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Professional Preparation

B.A. Mathematics, Summa cum laude, Fordham University, Bronx, NY, 1987

Appointments

<i>2011 – present</i>	<i>CIRES Senior Associate Scientist, Special Projects Lead, NSIDC, Boulder, CO</i>
<i>2010 – 2011</i>	<i>CIRES Associate Scientist III, Special Projects Lead, NSIDC, Boulder, CO</i>
<i>2006 – 2010</i>	<i>CIRES Associate Scientist III, Manager of Science Programmers, NSIDC, Boulder, CO</i>
<i>1997 – 2006</i>	<i>CIRES Associate Scientist III, Science Programmer, NSIDC, Boulder, CO</i>
<i>1993 – 1997</i>	<i>Science Programmer, NSIDC, Boulder, CO</i>
<i>1988 – 1993</i>	<i>Member of the Technical Staff, Logicon Strategic and Information Systems Division, Colorado Springs and Boulder, CO</i>
<i>1986</i>	<i>Research Associate, AT&T Bell Laboratories, Murray Hill, NJ</i>

Research Grants

<i>2021 – 2024</i>	<i>Snow melt detection using Calibrated Enhanced-Resolution Brightness Temperatures (CETB) and pixel-level variability statistics: Implications for snow water equivalent estimation, runoff timing, and mobility. US Army Research and Development Center.</i>
<i>2021 – 2021</i>	<i>Antarctic firn aquifers: Deepening understanding of hydrofracturing, instability and ice shelf collapse. NASA Cryospheric Research.</i>
<i>2021 – 2024</i>	<i>Improved Operational Sea Ice Products using Spatially Enhanced AMSR2 Data. NOAA Joint Polar Satellite System Proving Ground and Risk Reduction Program.</i>
<i>2020 – 2023</i>	<i>Mapping firn aquifers on the ice sheets using enhanced-resolution Soil Moisture Active Passive (SMAP) L-band brightness temperature data. NASA SMAP Science Team.</i>
<i>2020 – 2021</i>	<i>Constraining aquifer formation and expansion in Greenland using enhanced resolution brightness temperatures. NASA Cryospheric Research.</i>

- 2018 – 2021** *Using enhanced-resolution passive microwave data to improve spatially distributed near real-time snow water equivalent estimates. US Army Research and Development Center.*
- 2018 – 2019** *Daily snow cover maps for use in understanding habitat and carrying capacity of Bighorn Sheep in the Sierra Nevada. Subcontract to University of California at Santa Barbara award from California Department of Fish and Wildlife.*
- 2016 – 2020** *Improved, enhanced-resolution SMAP soil moisture using image reconstruction. NASA Terrestrial Hydrology.*
- 2013 – 2018** *An improved, enhanced-resolution, gridded passive microwave ESDR for monitoring cryospheric and hydrologic time series. NASA MEaSURES.*

Refereed Journal Articles

2021

Miller, J. Z., R. Culberg, D. G. Long, C. A. Shuman, D. M. Schroeder, M. J. Brodzik. 2021. An empirical algorithm to map perennial firn aquifers, ice slabs, and perched firn aquifers within the Greenland Ice Sheet using satellite L-band microwave radiometry. **The Cryosphere Discussions** 2021, 1–47. doi: 10.5194/tc-2021-116.

2020

Johnson, M. T., J. M. Ramage, T. Troy, M. J. Brodzik. 2020. Snowmelt Detection with Calibrated, Enhanced-Resolution Brightness Temperatures (CETB) in Colorado Watersheds. **Water Resources Research** 56, e2018WR024542. doi: 10.1029/2018WR024542.

Miller, J. Z., D. G. Long, K. C. Jezek, J. T. Johnson, M. J. Brodzik, C. A. Shuman, L. S. Koenig, T. A. Scambos. 2020. Brief communication: Mapping Greenland’s perennial firn aquifers using enhanced-resolution L-band brightness temperature image time series. **The Cryosphere** 14(9), 2809–2817. doi: 10.5194/tc-14-2809-2020.

2019

Armstrong, R. L., K. Rittger, M. J. Brodzik, A. Racoviteanu, A. P. Barrett, S.-J. S. Khalsa, B. Raup, A. F. Hill, A. L. Khan, A. M. Wilson, R. B. Kayastha, F. Fetterer, B. Armstrong. 2019. Runoff from glacier ice and seasonal snow in High Asia: Separating melt water sources in river flow. **Regional Environmental Change**, 19(5):1249–1261, doi: 10.1007/s10113-018-1429-0.

Long, D. G., M. J. Brodzik, M. A. Hardman. Enhanced-resolution SMAP brightness temperature image products. 2019. **IEEE Transactions on Geoscience and Remote Sensing**, 57(7):4151–4163, doi: 10.1109/TGRS.2018.2889427.

2018

Brodzik, M. J., D. G. Long, M. A. Hardman. 2018. Best practices in crafting the calibrated, enhanced-resolution passive-microwave EASE-Grid 2.0 brightness temperature Earth System Data Record. **Remote Sensing**, 10(11), doi: 10.3390/rs10111793.

2017

Paget, A. C., M. J. Brodzik, D. G. Long and M. A. Hardman. 2017. Bringing Earth’s microwave maps into sharper focus. **Eos**, 98(6):28-32.

2016

Long, D. G. and M. J. Brodzik. 2016. Optimum image formation for spaceborne microwave radiometer products. *IEEE Transactions on Geoscience and Remote Sensing*, 54(5):2763-2779, doi: 10.1109/TGRS.2015.2505677.

2014

Brodzik, M. J., B. Billingsley, T. Haran, B. Raup, M. H. Savoie. 2014. Correction: Brodzik, M. J. et al. EASE-Grid 2.0: Incremental but Significant Improvements for Earth-Gridded Data Sets. *ISPRS International Journal of Geo-Information* 2012, 1, 32-45. *ISPRS International Journal of Geo-Information*, 3(3):1154-1156, doi: 10.3390/ijgi3031154.

2012

Brodzik, M. J., B. Billingsley, T. Haran, B. Raup, M. H. Savoie. 2012. EASE-Grid 2.0: Incremental but significant improvements for Earth-gridded data sets. *ISPRS International Journal of Geo-Information*, 1(1):32-45, <http://www.mdpi.com/2220-9964/1/1/32/>.

2009

Savoie, M. H, R. L. Armstrong, M. J. Brodzik, J. R. Wang. 2009. Atmospheric corrections for improved satellite passive microwave snow cover retrievals over the Tibet Plateau. *Remote Sensing of Environment*, 113(12):2661-2669, doi: 10.1016/j.rse.2009.08.006

Tedesco, M., M. Brodzik, R. Armstrong, M. Savoie, J. Ramage. 2009. Pan-arctic terrestrial snowmelt trends (1979-2008) from spaceborne passive microwave data and correlation with the Arctic Oscillation. *Geophysical Research Letters*, 36, L21402, doi: 10.1029/2009GL039672.

