

# **81st Annual Eastern Snow Conference 2025**

Syracuse, New York, USA  
10 - 12 June 2025

ISBN: 979-8-3313-3424-6

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2025) by Eastern Snow Conference  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact Eastern Snow Conference  
at the address below.

Eastern Snow Conference  
C/O Dr. Krystopher Chutko  
117 Science Pl-Dept. Geography  
Saskatoon, Sk, Canada S7N 5C8

<https://www.easternsnow.org/>

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## CONTENTS

|                                                                   |      |
|-------------------------------------------------------------------|------|
| <b>Dedication</b>                                                 | iii  |
| <b>Table of Contents</b>                                          | v    |
| <b>Foreward</b>                                                   | xi   |
| <b>Statement of Purpose</b>                                       | xiii |
| <b>Executives for the 81<sup>st</sup> Eastern Snow Conference</b> | xv   |
| <b>President's Page</b>                                           | xvii |
| <b>Life Members</b>                                               | xix  |
| <b>Awards</b>                                                     | xxi  |

### Oral Session #1

|                                                                                                                                                                                                                                                                                                  |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>Explaining Snow Biases in CMIP6 Simulations using Offline Snow Modelling</b><br><i>ALEKSANDRA ELIAS CHEREQUE, MARTY HEWITT, PAUL KUSHNER, CHRIS DERKSEN, AND LAWRENCE MUDRYK</i>                                                                                                              | 3 |
| <b>Snow Classification and Characterization in Eastern North America</b><br><i>JEREMEY JOHNSTON, JENNIFER M. JACOBS, MEGAN VERFAILLIE VARDAMAN, AND EUNSANG CHO</i>                                                                                                                              | 4 |
| <b>Development and Evaluation of a Physics-Based Snow Model to Assess Spatiotemporal Snowpack and Snowmelt Runoff Variability in the Northeastern USA</b><br><i>ANNA GRUNES, GRAHAM SEXSTONE, JOHN HAMMOND, KATHERINE HALE, DONNA RIZZO, PATRICK CLEMINS, BEVERLEY WEMPLE, AND ARNE BOMBLIES</i> | 6 |
| <b>High-Resolution Glacier Melt Modeling in High Arctic Canada</b><br><i>MADELINE MYERS AND LAURA THOMSON</i>                                                                                                                                                                                    | 7 |

### Poster Session #1

|                                                                                                                                                                                                                                                       |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Quantification of Snowmelt-induced Streamflow Within the Smith River Watershed, Montana, Using a Water Balance Analysis</b><br><i>FARHAAN COOVERJI, EUNSANG CHO, BAILING LI, CARRIE VUYOVICH, JENNIFER JACOBS, SAMUEL TUTTLE, AND ERIC SPROLES</i> | 11 |
| <b>Investigating Proglacial Icing Formation and Temporal Dynamics on Axel Heiberg Island, Nunavut: A Remote Sensing Approach</b><br><i>A. O'FLYNN</i>                                                                                                 | 12 |
| <b>Mechanical and Microstructural Behaviour of Snow with an Ice Lens under Variable Rate Compressive Loading</b><br><i>MARIN BLAISDELL AND IAN BAKER</i>                                                                                              | 13 |

