols Under Present and Future Climatic Conditions for Roadway Stream Crossing Structures within the Deerfield River Watershed, Massachusetts. PI: P. Sturdevant Rees, Co-I: S. Maybee, S. Jackson, **M. Rawlins**, B. Letcher. Total Budget: 969K, Performance Period: 07/14–12/16
- NASA Carbon Cycle Science Program (UMass): Synthesis and Integration of Recent Research Characterizing the Carbon Cycle of Northern Eurasia. PI: **M. Rawlins**, Co-I: D. Lettenmaier, K. McDonald. Total Budget: 546K, Performance Period: 08/11–08/14
- NASA NEWS (UC-Irvine/JPL): Terrestrial water storage changes and boreal drought under a warming climate: Investigation with multi-sensor satellite observations, in-situ data, and hydro-ecological process modeling. PI: I Velicogna. CO-I: K. McDonald, J. Kimball, **M. Rawlins**. Total Budget: 686K, Performance Period: 06/09–05/13
- NASA Fellowship (JPL): Microwave Remote Sensing of Seasonal Processes in Terrestrial Ecosystems. PI: **M. Rawlins**, Performance Period: 11/07–10/09

Conferences Presentations and Invited Talks

- American Geophysical Union, San Francisco, 15–19 December 2014 (Invited), “Recent Advances in Quantifying Hydrological Processes Linking Water, Carbon, and Energy Exports into Coastal Margins Along the Arctic Land-Sea Boundary”
- American Geophysical Union, San Francisco, 15–19 December 2014, “Assessment of Model Estimates of Land-Atmosphere CO₂ Exchange Across Northern Eurasia”

- Northern New England Chapter of the American Planners Association Annual Meeting 11–12 September, 2014 (Invited), “Plenary Keynote - Climate Change in the Northeast”
- University of Maryland Department of Geographical Sciences’ seminar series 27 February, 2014 (Invited), “Recent Trends and Potential Future Trajectories in Arctic Water and Carbon Cycles Under a Warming Climate”
- American Geophysical Union, San Francisco, 9–13 December 2013, “Changes in the carbon cycle of northern Eurasia simulated by process models”
- NASA Land-Cover and Land-Use Change Science Team Meeting, Rockville, Maryland, 2–4 April 2013, “Synthesis and Integration of Recent Research Characterizing the Carbon Cycle of Northern Eurasia”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 3–7 December 2012, “Comparison of Numerical Model Estimates of Carbon Fluxes Across Northern Eurasia”
- Water in a Changing Climate: The Science Workshop (Invited), Jet Propulsion Laboratory, Pasadena California, 26–28 June 2012, “Numerical Modeling of Water and Permafrost Dynamics Over the Terrestrial Arctic”
- NASA Land-Cover and Land-Use Change Science Team Meeting, Rockville, Maryland, 3–5 April 2012, “Synthesis and Integration of Recent Research Characterizing the Carbon Cycle of Northern Eurasia”
- Northeast Regional Space Grant Meeting (Invited), Portsmouth, New Hampshire, 2–4 June 2011, “Climate Change and Regional Hydrology Across the Northeast US: Evidence of Changes, Model Projections, and Remote Sensing Approaches”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 13–17 December 2010, “Projected changes in phenological indices for North America using NARCCAP data”
- State of the Arctic Conference, Miami, Florida, 16–19 March 2010, “Analysis of the Arctic System for Freshwater Cycle Intensification: Observations and Expectations”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 14–18 December 2009, “An Intensified Water Cycle? Trend Analysis of the Arctic System Freshwater Cycle: Observations and Expectations”
- Annual Meeting of the Association of American Geographers, Las Vegas, Nevada, 22–27 March 2009, “Emerging Trends in Seasonal Hydrology Across Northern Eurasia”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 15–19 December 2008, “Shifts in Seasonal Hydrology Across Northern Eurasia: Emerging Trends and Water Cycle Linkages”
- Annual Meeting of the Association of American Geographers, Boston, Massachusetts, 15–19 April, 2008, “Tracing Freshwater Anomalies through the Air-Land-Ocean System: A Case Study from the Mackenzie River Basin and the Beaufort Gyre”