2004

Parsons, M. A., M. J. Brodzik, N. J. Rutter. 2004. Data management for the Cold Land Processes Experiment: Improving hydrological science. *Hydrological Processes*, 18, 3637-3653, doi:10.102/hyp5801.

2002

Armstrong, R. L., M. J. Brodzik. 2002. Hemispheric-scale comparison and evaluation of passive microwave snow algorithms. *Annals of Glaciology*, 34:38-44.

Brodzik, M. J., K. W. Knowles. 2002. "EASE-Grid: a versatile set of equal-area projections and grids" in M. Goodchild (Ed.) *Discrete Global Grids*. Santa Barbara, CA, USA: National Center for Geographic Information & Analysis, <http://escholarship.org/uc/item/9492q6sm>.

2001

Armstrong, R. L., M. J. Brodzik. 2001. Validation of passive microwave snow algorithms. *Remote Sensing and Hydrology 2000, IAHS Pub. No. 267*, Eds. M. Owe, K. Brubaker, J. Ritchie and A. Rango, 87-92.

Armstrong, R. L., M. J. Brodzik. 2001. Recent Northern Hemisphere snow extent: a comparison of data derived from visible and microwave sensors. *Geophysical Research Letters*, 23(19):3673-3676.

1995

Armstrong, R. L., M. J. Brodzik. 1995. An Earth-Gridded SSM/I Data Set for Cryospheric Studies and Global Change Monitoring. *Advances in Space Research*, 16(10):155-163.

Other Journal Articles and Contributions

2021

Long, D. G., M. J. Brodzik, M. A. Hardman. 2021. *The Effective Resolution of CETB Image Products*. NSIDC Special Report 21. National Snow and Ice Data Center. Boulder, CO.

Yang, D., Y. Zhao, R. Armstrong, M. J. Brodzik, D. Robinson. 2021. Yukon River Discharge Response to Seasonal Snow Cover Change. In D. Yang and D. L. Kane (Eds.), *Arctic Hydrology, Permafrost and Ecosystems*. Springer Nature Switzerland. <https://link.springer.com/content/pdf/10.1007%2F978-3-030-50930-9.pdf>, doi: 10.1007/978-3-030-50930-9_9.

2007

United Nations Environment Programme. Selected figures in Chapter 4, "Snow" in **Global Outlook for Ice and Snow**, UNEP:Nairobi, Kenya. 2007.

1997

Armstrong, Richard, M. J. Brodzik, A. Varani. 1997. The NSIDC EASE-Grid: addressing the need for a common, flexible, mapping and gridding scheme. **Earth System Monitor**, 7(4):6-7.

Published Data Sets

2021

Brodzik, M. J., D. G. Long, M. A. Hardman. 2021. SMAP Radiometer Twice-Daily rSIR-Enhanced EASE-Grid 2.0 Brightness Temperatures, Version 2.0. NASA National Snow and Ice Data Center DAAC, Boulder, CO USA. Digital Media, <http://nsidc.org/data/nsidc-0738>, doi: 10.5067/YAMX52BXFL10.

2019

Brodzik, M. J., R. L. Armstrong, A. P. Barrett, S.-J. S. Khalsa, A. Racoviteanu, B. H. Raup, K. Rittger. 2019. Contribution to High Asia Runoff from Ice and Snow (CHARIS) Melt Model Output, 2001 – 2014. National Snow and Ice Data Center, Boulder, CO USA. Digital Media, <http://nsidc.org/data/G10027>, doi: 10.7265/TQFB-M828.

Brodzik, M. J., D. G. Long, M. A. Hardman. 2019. SMAP Radiometer Twice-Daily rSIR-Enhanced EASE-Grid 2.0 Brightness Temperatures, Version 1. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/QZ3WJNOUZLFK.

2018

Brodzik, M. J., R. Armstrong. 2018. Near-Real-Time DMSP SSM/I-SSMIS Pathfinder Daily EASE-Grid Brightness Temperatures, Version 2. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/K7VT6D6Y2S06.

2016

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. Armstrong. 2016, updated 2018. MEaSURES Calibrated Enhanced-Resolution Passive Microwave Daily EASE-Grid 2.0 Brightness Temperature ESDR, Version 1. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/MEASURES/CRYOSPHERE/NSIDC-0630.001.

Brodzik, M. J., J. S. Stewart. 2016, updated daily. Near-Real-Time SSM/I-SSMIS EASE-Grid Daily Global Ice Concentration and Snow Extent, Version 5. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/3KB2JPLFPK3R.

2013

Brodzik, M. J., R. Armstrong. 2013. *Northern Hemisphere EASE-Grid 2.0 Weekly Snow Cover and Sea Ice Extent, Version 4*. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/P7O0HGJLYUQU.

2011

Brodzik, M., K. Knowles. 2011. *EASE-Grid 2.0 Land Cover Classifications Derived from Boston University MODIS/Terra Land Cover Data*. Boulder, Colorado USA: National Snow and Ice Data Center, doi: 10.5067/XR8523MC24TB.

Brodzik, M. and K. Knowles. 2011. *EASE-Grid 2.0 Land-Ocean-Coastline-Ice Masks Derived from Boston University MODIS/Terra Land Cover Data*. Boulder, Colorado, USA: National Snow and Ice Data Center, doi: 10.5067/VY2JQZL9J8AQ.

2007

Brodzik, M. J., R. L. Armstrong, M. Savoie. 2007. *Global EASE-Grid 8-day Blended SSM/I and MODIS Snow Cover*. Boulder, Colorado USA: National Snow and Ice Data Center, doi: 10.5067/KIGGFNVROX9V.

2005

Armstrong, R. L., M. J. Brodzik. 2005, updated 2007. *Northern Hemisphere EASE-Grid Weekly Snow Cover and Sea Ice Extent Version 3*. Boulder, Colorado USA: National Snow and Ice Data Center.

Armstrong, R. L., M. J. Brodzik, K. Knowles, M. Savoie. 2005, updated 2007. *Global Monthly EASE-Grid Snow Water Equivalent Climatology, Version 1*. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/KJVERY3MIBPS.

2002

Cline, D., R. Armstrong, R. Davis, K. Elder, G. Liston. 2002, updated 2003. *CLPX-Ground: ISA Snow Depth Transects and Related Measurements*. In situ data edited by M. Parsons and M. J. Brodzik. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5060/D4MW2F23.

Cline, D., R. Armstrong, R. Davis, K. Elder, G. Liston. 2002, updated 2004. *CLPX-Ground: ISA snow pit measurements*. Edited by M. Parsons and M. J. Brodzik. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5060/D4H41PBP>.

2001

Armstrong, R. L., M. J. Brodzik. 2001. *Northern Hemisphere EASE-Grid Weekly Snow Cover and Sea Ice Extent Version 2*. Boulder, CO, USA: National Snow and Ice Data Center.

