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EDUCATION

- Post-Doctoral Fellowship** Cooperative Institute for Research in Environmental Sciences
University of Colorado at Boulder, 2004-2006.
- Ph.D.** Department of Hydrology and Water Resources, College of Engineering and Mines,
University of Arizona, Tucson, 2004
Minor: Remote Sensing and Spatial Analysis
Dissertation: 'Estimating the spatial distribution of snow water equivalent and
snowmelt in mountainous watersheds of semi-arid regions'
- M.S.** Donald Bren School of Environmental Science and Management, University of
California, Santa Barbara, 2000
Thesis: 'Analysis of alternative watershed management strategies for the Lauro
Canyon watershed, Santa Barbara County, California'
- B.A.** Environmental Studies, University of Colorado, Boulder, 1997

RESEARCH INTERESTS

Surface Water and Snow Hydrology; Remote Sensing; Ecohydrology

PROFESSIONAL EXPERIENCE

Research

- 2008 – Present **Research Scientist**, Water & Carbon Cycles Group, NASA Jet Propulsion
Laboratory, Pasadena, California.
- 2006 – Present **Assistant Research Scientist**, Department of Civil and Environmental
Engineering, University of California, Los Angeles.
- 2004 – 2006 **Post-Doctoral Fellow**, Cooperative Institute for Research in Environmental
Sciences, University of Colorado, Boulder.
- 2000 – 2004 **Graduate Research Associate**, Dept. of Hydrology and Water Resources,
University of Arizona, Tucson.

- 1998 – 2000 **Graduate Student Researcher**, Bren School of Environmental Science and Management, University of California, Santa Barbara.
- 1997 **Research Assistant**, Natural Hazards Research and Applications Information Center, University of Colorado, Boulder.
- Teaching*
- 2007 - Present **Lecturer**, 'Remote Sensing with Hydrologic Applications', UC, Los Angeles, Department of Civil and Environmental Engineering.
- 2007 - Present **Lecturer**, 'Practicum in Environmental Sciences', UC, Los Angeles, Institute of the Environment.
- 2006 **Guest Lecturer**, 'Introduction to Surface Hydrology', UC, Riverside, Department of Environmental Science.
- 2003 **Guest Lecturer**, 'Remote Sensing Applications in Civil Engineering', UC, Irvine, Department of Civil and Environmental Engineering.
- 2002 **Teaching Assistant**, 'The Earth and Its Environments: Introduction to Global Change', U. of Arizona, Natural Sciences Program.
- 2002 **Lecturer and Teaching Assistant**, 'Snow Hydrology: An Introduction to Physical, Chemical, and Biogeochemical Processes in Seasonally Snow-covered Systems', U. of Arizona, Department of Hydrology and Water Resources.
- 2001 **Guest Lecturer**, 'Advanced Topics in Hydrometeorology and Hydroclimatology', U. of Arizona, Department of Hydrology and Water Resources.
- 1999 **Teaching Assistant**, 'Human Use and Physical Processes of Rivers', UC, Santa Barbara, Department of Geography / Environmental Studies.

Theses Advised

- UCLA M. Durand (Ph.D., 2007) ; K. Musselman (Ph.D.) ; D. Perrot (undergrad.) ; L. Meromy (undergrad) ; A. Kwok (undergrad.)
- U. Colorado S. Kurc (Ph.D. 2006)
- U. Arizona K. Musselman (M.S. 2006); W. Veatch (M.S. 2008)

Field Experience

- 2008 **Co-Leader**, Development of Andean snow measurement program, Santiago, Chile (U. of Chile & Chile Department of Water Resources).
- 2006 - 2008 **Co-leader**, Development of a water-balance instrument cluster for ecosystem science, Sequoia National Park, California.
- 2006 **Project Leader**, Detection of snow – vegetation interactions using field spectroscopy, Niwot Ridge LTER, Colorado.
- 2005 **Project Leader**, Detection of arctic snow properties using field spectroscopy, Jakobshavn Glacier, Greenland Ice Sheet.
- 2004-2006 **Co-leader**, Development of a water-balance instrument cluster for ecosystem science, Valles Caldera National Preserve, New Mexico.
- 2002-2003 **Team Leader**, NASA Cold Land Processes Experiment, Rocky Mountains, Colorado.
- 2001-2002 **Participant**, Development of a water-balance instrument cluster for ecosystem science, Catalina Mountains, Arizona.