|                                                                                                                                                                                                                                                                                                                     |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Refining the French-Press Model of Dry Snow Compaction</b><br><i>ANNA VALENTINE, AARON STUBBLEFIELD, AND COLIN MEYER</i>                                                                                                                                                                                         | 14 |
| <b>Near Real-Time Snow Water Equivalent Records: Using Calibrated, Enhanced-Resolution Passive Microwave Version 2 Data (CETB) to Track an Early November Storm in Colorado</b><br><i>MOLLY A. HARDMAN, MARY J. BRODZIK, JOAN M. RAMAGE, AND SCOTT LEWIS</i>                                                        | 15 |
| <b>Rapid Ablation Snow Roughness Features Quantified</b><br><i>STEVEN R. FASSNACHT, MICHAEL T. TALBOT, JULIO LOPEZ, JESUS REVULETO, JAVIER HERRERO, ANTONIO JUAN COLLADOS LARA, DAVID PUILIDO, HELEN FLYNN, MARIN MACDONALD, JESSICA SANOW, AND JUAN IGNACIO LOPEZ-MORENO</i>                                       | 16 |
| <b>Automated Snow Covered Area Extraction from Field Camera Imagery</b><br><i>RASHIK KOIRALA, JEREMY JOHNSTON, AND JENNIFER JACOBS</i>                                                                                                                                                                              | 18 |
| <b>Interpreting Seasonal Changes in SWESARR Backscatter Data in Grand Mesa, Colorado</b><br><i>MELODY PIN-CHIEH PAN, MICHAEL DURAND, SYDNEY BARATTA, DYLAN BOYD, SIOBHAN CIAFONE, J. MICHELLE HU, ELODIE MACORPS, HANS-PETER MARSHALL, MEGAN MASON, BAREERA MIRZA, EVI OFEKEZE, CARRIE VUYOVICH, AND KEHAN YANG</i> | 19 |
| <b>Creation of a Low-Cost Ice-Melt Monitoring System</b><br><i>FÉLIX ST-AMOUR AND LAURA THOMSON</i>                                                                                                                                                                                                                 | 21 |
| <b>A Climatology of the Solid-to-Liquid Ratio of Precipitation on the Summit of Mount Washington, NH</b><br><i>MEES FRANSEN AND MARIN MACDONALD</i>                                                                                                                                                                 | 22 |
| <b>Relative Importance of Canopy Structure Metrics on Snowpack Dynamics in the Northeast using Random Forest Algorithms</b><br><i>JACOB LADUE, ANNA GRUNES, BEVERLEY WEMPLE, AND ARNE BOMBLIES</i>                                                                                                                  | 24 |
| <b>Winter 2024-2025 Snow Condition within a Northern NH Catchment using Uncrewed Aerial Systems (UAS) Lidar</b><br><i>ADAM HUNSAKER, JEREMY JOHNSTON, ANDREW FLEMING, RYAN REED, RASHIK KOIRALA, DANIEL EVANS, MARK GREEN, MINUN KANG, AND JENNIFER JACOBS</i>                                                      | 25 |
| <b>Mapping Glacier Disintegration in the Beas River Basin using Geospatial Techniques: A Case Study of Parbati Catchment</b><br><i>SHEKHAR KUMAR</i>                                                                                                                                                                | 26 |

## Oral Session #2

|                                                                                                                                                                                                                        |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Improving Predictions of Snow Resources Using Midlatitude SSTs with Convergent Cross Mapping</b><br><i>HAEJO KIM, DAVID FASTOVICH, TRIPTI BHATTACHARYA, AND SAM TUTTLE</i>                                          | 29 |
| <b>The Potential of Causal Inference for Examining the Connection of Snowmelt and River Discharge – A Northern Hemisphere Analysis from 1980 - 2022</b><br><i>SAMUEL SCHILLING, ANDREAS DIETZ, AND CLAUDIA KUENZER</i> | 30 |

|                                                                                                                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>A Dual Ku- and C-Band Airborne SAR: Second Deployment and Interferometric Results</b>                                                                                                                        | 32 |
| <i>MARC CLOSA TARRES, PAUL SIQUEIRA, JAMES M. ADAM, JOSEPH MALOYAN, TAKUYA SEAVER, ANTHONY MIGRIDICHIAN, RUSSELL TESSIER, LEUNG TSANG, FIROZ BORAH, HANS-PETER MARSHALL, ELIAS DEEB, AND GORDON FARQUHARSON</i> |    |

|                                                                                                                                                                       |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Ku-band Radar Assimilation to Advance SWE Estimates: Synthetic and Observational Point-scale Experiments</b>                                                       | 34 |
| <i>COURTNEY BAYER, VINCENT VIONNET, NICOLAS R. LEROUX, JULIEN MELOCHE, MARCO CARRERA, BERNARD BILODEAU, MARIA ABRAHAMOWICZ, FRANCK LESPINAS, AND BENOIT MONTPETIT</i> |    |