1999

Knowles, K. W., E. G. Njoku, R. L. Armstrong, M. J. Brodzik. 1999. *Nimbus-7 SMMR Pathfinder daily EASE-Grid brightness temperatures*. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/36SLCSCZU7N6.

1995

Armstrong, R. L., M. J. Brodzik. 1995. *Northern Hemisphere EASE-Grid Weekly Snow Cover and Sea Ice Extent*. Boulder, CO, USA: National Snow and Ice Data Center.

1994

Armstrong, R., K. Knowles, M. J. Brodzik, M. A. Hardman. 1994, updated 2019. *DMSP SSM/I-SSMIS Pathfinder Daily EASE-Grid Brightness Temperatures, Version 2*. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center, doi: 10.5067/3EX2U1DV3434.

Conference Presentations

2021

Enzminger, T., A. Dugger, K. Rittger, E. Bair, J. McCreight, M. Raleigh, M. J. Brodzik. 2021. *Improving streamflow forecasts in the NOAA National Water Model using observational constraints on snowpack albedo and snow-covered area from STC-MODSCAG*. In *Proceedings of 88th Annual Western Snow Conference*, virtual.

Rittger, K., E. Bair, M. J. Brodzik, M. Raleigh, K. Musselman, J. Dozier, T. H. Painter, M. Serreze. 2021. *Snow Today at the National Snow and Ice Data Center*. Presentation at *Western Snow Conference*, virtual, 12–15 April.

2020

Brodzik, M. J., M. A. Hardman, D. G. Long. 2020. *Building trusted enhanced-resolution satellite passive microwave data sets: Lessons learned producing interoperable data for hydrologic and cryospheric applications*. E-Lightning presentation IN005-05, at *AGU Fall Meeting*, virtual, 1-17 December, <http://bit.ly/3cHjzdB>.

Enzminger, T., A. Dugger, K. Rittger, A. Rafieeiniasab, E. Bair, J. McCreight, M. Raleigh, K. FitzGerald, M. J. Brodzik. 2020. *Remotely-sensed observational constraints on snow-covered area and snowpack albedo improve snowpack and streamflow simulations in the NOAA National Water Model*. Presentation H047-03, at *AGU Fall Meeting*, virtual, 1-17 December.

Miller, J., T. A. Scambos, D. G. Long, C. A. Shuman, A. F. Banwell, A. Colliander, M. Mousavi, R. Datta, M. J. Brodzik. 2020. *Intense surface melting and firn saturation on the West Antarctic Ice Sheet during the 2019–2020 austral melt season mapped from space using satellite C-band radar scatterometry*. Presentation C022-0006 at *AGU Fall Meeting*, virtual, 1-17 December.

Rittger, K., M. Krock, W. Kleiber, E. Bair, M. J. Brodzik, T. Stephenson, B. Rajagopalan, J. Dozier, T. H. Painter, K. J. Bormann, M. Skiles, C. Ackroyd. 2020. *Fusion of high spatial and high temporal snow surface properties from satellite observations for estimating snow water equivalent*. Presentation C005-0015 at *AGU Fall Meeting*, virtual, 1-17 December.

2019

Brodzik, M. J., J. M. Ramage, M. T. Johnson, T. J. Troy, D. G. Long, R. L. Armstrong. 2019. *Spatio-temporal trends in melt onset in the Upper Indus Basin using enhanced-resolution passive microwave brightness temperatures*. Poster HYDRO:#55, *AMS 99th Annual Meeting*, Phoenix, AZ, USA, 7–10 Jan.

Brodzik, M. J., D. G. Long, M. A. Hardman, J. M. Ramage, R. L. Armstrong, R. Kelly. 2019. *How enhanced-resolution brightness temperatures are improving algorithms for SWE and melt onset*. Poster, *Eastern Snow Conference*, Fairlee, VT, USA, 4–6 Jun.

W. Kleiber, K. Rittger, B. Rajagopalan, M. J. Brodzik, M. Krock. 2019. Down-scaling Daily Remotely Sensed Snow Cover Fraction Based on a Two Stage Machine Learning Model. Poster H21N-1945, AGU Fall Meeting, San Francisco, CA, 9-13 December.

J. Miller, T. A. Scambos, D. G. Long, C. Mí ege, B. Wallin, L. Montgomery, M. J. Brodzik. 2019. Mapping Firn Aquifers on Antarctic Ice Shelves from Space using L-band Satellite Microwave Radiometry. Presentation at AGU Fall Meeting, C33A-07, San Francisco, CA, 9-13 December.

Ramage, J. M., M. J. Brodzik, M. A. Hardman, D. G. Long. 2019. Testing Calibrated Enhanced-Resolution Brightness Temperatures (CETB) to detect significant events in lake ice formation and evolution on large Northern lakes. Poster, Eastern Snow Conference, Fairlee, VT, USA, 4-6 Jun.

Rittger, K., W. Kleiber, K. J. Bormann, H. G. V. Chan, W. P. Doan, T. H. Painter, E. Bair, K. N. Musselman, A. L. Dugger, M. J. Brodzik, B. Rajagopalan. 2019. Multi-platform, Multi-sensor Snow Surface Properties for Energy Balance and Model Validation. Presentation at AGU Fall Meeting, C42B-04, San Francisco, CA, 9-13 December.

2018

Armstrong, R. L., A. P. Barrett, M. J. Brodzik, F. Fetterer, A. F. Hill, R. B. Kayastha, S.-J. S. Khalsa, A. Khan, A. Racoviteanu, B. Raup, K. Rittger, A. Wilson, B. R. Armstrong. 2018. Contribution to High Asia runoff from glacier ice and seasonal snow (CHARIS). Poster C21E-1388, AGU Fall Meeting, Washington, DC, 10-14 Dec.

Brodzik, M. J., D. G. Long, M. A. Hardman, J. Ramage, M. T. Johnson, R. L. Armstrong. 2018. New enhanced-resolution passive microwave climate record for historical analysis. TE-3e, POLAR2018, Davos, Switzerland, 19-23 Jun.

Brodzik, M. J., J. M. Ramage, M. A. Hardman, David G. Long, R. L. Armstrong. 2018. Improving melt onset detection in mountainous regions from the new, enhanced-resolution passive microwave climate record. 2018. Poster CR 2.1:10690, EGU General Assembly, Vienna, Austria, 9-13 Apr.

Johnson, M. T., J. M. Ramage, T. Troy, M. J. Brodzik. 2018. Passive microwave remote sensing of Colorado watersheds using Calibrated, Enhanced-Resolution Brightness Temperatures (CETB) for estimation of snowmelt timing – CLPx and SnowEx, 2018. Poster, 75th Annual Eastern Snow Conference, College Park, MD, 5-8 Jun.

Racoviteanu, A., K. Ritter, R. L. Armstrong, M. J. Brodzik, A. F. Hill, A. Khan, A. Wilson. 2018. Estimating snowline altitudes across High Mountain Asia for melt modeling: challenges in using remote sensing. CR 1.4-11151, EGU General Assembly, Vienna, Austria, 9-13 Apr.