- 2001-2002 **Participant**, River channel geomorphology and nutrient flux measurement campaigns – NSF, SAHRA, San Pedro River, Arizona.
- 2001-2002 **Project Leader**, Monthly distributed snow water equivalent field campaigns – NSF, SAHRA, San Juan Mountains, Colorado.
- 2000 **Participant**, Ground Truth Mission for Research Scanning Polarimeter, Sierra Nevada, California.

HONORS AND AWARDS

- 2008 **Director's Fellowship**, NASA Jet Propulsion Laboratory.
- 2004-2006 Cooperative Institute for Research in Environmental Sciences (CIRES) **Visiting Fellowship**.
- 2003-2004 Graduate College **Fellow Award**: Research Excellence, U. Arizona.
- 2003-2004 Arizona Floodplain Management Association **Scholarship**.
- 2003 **Best Paper**, Western Snow Conference.
- 2003 *The Montgomery Prize*: **Best Oral Presentation**, El Dia del Agua, Dept. of Hydrology and Water Resources, University of Arizona.
- 2002-2004 Dept. of Hydrology and Water Resources, *Graduate Student Scholarship*, University of Arizona.
- 2001 *Dr. James E. Church Memorial Award*, **Best Student Paper**, Western Snow Conference.
- 2000-2002 NSF STC, Sustainability of semi-Arid Hydrology and Riparian Areas, *Graduate Research Fellowship*, University of Arizona.

INVITED PRESENTATIONS

- 2009 Merging satellite data, ground measurements, and modeling to understand the mountain water cycle, Swiss Federal Institute for Forest, Snow, and Landscape Research, Switzerland, March 3.
- 2009 Integrated measurement and modeling approaches for mapping snow over complex topography, Ecole Polytechnique Federale de Lausanne, Switzerland, March 13.
- 2009 Climate change at the edge of the cryosphere: integrating observations and models to understand the mountain water cycle, University of Colorado, Jan. 26.
- 2008 State-of-the-art snow measurement and modeling of the American Cordillera, Department of Civil Engineering, University of Chile, Oct. 6.
- 2008 Cryospheric change in the Sierra Nevada: combining satellite data, ground measurements, and modeling to understand the mountain water cycle, Institute for Geophysics and Planetary Physics, UCLA, March 28.
- 2008 Merging satellite data, ground measurements, and modeling to understand the mountain water cycle, Department of Civil & Environmental Engineering, UC Berkeley, March 3.
- 2008 Snowmelt Modeling in the Rio Grande Headwaters: Merging Field Studies with Satellite Observations, Department of Earth & Planetary Sciences, University of New Mexico, February 28.