### Oral Session #3

|                                                                                                   |    |
|---------------------------------------------------------------------------------------------------|----|
| <b>Decoding Global Precipitation Processes and Particle Evolution Using Unsupervised Learning</b> | 37 |
| <i>FRASER KING, CLAIRE PETTERSEN, BRANDA DOLAN, JULIA SHATES, AND DEREK POSSELT</i>               |    |

|                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------|----|
| <b>Interannual Variability in Snowfall and its Influence on Snow Ice Formation on Canadian Sub-Arctic Lakes</b> | 38 |
| <i>ALICIA POWW AND HOMA KHEYROLLAH POUR</i>                                                                     |    |

|                                                                                                      |    |
|------------------------------------------------------------------------------------------------------|----|
| <b>Learning Internal Ice Layer Thickness With Physics-Informed Spatio-Temporal Graph Transformer</b> | 39 |
| <i>ZESHENG LIU AND MARYAN RAHNEMOONFAR</i>                                                           |    |

|                                                                                                                                |    |
|--------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Correlating the Russian Snow Penetrometer and the California Bearing Ratio for Measuring High-Strength Compacted Snow</b>   | 40 |
| <i>KATIE L. DUGGAN DIDOMINIC, CHRESTIEN M. CHARLEBOIS, TERRY D. MELENDY, MARGARITA ORDAZ, CHASE T. BRADLEY, AND LANE MASON</i> |    |

### Poster Session #2

|                                                                                                                                                                |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Assessing the Accuracy and Influencing Factors of Airborne LiDAR Snow Depth Estimates in Boreal Forests: Insights from NASA SnowEx 2023 Alaska Campaign</b> | 45 |
| <i>JIPENG LIU, EUNSANG CHO, AND CARRIE VUYOVICH</i>                                                                                                            |    |

|                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------|----|
| <b>Fluctuations in Sierra Nevada Snow Cover Drive Groundwater Changes in California's Central Valley Basins</b> | 46 |
| <i>DOROTHY K. HALL, BRYANT D. LOOMIS, JOHN S. KIMBALL, AND NICOLO E. DIGIROLAMO</i>                             |    |

|                                                                                                                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>SNOWWI System Brief: A Multi-Frequency Interferometric Synthetic Aperture Radar (InSAR) for Snow Science Applications</b>                                                                                    | 52 |
| <i>TAKUYA SEAVER, PAUL SIQUEIRA, MARC CLOSA TARRES, JAMES M. ADAM, JOSEPH MALOYAN, ANTHONY MIGRIDICHIAN, RUSSELL TESSIER, LEUNG TSANG, FIROZ BORAH, HANS-PETER MARSHALL, ELIAS DEEB, AND GORDON FARQUHARSON</i> |    |

|                                                                                             |    |
|---------------------------------------------------------------------------------------------|----|
| <b>Applying an Offline Snow Model to Compare Snow Products in the Mackenzie River Basin</b> | 54 |
| <i>MARTY HEWITT, ALEKSANDRA ELIAS CHEREQUE, AND PAUL KUSHNER</i>                            |    |