Ramage, J. M., M. T. Johnson, M. J. Brodzik, T. Troy, M. A. Hardman, D. G. Long. 2018. Noisy data or noisy landscape? Putting new Calibrated, Enhanced-Resolution Brightness Temperatures to the test. Presentation, 75th Annual Eastern Snow Conference, College Park, MD, 5-8 Jun.

Rittger, K., R. L. Armstrong, E. Bair, M. J. Brodzik, A. Racoviteanu, A. F. Hill, A. M. Wilson, A. Khan, S.-J. S. Khalsa, A. P. Barrett, B. Raup, T. H. Painter. 2018. The contribution to High Asia runoff from ice and snow (CHARIS): understanding the source of cryospheric contributions to the water balance. CR 1.4-11873, EGU General Assembly, Vienna, Austria, 9-13 Apr.

Hardman, M. A., D. G. Long, M. J. Brodzik. 2018. How to evaluate SMAP radiometer spatial resolution enhancements from image reconstruction? Poster H51W-1652, AGU Fall Meeting, Washington, DC, 10-14 Dec.

Johnson, M. T., J. M. Ramage, T. Troy, M. J. Brodzik. 2018. Snowmelt detection using Calibrated, Enhanced-Resolution Brightness Temperatures (CETB) across Conterminous US (CONUS). Poster C13I-1243, AGU Fall Meeting, Washington, DC, 10-14 Dec.

Ramage, J. M., M. T. Johnson, M. J. Brodzik, T. Troy, M. A. Hardman, D. G. Long. 2018. Exploiting High Resolution CETB Statistics to Detect and Characterize Dynamic Surfaces, 2018. Poster C13I-1244, AGU Fall Meeting, Washington, DC, 10-14 Dec.

Rittger, K., N. Bair, W. P. Doan, M. J. Brodzik. 2018. Historical and real-time snow product suite for the Indus River basin. Poster H53E-04, AGU Fall Meeting, Washington, DC, 10-14 Dec.

2017

Armstrong, R., M. J. Brodzik, B. Armstrong, A. Barrett, F. Fetterer, A. Hill, S.-J. S. Khalsa, A. Racoviteanu, B. Raup, K. Rittger, M. Williams, A. Wilson, Q. Ye. 2017. Improving understanding of glacier melt contribution to High Asian river discharge through collaboration and capacity building with High Asian CHARIS partner institutions. Poster HS6.2-11240, EGU General Assembly, Vienna, Austria, 23-28 Apr.

Brodzik, M. J. 2017. Satellite remote sensing resources for hydrological studies. Presentation, CHARIS project meeting, Nagargot, Nepal, 8-9 Apr.

Brodzik, M. J., M. A. Hardman, D. G. Long. 2017. Enhancing spatial resolution with image reconstruction: a newly-reprocessed, global historical passive microwave record and preliminary applications to estimate melt onset. Presentation Ch01, Third International Conference on Mountain Hydrology and Meteorology for the Sustainable Development, Kathmandu, Nepal, 10- 11 Apr.

Brodzik, M. J., M. A. Hardman, D. G. Long. 2017. Leveraging metadata conventions to improve usability of an EASE-Grid 2.0 passive microwave data product. Proceedings IGARSS 2017, Ft. Worth, TX:5197-5200. doi: 10.1109/IGARSS.2017.8128172.

Brodzik, M. J., M. A. Hardman, D. G. Long. 2017. Usability and interoperability improvements for an EASE-Grid 2.0 passive microwave data product using CF conventions. E-Lightning presentation IN42B-06, AGU Fall Meeting, New Orleans, LA, 11-15 Dec. <https://bit.ly/2LAW5Lw>.

Brodzik, M. J., D. G. Long, M. A. Hardman. 2017. Enhanced-resolution soil moisture using image reconstruction, Part One: TB Resolution Enhancement. Presentation, SUSMAP Science meeting, Cambridge, MA, 19-20 Oct.

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2017. A new era for gridded passive microwave data at the NASA NSIDC DAAC. NASA Earthdata Seminar Series. <https://www.youtube.com/watch?v=qVx5nCEq1Po>.

Brodzik, M. J., D. G. Long, J. Ramage, R. Kelly, M. A. Hardman. 2017. How do enhanced-resolution brightness temperatures benefit passive microwave algorithms for SWE and melt onset? Poster, SnowEx Science Meeting, Longmont, CO, 8-10 Aug.

Hardman, M. A., M. J. Brodzik, K. W. Beam. Creating a python cocoon around legacy C code. Poster, SciPy 2017, Austin, TX, 10-14 Jul.

Hardman, M. A., M. J. Brodzik, D. G. Long, J. Ramage. 2017. *Calibrated, Enhanced-Resolution Brightness Temperature ESDR: A new era for gridded passive microwave data*. Poster C51C-0993, AGU Fall Meeting, New Orleans, LA, 11-15 Dec.

Johnson, M. T., J. M. Ramage, T. Troy, and M. J. Brodzik. *Passive microwave remote sensing of Colorado watersheds using Calibrated, Enhanced-Resolution Brightness Temperatures (CETB) from AMSR-E and SSM/I for estimation of snowmelt timing*, 2017. Poster presentation at AGU Fall Meeting, C51C-0994, New Orleans, LA, 11-15 December.

Long, D. G., M. J. Brodzik, M. Hardman. 2017. *Enhanced-resolution SMAP Soil Moisture Using Image Reconstruction*. Proceedings IGARSS 2017, Ft. Worth, TX:2499–2502. doi: 10.1109/IGARSS.2017.8127502.

Ramage, J. M., M. J. Brodzik, M. A. Hardman, T. Troy. 2017. *Testing snow melt algorithms in high relief topography using Calibrated Enhanced-Resolution Brightness Temperatures, Hunza River basin, Pakistan*. Poster C51C-0996, AGU Fall Meeting, New Orleans, LA, 11-15 Dec.

Rittger, K., R. L. Armstrong, E. Bair, A. Racoviteanu, M. J. Brodzik, A. F. Hill, A. M. Wilson, A. Khan, J. Ramage, S.-J. S. Khalsa, B. Raup, T. H. Painter. 2017. *The contribution to High Asia runoff from ice and snow (CHARIS): understanding the source and trends of cryospheric contributions to the water balance*. Presentation C33D-1232, AGU Fall Meeting, New Orleans, LA, 11-15 Dec.

Rittger, E. Bair, A. Racoviteanu, M. J. Brodzik, S.-J. S. Khalsa, B. Raup, T. H. Painter, J. Dozier. 2017. *Quantifying the individual contributions of melt from snow and glaciers in High Mountain Asia river basins: Syr Darya, Amu Darya, Indus, Ganges, and Brahmaputra*. Presentation HS2.2.1–11559, EGU General Assembly, Vienna, Austria, 23-28 Apr.