- 2007 Observations and models for snowpack estimation over complex topography, Water & Carbon Cycle Seminar Series, NASA Jet Propulsion Laboratory, June 13.
- 2007 Planes, trains, and snowmobiles: observing the decline of Earth's snow and ice, Environmental Science Colloquium, UCLA, Institute of the Environment, April 16.
- 2006 Reconstructing snow water equivalent in the Rio Grande headwaters: a multi-sensor comparison, Water Resources Program, University of Colorado at Boulder, April 8.
- 2006 Snowmelt modeling in mountainous watersheds: merging field studies with satellite observations, Department of Environmental Science, UC, Riverside, April 3.
- 2006 Scaling snow observations from the point to the grid-element: implications for observation network design, National Snow and Ice Data Center, Boulder, Colorado, January 27.
- 2005 Up-scaling point observations of snow water equivalent in the Rio Grande headwaters: implications for observation network design, Department of Hydrology and Water Resources, University of Arizona, February 2.
- 2004 The Representation of Snow Surface Albedo in Distributed Snowmelt Models: a Comparison of Ground-based and Remotely Sensed Approaches, *Cryospheric Seminar*, National Snow and Ice Data Center, University of Colorado, Boulder, November 12.
- 2004 Global climate change: affects on snow and ice, *The Day After Tomorrow: Press Briefing*, SAHRA, University of Arizona, Tucson, May 25.
- 2004 Incorporating remotely sensed data into distributed snowmelt modeling in a mountainous watershed, *Forest Watershed Science Special Seminar*, Department of Environmental Science, Policy and Management, UC Berkeley, February 26.
- 2003 Snow measurement, melt & runoff research at the University of Arizona, *El Niño, Drought, and Fire-Related Forecasts and Research Initiatives: A Phoenix Press Briefing*, Arizona Department of Water Resources, March 20.
- 2002 Incorporating remotely sensed snow surface grain size into spatially distributed snowmelt modeling, *Fall AGU Meeting*, San Francisco, CA., December 8.

SERVICE ACTIVITIES

- Journal Reviews: *Climate Dynamics; Journal of Hydrometeorology, Journal of Geophysical Research; Water Resources Research; Talanta; Hydrological Processes; Monthly Weather Review; Hydrological Sciences Journal; Advances in Water Resources; Journal of Hydrology; Cold Regions Science and Technology; Arctic, Antarctic, & Alpine Research; Geophysical Research Letters*
- Proposal Reviews: NSF- Arctic Natural Sciences; Inter-American Institute for Global Change Research; NASA-Terrestrial Hydrology (Panelist); NSF- Hydrological Sciences; NSF – Instrumentation and Facilities
- Sessions Organized: 2007 Spring AGU, Hydrologic Uncertainty and Water Resource Management in the American Cordillera

SCIENTIFIC COMMITTEES AND WORKING GROUPS

2008 – Present	NASA JPL's Global Climate and Energy Initiative
2007 - Present	NCAR's Bio-hydro-atmosphere interactions of Energy, Aerosols, Carbon, H ₂ O, Organics & Nitrogen (BEACHON) Working Group
2004 - Present	Sierra Nevada Hydrologic Observatory Planning Group
2001 - Present	NASA Cold Land Processes Working Group

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

AGU (American Geophysical Union)
AMS (American Meteorological Society)
AWRA (American Water Resources Association)
AAAS (American Association for the Advancement of Science)

EXTERNAL GRANTS*Current / Selected*

NASA - \$400,000	Co-PI (E. Njoku PI): Optically equivalent snow grain size detection to enhance the multi-scale, multi-frequency snow datasets of the NASA Cold Lands Processes Experiment. (2009 – 2011)
NASA - \$580,000	Co-PI (M. Durand PI): Relating in situ snow cover properties to multi-scale, multi-frequency remote sensing data utilizing CLPX datasets. (2009 – 2012)
NSF - \$352,723	PI-Molotch : Snowpack energy and mass balance: implications for biogeochemical feedbacks in alpine watersheds. (2008 – 2011)
NOAA - \$365,495	PI-Molotch : Scaling snow observations from the point to the grid element: supporting NOHRSC's National Snow Analysis system. (2007 – 2010)
NASA - \$349,898	PI-Molotch : Assimilation of MODIS snow cover products into operational hydrologic forecast models. (2007 – 2010)
NSF - \$300,000	PI-Molotch : Quantifying controls on snow distribution in the Sierra Nevada using ground-based and remotely sensed observations within an ensemble Kalman smoother. (2007 – 2010)
USGS - \$63,116	PI-Molotch : A Bayesian approach to snow water equivalent reconstruction. (2008-2011)
NSF – \$97,653	Co-PI (G. Okin PI): Acquisition of an ASD FieldSpec3: field spectroscopy in support of aeolian geomorphology, snow hydrology, and teaching at UCLA. (2008)
NASA/JPL - \$47,269	Co-PI (S. Margulis PI): Characterizing snowpack accumulation and melt and the resulting spring streamflow in Sierra basins using a novel data assimilation and modeling approach. (2007 – 2010)
NSF - \$307,678	Co-PI (R. Bales PI): Observatory design in the mountain west: scaling measurements and modeling in the San Joaquin Valley and Sierra Nevada. (2006 – 2008)
NSF - \$16M	Co-PI (26 Co-PI's): Science and technology center for the Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA). (2005 – 2008)

