

# *Mary J. Brodzik*

*CIRES Senior Associate Scientist  
Special Projects Lead  
National Snow and Ice Data Center  
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## *Contact Information*

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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&amp;T Bell Laboratories, Murray Hill, NJ</i>

## *Research Grants*

<i>2018 – 2021</i>	<i>Using enhanced-resolution passive microwave data to improve spatially distributed near real-time snow water equivalent estimates. US Army Research and Development Center.</i>
<i>2018 – 2019</i>	<i>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.</i>
<i>2016 – 2020</i>	<i>Improved, enhanced-resolution SMAP soil moisture using image reconstruction. NASA Terrestrial Hydrology.</i>
<i>2013 – 2018</i>	<i>An improved, enhanced-resolution, gridded passive microwave ESDR for monitoring cryospheric and hydrologic time series. NASA MEaSUREs.</i>

## *Refereed Journal Articles*

## 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*

#### 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*

#### 2019

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

### 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.

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.

### 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, 2<sup>nd</sup> 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.*

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## **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.*

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## **1998**

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*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.*

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*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.*

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## **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 Climate Assessment Products and Indicators.

2018. Austrian Science Foundation.

2019. NASA Advanced Information Systems Technology.

### ***Journal Article Reviews***

*IEEE Geoscience and Remote Sensing Letters*

*International Journal of Applied Earth Observation & Geoinformation*

*Journal of Atmospheric and Oceanic Technology*

*Journal of Geophysical Research Atmospheres*

*Journal of Hydrological Engineering*

*Journal of Hydrometeorology*

*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***

*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*  
*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*