2016

Brodzik, M. J., B. Armstrong, R. L. Armstrong, A. Barrett, F. Fetterer, A. Hill, H. A. Hughes, S. J. S. Khalsa, A. Khan, A. Racoviteanu, B. Raup, K. Rittger, M. Williams, A. Wilson. 2016. *CHARIS lessons learned in capacity building for hydrological sciences with Asian partner communities*. Poster PA43A-2183, AGU Fall Meeting, San Francisco, CA, 12-16 Dec.

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2016. *Using image reconstruction to enhance spatial resolution of the satellite passive microwave historical record*. Invited presentation, Global Climate Observing System (GCOS) Terrestrial Observation Panel for Climate (TOPC) meeting, Boulder, CO, 25-27 Apr.

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2016. *Using image reconstruction to enhance spatial resolution of the satellite passive microwave historical record*. Invited presentation, NSIDC User Working Group Meeting, Boulder, CO, 9-10 Aug.

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2016. *A new era for NSIDC's gridded passive microwave data*. Invited presentation, CIRES Cryospheric and Polar Processes Seminar, Boulder, CO, 12 Oct.

Brodzik, M. J., A. Paget, D. G. Long, M. A. Hardman, T. M. Haran. 2016. *Leveraging GeoTIFF compatibility for visualizing a new EASE-Grid 2.0 global satellite passive microwave climate record*. Poster OD24C-2478, 2016 Ocean Sciences Meeting, New Orleans, LA, 21-26 Feb.

Hardman, M. A., M. J. Brodzik, D. G. Long. 2016. Using image reconstruction to improve SMAP radiometer spatial resolution. Poster H31G-1483, AGU Fall Meeting, San Francisco, CA, 12-16 Dec.

Racoviteanu, A., K. Rittger, M. J. Brodzik, T. H. Painter, R. Armstrong. 2016. Fluctuating snow line altitudes in the Hunza basin (Karakoram) using Landsat OLI imagery. Poster EGU2016-10599, EGU meeting, Vienna, Austria, 17-22 Apr.

Ramage, J., M. J. Brodzik, M. A. Hardman. 2016. Melt on the margins: Calibrated Enhanced-Resolutions Brightness Temperatures to melt onset near glacier margins & transition zones. Presentation, Eastern Snow Conference, Columbus, OH, 14-16 Jun.

Ramage, J., M. J. Brodzik, M. A. Hardman. 2016. Glacier melt detection in complex terrain using new AMSR-E Calibrated Enhanced Daily EASE-Grid 2.0 Brightness Temperatures (CETB) Earth System Data Record. Poster C13D-0859, AGU Fall Meeting, San Francisco, CA, 12-16 Dec.

Rittger, K., M. J. Brodzik, E. Bair, A. Racoviteanu, A. Barrett, S. J. S. Khalsa, R. Armstrong, J. Dozier. 2016. Distinguishing snow and glacier ice melt in High Asia using MODIS. EGU2016-9154, EGU meeting, Vienna, Austria, 17-22 April.

Rittger, K., M. J. Brodzik, T. H. Painter, A. Racoviteanu, R. Armstrong, J. Dozier. 2016. Trends in annual minimum exposed snow and ice cover in High Mountain Asia from MODIS. EGU2016-10332, EGU meeting, Vienna, Austria, 17-22 Apr.

Zender, C., P. Leonard, E. Armstrong, M. J. Brodzik, J. Glassy, A. Jelenak, S. J. S. Khalsa, W. Yang. 2016. Guidelines for swath structures in Earth science products. Poster, ESDSWG meeting, Greenbelt, MD, 6-8 Apr.

2015

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2015. Using image reconstruction to enhance spatial resolution of the satellite passive microwave historical record. Presentation, MicroSnow2 Meeting, Columbia, MD, 13-15 Jul.

Brodzik, M. J., D. G. Long, M. A. Hardman, A. Paget, R. L. Armstrong. 2015. Using image reconstruction methods to enhance spatial resolution of a reprocessed satellite passive microwave historical record. Poster, 2nd International Satellite Snow Products Intercomparison Workshop, Boulder, CO, 14-16 Sep.

Haran, T., M. J. Brodzik, D. J. Scott, B. Nordgren, T. Estilow. 2015. Using GDAL to convert NetCDF 4 CF 1.6 to GeoTIFF. Poster IN21A-1677, AGU Fall Meeting, San Francisco, CA, 14-18 Dec.

Hardman, M. A., M. J. Brodzik, D. G. Long, A. Paget, R. L. Armstrong. 2015. Reprocessing the historical satellite passive microwave record at enhanced spatial resolutions using image reconstruction. Poster GC31D-1218, AGU Fall Meeting, San Francisco, CA, 14-18 Dec.

Rittger, K., K. Bormann, M. J. Brodzik, R. Armstrong, T. H. Painter, J. Dozier. 2015. Fractional snow cover for Landsat OLI, MODIS and VIIRS from spectral mixture analysis. Poster, 2nd International Satellite Snow Products Intercomparison Workshop, Boulder, CO, 14-16 Sep.

Rittger, K., M. J. Brodzik, E. Bair, A. Racoviteanu, A. Barrett, S. J. S. Khalsa, B. Raup, R. Armstrong, J. Dozier, T. H. Painter, R. E. Davis. 2015. Distinguishing snow and glacier ice melt in High Asia using MODIS. Presentation, CAS-NASA Workshop on Snow and Glacier Change and Related Natural Disasters in High Mountain Asia, Mammoth, CA, 9 Sep.

Rittger, K., M. J. Brodzik, E. Bair, A. Racoviteanu, S. J. S. Khalsa, A. Barrett, R. Armstrong, J. Dozier. 2015. Distinguishing snow and glacier ice melt in High Asia using MODIS. Presentation C24A-03, AGU Fall Meeting, San Francisco, CA, 14-18 Dec.

Rittger, K., M. J. Brodzik, A. Racoviteanu, A. Barrett, S. J. S. Khalsa, R. Armstrong. 2015. Distinguishing snow and ice melt contributions using daily MODIS and a temperature index melt model in the Hunza River basin. Poster, EGU meeting, Vienna, Austria, 13-17 Apr.

Rittger, K., M. J. Brodzik, A. Racoviteanu, A. Barrett, S. J. S. Khalsa, R. Armstrong, E. Bair, J. Dozier, R. Davis. 2015. Snow and ice melt contributions from a temperature index model and an energy balance model in the Hunza River basin. 26th IUGG General Assembly, Prague, Czech Republic, 22 Jun - 2 Jul.

Zender, C., P. Leonard, E. Armstrong, S. Berrick, M. J. Brodzik, S. Doman Bennett, S. J. S. Khalsa, H. Lee, D. Marinelli, J. Plutchak, M. Yang. 2015. Guidelines for creating grid structures in Earth science product files. Poster, ESDSWG meeting, Greenbelt, MD, March 23-25.

2014

Brodzik, M. J. 2014. MODICE: An automatic method for mapping the world's glaciers. Invited presentation to BYU engineering seminar, Provo, UT, 11 Mar.