|                                                                                                                                                                                                   |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Modeling Northeastern U.S. Snowpacks to Inform Hydrologic Partitioning under Changing Winter Conditions</b>                                                                                    | 55 |
| <i>HAEJO KIM, AARON MOHAMMED, AND SAM TUTTLE</i>                                                                                                                                                  |    |
| <b>A 20-Year Climatology of Upslope Snowfall Events on Mount Washington (2005-2025)</b>                                                                                                           | 56 |
| <i>PETER EDWARDS</i>                                                                                                                                                                              |    |
| <b>Snow Water Equivalent Estimates from Uncrewed Aerial Systems (UAS) Lidar and Ground Penetrating Radar (GPR)</b>                                                                                | 58 |
| <i>MINSUN KANG, ADAM HUNSAKER, MAHSA MORADI, AND JENNIFER M. JACOBS</i>                                                                                                                           |    |
| <b>What’s Driving the Signal? Interpretable Machine Learning Unveils the Connection Between SWE and Spatiotemporal Variability in Passive Microwave Observations</b>                              | 59 |
| <i>MAHBOUBEH BOUESHAGH, JOAN M. RAMAGE, MARY J. BRODZIK, DAVID G. LONG, MOLLY HARDMAN, AND HANS-PETER MARSHALL</i>                                                                                |    |
| <b>A Matter of Spatial Scale – Examining the Representativeness of Low-Resolution Sea Ice Concentration Products of Conditions at Coastal Sites along the Central Western Antarctic Peninsula</b> | 60 |
| <i>ANDREW G. KLEIN, CARLY K. CASPER, JESSICA N. FITZSIMMONS, AND DARREN H. HENRICHs</i>                                                                                                           |    |
| <b>Modeling Snow Water Equivalent using UAS Snow Depth and a Temperature-Index Model in a Transitional Montane Forest in the Eastern United States</b>                                            | 61 |
| <i>RYAN REED, ADAM HUNSAKER, JEREMY JOHNSTON, AND JENNIFER M. JACOBS</i>                                                                                                                          |    |
| <b>Influence of Forest Canopy Type on a Seasonal Snowpack in the Central Adirondack Mountains, NY</b>                                                                                             | 63 |
| <i>MADISON WOODLEY, HEATHER A. GUNN, COLIN BEIER, JAMES S. MILLS, AND SAMUEL E. TUTTLE</i>                                                                                                        |    |
| <b>Pixel-wise Snow Melt and Refreeze Detection as a Function of Snow Class and Terrian</b>                                                                                                        | 64 |
| <i>JOAN M. RAMAGE, MAHBOUBEH BOUESHAGH, LEIA G. BARNES, MOLLY A. HARDMAN, AND MARY J. BRODZIK</i>                                                                                                 |    |

#### Oral Session #4

|                                                                                                                                                                                                                                                   |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>The Northeast Snow Survey (NESS) Feasibility Study: Updates and Next Steps for Designing an Automated Snowpack and Climate Monitoring Network in the Northeastern United States</b>                                                            | 69 |
| <i>ELIZABETH BURAKOWSKI, JOSHUA BENEŠ, JORDAN CLAYTON, ALIX CONTOSTA, ANNA GRUNES, HEATHER HOFMAN, BRAEDON LINEMAN, CARA MCCARTHY, SCOTT MCKIM, GEORGIA MURRAY, CHRIS NADEAU, SARAH NELSON, KYLER PHILLIPS, MELISSA WEBB, AND LUCAS ZUKIEWICZ</i> |    |
| <b>Recommended Methods for Mapping Snow Covered Areas with UAS RGB imagery</b>                                                                                                                                                                    | 71 |
| <i>ANDREW G. FLEMING, MAHSA MORADI, AND JENNIFER M. JACOBS</i>                                                                                                                                                                                    |    |

|                                                                                                                                |    |
|--------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Evaluating the Impact of the Seasonal Snowpack on the Wintertime Energy Budget at the Hubbard Brook Experimental Forest</b> | 72 |
| <i>MARK B. GREEN, JENNIFER M. JACOBS, AND JEREMY JOHNSTON</i>                                                                  |    |

|                                                                                                                                     |    |
|-------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Seasonal and Spatial Dynamics of Snow Cover for an Evergreen Forest Ecosystem Retrieved with the LVS3 Model and MODIS Images</b> | 73 |
| <i>QINGYUAN ZHANG</i>                                                                                                               |    |