Past

- NOAA - \$14,077 **PI-Molotch:** Realization of snow / vegetation interactions using field spectroscopy. (2005 – 2006)
- CUAHSI - \$5,000 **Co-PI (R. Rice PI):** Consortium of Universities for the Advancement of Hydrologic Science Inc., Vision paper grant: Mountain hydrology of the semi-arid western U.S. (2005)

PUBLICATIONS

- (19) Burns, S.P., M.W. Williams, P.D. Blanken, **N.P. Molotch**, A.A. Turnipseed, M.V. Losleben, and R.K. Monson, Rapid temperature changes within a subalpine forest snowpack, *Geophysical Research Letters*, in revision.
- (18) **Molotch, N.P.**, P.D. Brooks, S.P. Burns, M. Litvak, J.R. McConnell, R.K. Monson, and *K. Musselman, Ecohydrological controls on snowmelt partitioning in mixed-conifer sub-alpine forests, *Ecohydrology*, in press.
- (17) Veatch, W, P.D. Brooks, *J. Gustafson, **N. P. Molotch**, Quantifying the effects of forest canopy cover on net snow accumulation at a continental, mid-latitude site, Valles Caldera National Preserve, NM, USA, *Ecohydrology*, Vol. 2, doi: 10.1002/eco.45, 2009.
- (16) **Molotch, N.P.**, Reconstructing snow water equivalent in the Rio Grande headwaters using remotely sensed snow cover data and a spatially distributed snowmelt model, *Hydrological Processes*, Vol. 23, doi: 10.1002/hyp.7206, 2009.
- (15) **Molotch, N.P.**, T. Meixner, and M.W. Williams, Estimating stream chemistry during the snowmelt pulse using a spatially distributed, coupled snowmelt and hydrochemical modeling approach, *Water Resources Research*, Vol. 44, doi:10.1029/2007WR006587, 2008.
- (14) Durand, M., **N.P. Molotch**, and S. Margulis, A bayesian approach to snow water equivalent reconstruction, *Journal of Geophysical Research*, **I13**, doi:10.1029/2008JD009894, 2008.
- (13) **Molotch, N.P.**, and S.A. Margulis, Estimating the distribution of snow water equivalent using remotely sensed snow cover data and a spatially distributed snowmelt model: a multi-resolution, multi-sensor comparison, *Advances in Water Resources*, **31**, 2008.
- (12) Lyon, S.W., P.A. Troch, *P.D. Broxton, **N.P. Molotch**, P.D. Brooks, Monitoring the timing of snowmelt and the initiation of streamflow using a distributed network of temperature/light sensors, *Ecohydrology*, **1**, 2008.
- (11) Musselman, K., **N.P. Molotch**, and P.D. Brooks, Effects of vegetation on snow accumulation and ablation in a mid-latitude sub-alpine forest, *Hydrological Processes*, Vol 22, 2008.
- (10) Durand, M., **N.P. Molotch**, and S. Margulis, Merging complementary remote sensing datasets in the context of snow water equivalent reconstruction, *Remote Sensing of Environment*, Vol. 112, 2008.
- (9) **Molotch, N.P.**, P.D. Blanken, M.W. Williams, A.A. Turnipseed, R.K. Monson, and S.A. Margulis, Estimating sublimation of intercepted and sub-canopy snow using eddy covariance systems, *Hydrological Processes*, **21**, doi: 10.1002/hyp.6719, 2007.
- (8) Painter, T.H., **N.P. Molotch**, and *M. Cassidy, Contact spectroscopy for determination of stratigraphy of snow grain size, *Journal of Glaciology*, **53**(180), 2007.
- (7) Bales, R.C., **N.P. Molotch**, T.H. Painter, M. Dettinger, R. Rice, and J. Dozier, Mountain hydrology of the Western United States, *Water Resources Research*, **42**, W08432, doi:10.1029/2005WR004387, 2006.