Brodzik, M. J., R. L. Armstrong, A. Barrett, F. Fetterer, D. Hashmi, S. J. S. Khalsa, A. Racoviteanu, B. Raup, K. Rittger, M. Williams, A. Wilson. 2014. Contribution to High Asian Runoff from Ice and Snow (CHARIS) Project Preliminary Results from Upper Indus Basin. Presentation, International Association for Mathematical Geosciences, New Delhi, India, 20 Oct.

Brodzik, M. J., B. Billingsley, T. Haran, B. Raup, M. H. Savoie. 2014. Enabling ease of access for Earth-gridded data with EASE-Grid 2.0. Poster, ESDSWG, Greenbelt, MD, 25 Mar.

Brodzik, M. J., D. G. Long, R. L. Armstrong. 2014. Passive Microwave Earth System Data Record (ESDR) (a NASA MEaSURES project). Presentation, International Snow Working Group on Remote Sensing meeting, Granby CO, 11 Jan.

Brodzik, M. J., R. L. Armstrong, S. J. S. Khalsa, T. H. Painter, A. Racoviteanu, K. Rittger. 2014. Application of an ablation gradient model to characterize annual glacier ice melt contribution to major rivers in High Asia. H43J-1088, AGU Fall Meeting 2014, San Francisco, CA, 15-19 Dec.

Hardman, M. A., M. J. Brodzik, J. Gotberg, D. G. Long, A. Paget. 2014. Tactical approaches for making a successful satellite passive microwave ESDR. Poster IN31A-3711, AGU Fall Meeting 2014, San Francisco, CA, 15-19 Dec.

Paget, A., M. J. Brodzik, J. Gotberg, M. A. Hardman, D. G. Long. 2014. Using image reconstruction methods to enhance gridded resolution for a newly-calibrated passive microwave Earth System Data Record. Poster A51J-3158, AGU Fall Meeting 2014, San Francisco, CA, 15-19 Dec.

Rittger, K., M. J. Brodzik, A. Burgess, E. Burgess, T. H. Painter, R. L. Armstrong. 2014. Distinguishing ice from snow for melt modeling using daily observations from MODIS. EGU, Vienna, Austria, 27 Apr - 1 May.

Laidlaw, R., T. H. Painter, C. Mattmann, P. Ramirez, K. Borman, M. J. Brodzik, A. Burgess, K. Rittger, C. Goodale, M. Joyce, L. McGibbney, P. Zimdars, NASA JPL Snow Team. 2014. Snow Data System, NASA JPL. Poster IN23D-3759, AGU Fall Meeting 2014, San Francisco, CA, 15-19 Dec.

2013

Armstrong, R. L., A. P. Barrett, M. J. Brodzik, F. Fetterer, D. Hashmey, U. Horodyskyj, S. J. S. Khalsa, A. Khan, A. Racoviteanu, B. H. Raup, M. W. Williams, A. M. Wilson. 2013. CHARIS: the contribution to High Asia runoff from ice and snow: Preliminary results from Upper Indus Basin, Pakistan. GC23D-0966, AGU Fall Meeting, San Francisco, CA, 9-13 Dec.

Armstrong, R. L., A. P. Barrett, M. J. Brodzik, F. Fetterer, U. Horodyskyj, S. J. S. Khalsa, A. Khan, A. Racoviteanu, A. Rasmussen, B. H. Raup, M. W. Williams, A. M. Wilson. 2013. Establishing a collaborative effort to assess the contribution to High Asia runoff from ice and snow. EGU2013-3542, EGU Meeting, Vienna, Austria, 7-12 Apr.

Armstrong, R. L., A. P. Barrett, M. J. Brodzik, F. Fetterer, U. Horodyskyj, S. J. S. Khalsa, A. Khan, A. Racoviteanu, A. Rasmussen, B. H. Raup, M. W. Williams, A. M. Wilson. 2013. Establishing a collaborative effort to assess the contribution to High Asia runoff from ice and snow. DACA-13:C5.2, Davos Atmosphere and Cryosphere Assembly DACA-13, Davos, Switzerland, 8-12 Jul.

Brodzik, M. J., B. Billingsley, T. M. Haran, B. H. Raup, M. H. Savoie. 2013. Enabling ease of access for Earth-gridded data with EASE-Grid 2.0. IN13A-1555, AGU Fall Meeting, San Francisco, CA, 9-13 Dec.

Goodale, C., T. Painter, C. Mattmann, K. Rittger, M. Brodzik, A. Bryant, P. Ramirez, A. Hart, P. Zimdars. 2013. 2013 JPL's Snow Data System Year in Review. C21D-0681, AGU Fall Meeting, San Francisco, CA, 9-13 Dec.

Paget, A. C., D. G. Long and M. J. Brodzik. 2013. A climate record of enhanced spatial resolution radiometer data. C14B-01, AGU Fall Meeting, San Francisco, CA, 9-13 Dec.

Rittger, K., T. Painter, C. Mattmann, F. Seidel, A. Burgess, M. Brodzik. 2013. Snow and ice climatology of the Western United States and Alaska from MODIS. C21D-0673, AGU Fall Meeting, San Francisco, CA, 9-13 Dec.

2012

Brodzik, M. J., R. L., Armstrong, A. P. Barrett, M. J. Brodzik, F. Fetterer, U. Horodyskyj, S. J. S. Khalsa, A. Khan, A. Racoviteanu, A. Rasmussen, B. H. Raup, M. W. Williams, A. M. Wilson. 2012. Establishing a collaborative effort to assess the role of glaciers and seasonal snow cover in the hydrology of the mountains of High Asia. CG11A-0956, AGU Fall Meeting, San Francisco, CA, 3-7 Dec.

Brodzik, M. J., T. H. Painter, A. Racoviteanu, R. L. Armstrong. 2012. Using MODIS to map changes in Earth's annual minimum exposed snow and ice. C21C-0624, AGU Fall Meeting, San Francisco, CA, 3-7 Dec.

Kaminski, M., M. J. Brodzik, J. Deems. 2012. IceBridge airborne mission data and services at the National Snow and Ice Data Center. Poster, ESA-CliC-EGU Earth Observation and Cryosphere Science Meeting, Frascati, Italy, 13-15 Nov.

Liu, M., J. A. Collins, S. Lewis, J. Oldenburg, M. J. Brodzik, J. Braucher. 2012. Caching strategies for improving performance of web-based geographic applications. Poster IN13A-1502, AGU Fall Meeting, San Francisco, CA, 3-7 Dec.

Tressel, S. S., M. L. Kaminski, M. J. Brodzik. 2012. The NASA IceBridge project quickly delivers snow and ice elevation measurements of dynamic polar landscapes. C21B-0594, AGU Fall Meeting, San Francisco, CA, 3-7 Dec.