- Annual Meeting of the American Geophysical Union, San Francisco, California, 10–14 December 2007, “An Intensified Arctic Water Cycle? Trend Analysis of the Arctic System Freshwater Cycle: Observations and Expectations”
- Workshop on Eurasian Hydroclimatology, International Arctic Research Center, University of Alaska-Fairbanks, November 12, 2007, (Invited) “Errors and Uncertainties In Arctic Precipitation Observations and Spatial Estimates”
- Arctic Research Consortium of the United States (ARCUS) 19th Annual Meeting and Arctic Forum 2007, Washington, D.C., 23–25 May, 2007 (Invited) “Precipitation Changes, Uncertainties, and Associated Impacts to the Arctic Environment”
- Division of Earth and Ocean Sciences, Nicholas School of the Environment (Invited), 2 April 2007, Duke University, (Invited) “Methods and Models for Understanding Arctic, Terrestrial Hydrology and Applications for Ecosystem Studies at Regional to Global Scales”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 11–15 December 2006 “Analysis of Arctic Hydrological Data for Signs of Water Cycle Intensification”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 8–12 December 2003 “Remote Sensing of pan-Arctic Snowpack Thaw Using the SeaWinds Scatterometer.”
- Annual Meeting of the American Geophysical Union, San Francisco, California, 6–10 December 2002 “Simulating pan-Arctic Runoff with a Macro-Scale Terrestrial Water Balance Model.”
- Circumpolar Active Layer Monitoring (CALM) Workshop (Invited), Lewes, Delaware, 10–15 November, 2002. “Estimating Active-Layer Thickness and Simulated Runoff across the pan-Arctic Drainage System.”
- Institute of Arctic and Alpine Research (INSTAAR) 32nd Annual Arctic Workshop, 14–16 March, 2002. “A Permafrost Water Balance Model for the Arctic: Model Runoff and Discharge Validation Sites.”
- Annual Meeting of the Association of American Geographers, Honolulu, Hawaii, 23–27 March, 1999, “Estimation of Arctic Climate Fields from Station Data.”

Awards/Honors

2015 University of Massachusetts Public Engagement Fellowship
 2009-2010 New Hampshire-NASA Space Grant Fellowship, Dartmouth College
 2008 New Generation of Polar Researchers (NGPR) Scholar
 2007–2009 NASA Postdoctoral Fellowship
 1995 NASA Summer Institute on Atmospheric and Hydrospheric Sciences

Service

- Member: Scoping Study, NASA Arctic-COLORS (Arctic-COastal Land Ocean interactions), 2015.
- Member: Science Definition Team, NASA Arctic Boreal Vulnerability Experiment (ABoVE), 2013–2014.
- Session Convener: Carbon Cycle Dynamics in the Arctic and Sub-Arctic Terrestrial and Peat Dominated Environments, American Geophysical Union Fall Meeting, 2014.
- Reviewer (journals): *Bulletin of the American Meteorological Society*, *Earth Interactions*, *Environmental Modelling & Software*, *Geophysical Research Letters*, *Hydrological Processes*, *International Journal of Climatology*, *Journal of Applied Meteorology and Climatology*, *Journal of Geophysical Research*, *Journal of Hydrology*, *Journal of Hydrometeorology*, *Nature Climate Change*, *Nature Geoscience*, *Ocean Modelling*.
- Reviewer (grant proposals): *NASA*, *NSF*, *National Sciences and Engineering Research Council of Canada*, *Netherlands Organization for Scientific Research*.
- Session Convener: Data and other cross-cutting issues for future polar research; International Polar Year (IPY) Oslo Science Conference, Oslo, Norway, June 8–12, 2010.
- Session Convener: Arctic Hydroclimatology; Association of American Geographers 2009 Annual Meeting. Las Vegas, Nevada, 22–27 March, 2009.

Outreach

[Record breaking warmth reported across the Northeast this fall](#), 22 News (WWLP), December 2, 2015

[Record high temperatures in Northeast, according UMass climate scientist](#), MassLive, December 2, 2015

[Massachusetts has more aggressive plan than new federal rule reducing power plants' greenhouse gas emissions](#), Daily Hampshire Gazette, August 6, 2015

[Scientists Too Pessimistic in Carbon Predictions](#), The Australian, July 29, 2015

[Northern Forests Falter in Combating Climate Change](#), Scientific American, July 28, 2015

[El Nino and New England Weather](#), WBZ News Radio 1030, July 23, 2015

[El Nino considered 85% likely through the winter](#), 22 News (WWLP), June 15, 2015

[Warmest May on Record](#), NBC Connecticut, June 1, 2015

[New England's epic winter gives way to unusually dry spring](#), Associated Press, May 30, 2015

[Climate Change in 2015](#), The Academic Minute, March 26, 2015

[Will A Snow Record-Shattering Winter Turn Into Spring Ice Jams?](#), New England Public Radio (WFCR), March 4, 2015

[UMass experts confirm regional cold records](#), The Greenfield Recorder, March 4, 2015

[February Sets Records For Cold Temperatures](#), Northeast Public Radio (WAMC), March 3, 2015

[Long time going: Cold, snowy February to be remembered](#), Worcester Telegram, March 3, 2015