- (6) **Molotch, N.P.**, and R.C. Bales, Comparison of ground-based and airborne snow-surface albedo parameterizations in an alpine watershed: impact on snowpack mass balance, *Water Resources Research*, VOL. **42**, doi:10.1029/2005WR004522, 2006.
- (5) **Molotch, N.P.**, and R.C. Bales, SNOTEL representativeness in the Rio Grande headwaters on the basis of physiographics and remotely sensed snow cover persistence, *Hydrological Processes*, VOL. **20**, doi: 10.1002/hyp.6128, 2006.
- (4) **Molotch, N.P.**, and R.C. Bales, Scaling snow observations from the point to the grid-element: implications for observation network design, *Water Resources Research*, VOL. **41**, doi: 10.1029/2005WR004229, 2005.
- (3) **Molotch, N.P.**, M.T. Colee, R.C. Bales, and J. Dozier, Estimating the spatial distribution of snow water equivalent in an alpine basin using binary regression tree models: the impact of digital elevation data and independent variable selection, *Hydrological Processes*, VOL. **19**, doi: 10.1002/hyp.5586, 2005.
- (2) **Molotch, N.P.**, T.H. Painter, R.C. Bales, and J. Dozier, Incorporating remotely sensed snow albedo into a spatially distributed snowmelt model, *Geophysical Research Letters*, VOL. **31**, doi:10.1029/2003GL019063, 2004.
- (1) **Molotch, N.P.**, S.R. Fassnacht, R.C. Bales, and S. R. Helfrich, Estimating the distribution of snow water equivalent and snow extent beneath cloud-cover in the Salt-Verde River basin, Arizona, *Hydrological Processes*, VOL **18**, doi:10.1002/hyp.1408, 2004.

Book Chapters

Fenn, M.E., Sickman, J.O., Bytnerowicz, A., Clow, D.W., **Molotch, N.P.**, Pleim, J.E., Tonnesen, G.S., Weathers, K.C., Padgett, P.E., and Campbell, D.H. Methods for measuring atmospheric nitrogen deposition inputs in arid and montane ecosystems of western North America. pp. 179-228 In A.H. Legge (ed.), *Developments in Environmental Science, Vol. 9: Relating Atmospheric Source Apportionment to Vegetation Effects: Establishing Cause Effect Relationships*. Elsevier, Amsterdam, 2009.