2011

Brodzik, M. J., M. Kaminski, J. Lacy, I. Truslove. 2011. Bringing value to IceBridge airborne mission data users. Presentation, World Climate Research Program (WCRP) Open Science Conference, Denver, CO 24-28 Oct.

Kaminski, M. L., M. J. Brodzik, J. S. Deems, and T. A. Scambos. 2011. Adaptive Management of IceBridge Airborne Mission Data at the National Snow and Ice Data Center. IN51B-1576, AGU Fall Meeting, San Francisco, CA, 5-9 Dec.

Schwab, M. J., M. Stanley, J. Pals, M. J. Brodzik, C. Fowler. 2011. Solutions for extracting file level spatial metadata from airborne mission data. IN51B-1586, AGU Fall Meeting, San Francisco, CA, 5-9 Dec.

Truslove, I., B. Billingsley, J. Lacy, G. Lewis, M. J. Brodzik, M. Kaminski, L. Lopez, M. McNulty, H. Wu. 2011. A software architecture to encourage internal and external software reuse. IN23B-1450, AGU Fall Meeting, San Francisco, CA, 5-9 Dec.

2010

Brodzik, M. J., M. L. Kaminski, J. S. Deems, T. A. Scambos. 2010. Managing IceBridge airborne mission data at the National Snow and Ice Data Center. C41A-0504, AGU Fall Meeting, San Francisco, CA, 13-17 Dec.

Meier, W., M. J. Brodzik, S. J. S. Khalsa. 2010. Intercalibration of near-real-time snow and sea ice products from passive microwave data. Presentation, Microrad 2010 11th Specialist Meeting on Microwave Remote Sensing, Washington, DC, 1-4 Mar.

2009

Billingsley, B. W., M. J. Brodzik, J. A. Collins. 2009. Software reuse example and challenges at NSIDC. *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract IN11C-1064.

Brodzik, M. J., T. H. Painter, R. L. Armstrong. 2009. A systematically-derived global glacier map derived from MODIS. *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract C51B-0476.

Collins, J. A., M. J. Brodzik, B. W. Billingsley. 2009. Lineage management for on-demand data. *Eos Trans. AGU* 90(52), Fall Meet. Suppl., Abstract IN31B-1006.

2008

Brodzik, M. J., M. H. Savoie, R. L. Armstrong. 2008. Global snow extent climate data records and trends derived from satellite passive microwave and visible data. *Eos Trans. AGU*, 89(53), Fall Meet. Suppl. Abstract C11B-0498.

Brodzik, M. J., R. L. Armstrong, M. H. Savoie. 2008. Remote sensing of snow cover and snow water equivalent. Presentation to International Workshop on Spaceborne Snowfall Measurement, (IWSSM), Steamboat Springs, CO, 31 Mar - 4 Apr.

Brodzik, M. J., R. L. Armstrong, M. H. Savoie. 2008. Satellite-derived snow cover and snow water equivalent products at NSIDC. Presentation, NIC Snow Mapping Workshop, Silver Spring, MD, 14-15 Oct.

Gallaher, D., M. J. Brodzik, T. Scambos, J. Stroeve. 2008. Forcing interoperability: An intentionally fractured approach. *Eos Trans. AGU*, 89(53), Fall Meet. Suppl. Abstract IN23B-1089.

2007

Brodzik, M. J., R. L. Armstrong, M. H. Savoie. 2007. Snow cover mapping at the continental to global scale using combined visible and passive microwave satellite data. *Eos Trans. AGU*, 88(52), Fall Meet. Suppl. Abstract C21A-0058.

Brodzik, M. J., R. L. Armstrong, E. C. Weatherhead, M. H. Savoie, D. A. Robinson. 2007. Regional trend analysis of satellite-derived snow extent and global temperature anomalies. Presentation, AAG Annual Meeting, San Francisco, CA, Apr.

Brodzik, M. J., M. H. Savoie, R. L. Armstrong. 2007. Preliminary study of local regression methods to interpolate gridded passive microwave brightness temperatures. *Eos Trans. AGU*, 88(52), Fall Meet. Suppl. Abstract B21A-0026.

Savoie, M. H., J. Wang, M. J. Brodzik, R. L. Armstrong. 2007. Atmospheric corrections for improved passive microwave snow cover retrievals over the Tibet Plateau. *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract C23A-0942.

2006

Brodzik, M. J., R. L. Armstrong, E. C. Weatherhead, M. H. Savoie, K. W. Knowles, D. A. Robinson. 2006. Regional trend analysis of satellite-derived snow extent and global temperature anomalies. *Eos Trans. AGU*, 87(52) Fall Meeting Supplement, Abstract U33A-0011.

Savoie, M. H., M. J. Brodzik, K. Knowles. 2006. AMSR-E/Aqua gridded brightness temperatures. *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H31A-1400.

2005

Armstrong, R. L., M. J. Brodzik, O. Frauenfeld, S. J. S. Khalsa. 2005. Analysis of the extreme winter of 1997-1998 on the Tibetan Plateau. AAG, Denver, CO, 3 Apr.

Armstrong, R. L., M. J. Brodzik, M. A. Parsons. 2005. Graphical representation of Cold Land Processes Experiment snow pit data. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl. Abstract C21A-1054.

Armstrong, R. L., M. J. Brodzik, M. H. Savoie, K. W. Knowles, R. G. Barry. 2005. Snow cover mapping at the continental to global scale using combined optical and passive microwave data. CliC Meeting, Beijing, May 2005.

Brodzik, M. J., R. L. Armstrong, K. Knowles, M. Savoie. 2005. The effect of sensor differences in deriving long-term trends from satellite passive microwave snow extent. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl. Abstract U21A-0804.

2004

Armstrong, R. L., M. J. Brodzik, M. H. Savoie, T. Zhang, O. Frauenfeld. 2004. Enhanced snow cover mapping on the Tibetan Plateau using NASA EOS optical (MODIS) and passive microwave (AMSR-E) remote sensing data. *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract C31A-0282.

Armstrong, R. L., M. J. Brodzik, J. R. Wang, M. H. Savoie, O. Frauenfeld, T. Zhang. 2004. Solutions to the snow cover mapping anomaly over the Tibetan Plateau. *Eos Trans. AGU*, 85(47), Fall Meet. Suppl. Abstract C31A-0282.

Savoie, M. H., E. Njoku, M. J. Brodzik, K. Knowles, R. L. Armstrong. 2004. Locating stable calibration targets. *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract H13C-0444.

2003

Armstrong, R. L., M. J. Brodzik, M.H. Savoie. 2003. Multi-sensor approach to mapping snow cover using data from NASA's EOS Aqua and Terra spacecraft (AMSR-E and MODIS). *Eos Trans. AGU*, 84(46), Fall Meet. Suppl. Abstract H32B-0549.

Knowles, K, M. J. Brodzik, M. H. Savoie. 2003. AMSR-E Swath to Grid Toolkit. *Eos Trans. AGU*, 84(46), Fall Meet. Suppl. Abstract H32B-0547.