## Oral Session #5

|                                                                                                                                                                                                                          |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>The Terrestrial Snow Mass Mission: Status Update</b>                                                                                                                                                                  | 77 |
| <i>B. MONTPETIT, C. DERKSEN, V. VIONNET, M. CARRERA, J. MELOCHE, N. LEROUX, M. BRADY, P. TOOSE, V. FORTIN, C. BAYER, S. BÉLAIR, R. KELLY, A. LANGLOIS, P. SIQUEIRA, N. ALLET, J. BERGERON, P. PLOURDE, AND R. GIRARD</i> |    |

|                                                                                                                                                     |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>A Coverage Analysis of Lidar, Passive Microwave, and Multispectral imagery to Define Measurement Requirements for a Theoretical Snow Mission</b> | 78 |
| <i>ZACHARY FAIR, CARRIE VUYOVICH, SUJAY KUMAR, MELISSA WRZESIEN, JUSTIN PFLUG, BETHANY THEILING, AND BATU OSMANOGLU</i>                             |    |

|                                                                                                                                |    |
|--------------------------------------------------------------------------------------------------------------------------------|----|
| <b>A Snow Observing Strategy to Integrate Taskable and Nontaskable Observations into Assimilation Framework</b>                | 80 |
| <i>MELISSA WRZESIEN, CARRIE VUYOVICH, SUJAY KUMAR, PAUL GROGAN, HADIS BANAFSHEH, DIVYA RAMACHANDRAN, AND EMMANUEL GONZALEZ</i> |    |

|                                                                                         |    |
|-----------------------------------------------------------------------------------------|----|
| <b>Eight Years (2017-present) of Snow Climatology from New York State Mesonet</b>       | 81 |
| <i>JUNHONG (JUNE) WANG, NATHAN BAIN, SCOTT MCKIM, NICK FARRUGGIO, AND JUSTIN MINDER</i> |    |

|                                                           |    |
|-----------------------------------------------------------|----|
| <b>South Pole Station Snow Drift Observation System</b>   | 83 |
| <i>CAMERON WAGNER, ADAM LEWINTER, AND DOMINIC FILIANO</i> |    |

## Oral Session #6

|                                                                                                                                                                          |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Are Manual Snow Measurements Still Important, and if so, Why?</b>                                                                                                     | 87 |
| <i>KRYSTOPHER J. CHUTKO, KRISHNA A. KOLEN, MITCH DRESSLER, ZACK GHERASIM, CONNOR JOHNSON, JOHN MORTON, LUKE POTTER, COLE C. ROSZELL, AND STEPHANA STEFANYSHYN-ALONSO</i> |    |

|                                                                                                                                           |    |
|-------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Estimating Snow Density and Snow Water Equivalent from Snow Depth and Seasonal Snow Climate Classifications Using Machine Learning</b> | 88 |
| <i>IBRAHIM OLALEKAN ALABI, HANS-PETER MARSHALL, JODI MEAN, AND ERNESTO TRUJILLO</i>                                                       |    |

|                                                                                           |    |
|-------------------------------------------------------------------------------------------|----|
| <b>Snow and Soil in Noah-MP: Examining their Interaction in the Eastern United States</b> | 90 |
| <i>MAHSA MORADI, CENLIN HE, RACHEL MCCRARY, AND JENNIFER M. JACOBS</i>                    |    |

|                                                                                                                                             |    |
|---------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Evaluation of the Noah-MP Land Surface Model for Snowmelt-Driven Flood Generation: Guidelines for Selecting Parameterization Schemes</b> | 91 |
| <i>EUNSAEM CHO, EUNSANG CHO, CARRIE VUYOVICH, BAILING LI, AND JENNIFER M. JACOBS</i>                                                        |    |

|                      |    |
|----------------------|----|
| <b>Sno-Foo Award</b> | 93 |
|----------------------|----|