Conference Proceedings

- Molotch, N.P.**, P.D. Blanken, M.W. Williams, A.A. Turnipseed, R.K. Monson, and S.A. Margulis, Estimating sublimation of intercepted and sub-canopy snow using eddy covariance systems, *Proc. of the 63rd Eastern Snow Conference*, Newark, Delaware, 2006.
- Molotch, N.P.**, and R.C. Bales, SNOTEL representativeness in the Rio Grande headwaters on the basis of physiographics and remotely sensed snow cover persistence, *Proc. of the 73rd Western Snow Conference*, Great Falls, Montana, 2005.
- Molotch, N. P.**, T.H. Painter, R. C. Bales, and J. Dozier, Optimization of binary regression tree models for estimating the spatial distribution of snow water equivalent in an alpine basin, *Proc. of the 7th Western Snow Conference*, Scottsdale, Arizona, 2003
- Molotch, N.P.**, S.R. Fassnacht, S.R. Helfrich, and R.C. Bales, Estimating the distribution of snow water equivalent and snow extent beneath cloud-cover in the Salt-Verde River Basin, Arizona, *Proc. of the 59th Eastern Snow Conference*, Stowe, Vermont, 2002.
- Molotch, N. P.**, T. H. Painter, M. T. Colee, C. W. Rosenthal, J. Dozier, and R. C. Bales, Analysis of the spatial variability of snow cover depletion in an alpine watershed, Tokopah Basin, Sierra Nevada, California, USA, *Proc. of the 69th Western Snow Conference*, Sun Valley, Idaho, USA (*Best Student Paper Award*), 2001.

*Abstracts***2008**

- Molotch, N.P.**, T. Link, S.R. Fassnacht, E. Herchmer, L. Meromy, S. Roberts, R. Rice, Determining subgrid variability in snow water equivalent surrounding operational snow stations of the Western U.S., *2008 Fall AGU Meeting, San Francisco, CA.*
- Musselman, K.N., **N.P. Molotch**, S.A. Margulis, Spatial, seasonal, and interannual variability of snow accumulation control mechanisms in two neighboring alpine and sub-alpine catchments in California's seasonally snow-covered southern Sierra Nevada, *2008 Fall AGU Meeting, San Francisco, CA.*
- Molotch, N.P.**, S.A. Margulis, J. Dozier, T.H. Painter, D. Shen, A. Kwok, Inter-annual variability in snow cover depletion and snow water equivalent in the Sierra Nevada inferred from MODIS data, *2008 Fall AGU Meeting, San Francisco, CA.*
- Driscoll, J.M., T. Meixner, M.W. Williams, **N.P. Molotch**, Combining end-member and reaction path modeling: a case study on hydrologic structure in an alpine catchment, *2008 Fall AGU Meeting, San Francisco, CA.*
- Durand, M., **N.P. Molotch**, S.A. Margulis, Validation of an ensemble-based Bayesian snow water equivalent reconstruction model, *2008 Eastern Snow Conference, Fairley, VT.*
- Molotch, N.P., J.R. McConnell, M. Litvak, S.P. Burns, R.K. Monson, K. Musselman, P. D. Brooks, Ecohydrological controls on snowmelt partitioning in mixed-conifer sub-alpine forests, *2008 Eastern Snow Conference, Fairley, VT.*

2007

- Molotch, N.P.**, J.R. McConnell, M. Litvak, and P.D. Brooks, Ecohydrological controls on snowmelt partitioning in a mixed-conifer sub-alpine forest, Valles Caldera, New Mexico, *2007 Fall AGU Meeting, San Francisco, CA.*
- Rice, R., **N.P. Molotch**, and R.C. Bales, Embedded sensor network design for spatial snowcover, *2007 Fall AGU Meeting, San Francisco, CA.*
- Veatch, W.C., P.D. Brooks, **N.P. Molotch**, J.R. Gustafson, and P.D. Broxton, Quantifying the Effects of Forest Canopy Cover on Snow Accumulation and Ablation at a Continental, Mid-latitude Site, Valles Caldera National Preserve, NM, *2007 Fall AGU Meeting, San Francisco, CA.*
- Durand, M, **N.P. Molotch**, and S.A. Margulis, Estimating snowfall patterns using timeseries of remote sensing images within a Bayesian framework, *2007 Fall AGU Meeting, San Francisco, CA.*
- Dozier, J, J.S. Famiglietti, R. Rice, **N.P. Molotch**, K. Rittger, T.H. Painter, and R.C. Bales, Analysis of the Sierra Nevada Snowpack in the 21st Century, *2007 Fall AGU Meeting, San Francisco, CA.*
- Fisher, J., X. Meng, R. Rice, C. Butler, **N.P. Molotch**, T.C. Harmon, and R.C. Bales, The Sierra Nevada-San Joaquin Hydrologic Observatory (SNSJHO): A WATERS Network Test Bed, *2007 Fall AGU Meeting, San Francisco, CA.*
- Lyon, S.W., P.A. Troch, P.D. Broxton, **N. P. Molotch**, and P.D. Brooks, The Use of Distributed Temperature/Light Probes to Capture the Spatio-Temporal Dynamics of Snowmelt and Headwater Stream Discharge, *2007 Fall AGU Meeting, San Francisco, CA.*
- Molotch, N.P.**, Reconstructing snow water equivalent in the Rio Grande headwaters using remotely sensed snow cover data and a spatially distributed snowmelt model, *2nd Conference on Hydrology, American Meteorological Society, San Antonio, TX.*