[Record Cold Is An Anomaly, Not A Shift In Climate Change](#), Northeast Public Radio (WAMC), March 2, 2015

[February was coldest ever on record in Amherst, and elsewhere](#), Daily Hampshire Gazette, March 1, 2015

[Coldest February in 180 years in Western Mass](#), 22 News (WWLP), March 1, 2015

[Scientists consider engineering Earth's atmosphere](#), 22 News (WWLP), February 11, 2015

[2014 was planet's warmest year on record, but not in cooler-than-average Northeast](#), MassLive, January 16, 2015

[Globally, 2014 Was Warmest on Record, but Not in Northeast](#), University of Massachusetts News Release, January 16, 2015

[Is this warm weather an "Indian Summer?"](#), WWLP Springfield, September 29, 2014

[Connecting Point](#), WGBY, May 19, 2014

[What The Climate Impact Report Means For Western New England](#), New England Public Radio, WFCR, May 8, 2014

[Temps to increase even higher by the end of the century](#), WWLP Springfield, May 6, 2014

[Report on climate change shows a detailed picture that should not be ignored](#), Letter to the Editor - The Springfield Republican, April 16, 2014

[Possible El Nio conditions projected](#), WWLP Springfield, March 11, 2014

[Potential Impact of Climate Change on Western Mass](#), WGGB Springfield, January 14, 2014

[Climate change interview, WHMP radio Bill Newman show, Northampton MA](#), December 27, 2013

[Recent Nor'easter Was a Storm of Historic Proportions, Says UMass Amherst Climate Scientist](#), University of Massachusetts News Release, February 11, 2013

[UMass Amherst Climate Modelers See Possible Warmer, Wetter Northeast Winters by 2070, Says UMass Amherst Climate Scientist](#), University of Massachusetts News Release, December 12, 2012

[Connecting Point](#), WGBY, October 11, 2012 (interview begins at 01:45)

[How Arctic Melt Could Affect Weather in New England](#), New England Public Radio, WFCR, September 21, 2012, 2012

[A Warm Fall Could Extend Mosquito Season, Threat of Mosquito-bourne Illnesses](#), New England Public Radio, WFCR, September 14, 2012, 2012

[40 In The Morning](#), WGGB Springfield, July 5, 2012

[Monthly weather/climate segment](#), WGBH Radio, June 6, 2012

40 In The Morning, WGGB Springfield, June 4, 2012

Warmest spring ever for parts of New England, 22 News, WWLP Springfield, June 4, 2012

Spring Temperatures Among Warmest on Record, New England Public Radio, WFCR, June 4, 2012

UMass Climatologist, Connecting Point, WGBY, May 1, 2012

Weather and climate, WGBH Radio, May 1, 2012

Northeast Saw One of the Warmest, Least Snowy Winters on Record, University of Massachusetts News Release, March 6, 2012

Loving A Woolen-Free Winter, Beef Calves Come Earlier Than Usual, Hamilton-Wenham Patch, February 18, 2012

SNOW SHOWS UP: New accumulation might help January catch up to Taunton's yearly average, Taunton Daily Gazette, January 21, 2012

Region weathering unseasonable lack of snow, Boston Globe, January 3, 2012

Climatologist, Connecting Point, WGBY, November 8, 2011

Rare October Snow, New England Public Radio, WFCR, November 7, 2011

Historic October Snowstorm Will Go Down in Record Books Across Storm-Wearied Southern New England, University of Massachusetts News Release, November 1, 2011

Community Corner with Michael Rawlins, WAMC, Northeast Public Radio, September 8, 2011

Global Warming, WWLP Mass Appeal, April 22, 2011

As Spring Arrives, Massachusetts and Connecticut Bid Good Riddance to One Very Snowy, Cold Winter, University of Massachusetts News Release, March 21, 2011

Don't confuse climate with the weather, The Republican, March 20, 2011

Record snowfall could mean growing trend, The Massachusetts Daily Collegian, February 9, 2011

Breaking records for snowfall, The Greenfield Recorder, February 3, 2011

Arctic Fence Involved in Erratic Weather, WFCR, February 2, 2011

UMass Climatologist Says January Brought Record Snow Across Massachusetts, Southern New England, University of Massachusetts News Release, February 2, 2011

Arctic ice loss may boost cold, snow here, Daily Hampshire Gazette, January 27, 2011

Temperature Changes, WFCR January 6, 2011

UMass Transit encourages students, residents, to hop on for climate change, The Massachusetts Daily Collegian, November 29, 2010

Arctic Freshwater Cycle is Intensifying Consistent with Climate Warming, say UMass Amherst Researcher and International Team, University of Massachusetts News Release, June 24, 2010