Parsons, M.A., M.J. Brodzik, T. Haran. 2003. An overview of the data collected during the Cold Land Processes Field Experiment. *Eos Trans. AGU*, 84(46), Fall Meet. Suppl. Abstract C42B-01.

2002

Armstrong, R.L. and M.J. Brodzik. 2002. Twenty-four year record of Northern Hemisphere snow cover fluctuations derived from passive microwave remote sensing data. Snow Watch '02, Silver Spring, MD 31 Oct-01 Nov.

Armstrong, R. L., M. J. Brodzik, M.H. Savoie. 2002. Hemispheric-scale snow cover climatologies derived from satellite remote sensing. *Eos Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract H52E-10.

Brodzik, M. J., R. L. Armstrong. 2002. Northern Hemisphere snow extent trends derived from visible and microwave satellite data. *Eos Trans. AGU*, 83(47), Fall Meeting Suppl., Abstract U72A-0006.

2001

Armstrong, R. L., M. J. Brodzik. 2001. Hemispheric-scale comparison and evaluation of passive microwave snow algorithms. 4th International Symposium on Remote Sensing in Glaciology, College Park, MD, 4-8 Jun 2001.

Armstrong, R. L., M. J. Brodzik, E. Njoku, vS. Surdyk. 2001. Time series of SMMR and SSM/I brightness temperatures over homogeneous targets: a preliminary look at variability/stability. Specialist Meeting on Microwave Remote Sensing, Boulder, CO 5-9 Nov.

2000

Armstrong, R.L., M.J. Brodzik. 2000. Validation of passive microwave snow algorithms. Proceedings IGARSS 2000, 24-28 July, 2000, Honolulu, HI:1255-1257.

Armstrong, R.L., M.J. Brodzik. 2000. Evaluation of passive microwave snow algorithms. *Eos, Transactions, American Geophysical Union*, 81(48), Fall Meeting Supplement, Abstract H62G-02.

1999

Armstrong, R.L., M.J. Brodzik, 1999. A twenty year record of global snow cover fluctuations derived from passive microwave remote sensing data. 5th Conference on Polar Meteorology and Oceanography, American Meteorological Society, Dallas, TX:113-117.

Armstrong, R. L., T. Zhang, M. J. Brodzik. 1999. Variations of snowmelt on the Greenland and Antarctic ice sheets from 1978-1998 as derived from passive microwave satellite data. American Geophysical Union Proceedings, San Francisco, CA, Dec.

Schweiger, A., C. Fowler, J. Key, J. Maslanik, J. Francis, R. Armstrong, M. J. Brodzik, T. Scambos, T. Haran, M. Ortmeyer, S. Khalsa, D. Rothrock, R. Weaver. 1999. P-Cube: a multisensor data set for polar climate Research. 5th Conference on Polar Meteorology and Oceanography, American Meteorological Society, Dallas, TX:136-141.

1998

Armstrong, R.L., M.J. Brodzik. 1998. A comparison of Northern Hemisphere snow extent derived from passive microwave and visible remote sensing data. Proceedings IGARSS'98, Seattle, WA:1255-1257.

Armstrong, R.L., M.J. Brodzik, A.T.C. Chang. 1998. A 20 year global snow cover climatology derived from Nimbus 7 SMMR and DMSP SSM/I Pathfinder data sets. Eos, Transactions, American Geophysical Union, 79(45):F78.

Hiltbrunner, D., C. Maetzler, R.L. Armstrong, M.J. Brodzik. 1998. Validation of snow algorithms using microwave signatures and independent ground measurements. IGARSS'98, Seattle WA, 6-10 Jul.

Kim, E. J., C. O'Kray, N. Hinds, A. W. England, M. J. Brodzik, K. Knowles, M. Hardman. 1998. A custom EASE-Grid SSM/I processing system. Proceedings IGARSS '98, Seattle, WA, pp. 1112-1114.

1997

Armstrong, R. L., M. J. Brodzik. 1997. A 20-year passive microwave data set: EASE-Grid brightness temperatures and their application in global change research. AGU Fall 1997 Meeting, San Francisco, CA.

1995

Armstrong, R. L., M. J. Brodzik, A. Tait. 1995. Global snow cover fluctuations derived from passive microwave remote sensing data. Eos Trans. AGU, 76(46):F203.

Armstrong, R. L., A. Tait, M. J. Brodzik. 1995. A methodology to validate snow cover products derived from SSM/I. GEWEX International Workshop on Cold-Season/Region Hydrometeorology, 22-26 May 1995, Banff, Alberta, IGPO Publication Series No. 15, p. 149.

1994

Weaver, R. L., R. L. Armstrong, M. J. Brodzik. 1994. Inter-comparison of sea ice concentrations derived from two gridding techniques – Lessons for the EOS era. International Symposium on the Role of the Cryosphere in Global Change, a meeting of the International Glaciological Society. Byrd Polar Research Center, The Ohio State University, Columbus, Ohio, 7-12 Aug.

Review Panel Service

2015. NASA.

2018. Austrian Science Foundation.
2019. NASA.
2019. NSF.
2020. NASA.
2021. NASA.

Journal Article Reviews

IEEE Geoscience and Remote Sensing Letters
International Journal of Applied Earth Observation & Geoinformation
Journal of Atmospheric and Oceanic Technology
Journal of Cold Regions Engineering
Journal of Geophysical Research Atmospheres
Journal of Hydrological Engineering
Journal of Hydrometeorology
Nature Scientific Data
Photogrammetric Engineering and Remote Sensing
Remote Sensing
Remote Sensing of Environment
The Cryosphere
Transactions on Geoscience and Remote Sensing
Water Resources Research

Professional Societies

American Geophysical Union
IEEE
IEEE Geosciences and Remote Sensing
International Snow Working Group on Remote Sensing

Honors and Awards

CIRES Service Award, 2010
Alpha Sigma Nu, Fordham University, 1987
Phi Beta Kappa, Fordham University, 1987
Phi Kappa Phi, Fordham University, 1987

Community Service

Member, University of Colorado Research Computing PetaLibrary Users Advisory Board, 2020-2022
Software Carpentry Helper, NSF RCNS Software Carpentry Workshop, Davos, Switzerland, 2018
Editorial Code Champion, Remote Sensing Code Library, 2017-2018
Session Co-chair, AGU Cryosphere (2015-2017) and ESSI (2012) Sessions
Session Co-chair, IAMG 2014
Judge, AGU OSPA Student Presentations
Member, NASA Earth Science Data System Working Groups

Working Group on Provenance, 2013
Working Group on Data Interoperability, 2014-2017
Working Group on Data Interoperability GeoTIFF Subgroup, 2019-2021
Mentor, Broomfield High School Science Research, 2021
Singer Representative to the Board of Directors, Ars Nova Singers, 1999-2000
Secretary-Treasurer, Twin Sisters Road Association, 1997-2007
Treasurer, Twin Sisters Road Association, 1996-1997