2006

- Margulis, S., and **N.P. Molotch**, Reconstructing snow water equivalent in the Rio Grande headwaters: a multi-resolution, multi-sensor comparison, *2006 Fall AGU Meeting, San Francisco, CA.*

- Molotch, N.P.**, T.H. Painter, and M. Cassidy, Snow / vegetation interactions inferred from contact spectroscopy, *2006 Fall AGU Meeting, San Francisco, CA*.
- Sickman, J.O., **N.P. Molotch**, T. Meixner, M.W. Williams, and T.H. Painter, Estimating stream chemistry during the snowmelt pulse using remotely sensed snow observations and a coupled snowmelt and biogeochemical modeling approach, *2006 Fall AGU Meeting, San Francisco, CA*.
- Conklin, M., R. Bales, B. Boyer, D. Cayan, J. Dozier, G. Fogg, T. Harmon, J. Kirchner, N. Miller, **N.P. Molotch**, and K. Redmond, Observatory design in the mountain west: scaling measurements and modeling in the San Joaquin Valley and Sierra Nevada, *2006 Fall AGU Meeting, San Francisco, CA*.
- Burns, S.P., R.K. Monson, M.V. Losleben, M.W. Williams, and **N.P. Molotch**, Measurements of snowpack temperature In a Colorado subalpine forest, *2006 Fall AGU Meeting, San Francisco, CA*.
- Brooks, P.D., **N.P. Molotch**, K. Musselman, E. Small, J. McConnell, R. Bales, and A. Rinehart, The effects of forest vegetation on snow accumulation, ablation, and meltwater routing, Valles Caldera National Preserve, NM, *2006 Fall AGU Meeting, San Francisco, CA*.
- Molotch, N.P.**, Reconstructing snow water equivalent in the Rio Grande headwaters using remotely sensed snow cover data and a spatially distributed snowmelt model. *2006 AGU Hydrology Days, Fort Collins, CO*.

2005

- Molotch, N.P.**, and R.C. Bales, Local-scale controls on snow distribution in the Rio Grande headwaters: implications for evaluating spatially distributed snowpack estimates, *2005 Fall AGU Meeting, San Francisco, CA*.
- Musselman, K., P.D. Brooks, and **N.P. Molotch**, Quantifying the effects of vegetation on a montane snowpack, Valles Caldera National Preserve, NM, *2005 Fall AGU Meeting, San Francisco, CA*.
- Bales, R.C., **N.P. Molotch**, D. Marks, and E. Small, Integrated snow and soil and water balance measurement strategy for multi-scale environmental observations in mountain areas, *2005 Fall AGU Meeting, San Francisco, CA*.
- Bales, R.C., et al., including **N.P. Molotch**, Measurement strategies for advancing understanding and forecasting of the Sierra Nevada water balance, *Second Annual Climate Change Research Conference, Sacramento, CA*.
- Molotch, N.P.**, and R.C. Bales, Scaling snow observations from the point to the grid-element: implications for observation network design. *2005 AGU Hydrology Days, Fort Collins, CO*.

2004

- Colee, M.T., J. Dozier, T.H. Painter, and **N. P. Molotch**, A spatially explicit snow model in a mid-latitude alpine basin. *2004 Fall AGU Meeting, San Francisco, CA*.
- Molotch, N.P.**, and R.C. Bales, Evaluation of the representativeness of automated snow water equivalent sensors in the Rio Grande headwaters using intensive field observations, remotely sensed snow cover data, and distributed snowmelt models. *2004 Fall AGU Meeting, San Francisco, CA*.
- Bales, R.C., J. Dozier, **N.P. Molotch**, T.H. Painter, and R. Rice, Mountain hydrology of the semi-arid western U.S.: research needs, opportunities and challenges. *2004 Fall AGU Meeting, San Francisco, CA*.
- Bales, R.C., J. Dozier, J. Famiglietti, G. Fogg, J. Hopmans, J. Kirchner, T. Meixner, **N.P. Molotch**, K. Redmond, R. Rice, J. Sickman, and J. Warwick, Plan for a Sierra Nevada Hydrologic Observatory: science aims, measurement priorities, research opportunities and expected impacts. *2004 Fall AGU Meeting, San Francisco, CA*.

Molotch, N. P., T.H. Painter, and R.C. Bales, Simulating snow / atmosphere energy exchange using semi-physical models and remotely sensed snow albedo data. *2004 AGU Western Pacific Geophysics Meeting*, Honolulu, HI.

Bales, R.C., **N.P. Molotch**, and R. Rice, Spatial variability of snow depths at SNOTEL sites: implications for network design. *2004 Mountain Climate Sciences Symposium, Kings Beach, CA.*

2003

Molotch, N. P., T.H. Painter, R. C. Bales, and J. Dozier, Incorporation of remotely-sensed snow grain size into a spatially distributed physical snowmelt model, *12th JPL Airborne Earth Science Workshop*, Jet Propulsion Laboratory, Pasadena, CA.

Molotch, N. P., T.H. Painter, R. C. Bales, and J. Dozier, Accuracy assessment of a net radiation and temperature index snowmelt model using ground observations of snow water equivalent in an alpine basin, *2003 Spring AGU Meeting*, Nice, France.

Molotch, N.P., T.H. Painter, R.C. Bales, and J. Dozier, Assimilation of remotely sensed snow cover properties into operational snowmelt modeling, *13th Annual El Dia del Agua*, Dept. of Hydrology and Water Resources, University of Arizona.

Brown-Mitic, C., **N.P. Molotch**, and R.C. Bales, Spatial energy balance snowmelt modeling of the Echaurren and Tokopah watersheds, *International Union of Geodesy and Geophysics 2003 General Assembly*, Sapporo, Japan.

2002

Molotch, N.P., T.H. Painter, M.T. Colee, R.C. Bales, and J. Dozier, Incorporating remotely sensed snow surface grain size into spatially distributed snowmelt modeling, *2002 Fall AGU Meeting*, San Francisco, CA (*Invited Presentation*).

M.T. Colee, T.H. Painter, J. Dozier, D. Turney and **N. P. Molotch**, A spatially-explicit snow model of a mid-latitude alpine basin, *2002 Fall AGU Meeting*, San Francisco, CA.

Molotch, N.P., S.R. Fassnacht, T. Bardsley and R.C. Bales, A comparison of spatial statistical techniques for the development of a validation data set for mesoscale modeling of snow water equivalence, *SAHRA 2nd Annual Meeting*.

2001

Molotch, N.P., S.R. Fassnacht, M.T. Colee, T. Bardsley and R.C. Bales, A comparison of spatial statistical techniques for the development of a validation data set for mesoscale modeling of snow water equivalence, *2001 Fall AGU Meeting*, San Francisco, CA.