CSAS-ASSISTED SCHOLARLY PUBLICATIONS

Scientific Publications | Presentations | Student Theses | More

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Courville ZR, Lieblappen RM, Thurston AK, Barbato RA, Fegyveresi JM, Farnsworth LB, Derry J, Jones RM, Doherty SJ and Rosten SA (2020) Microorganisms Associated With Dust on Alpine Snow. Front. Earth Sci. 8:122.doi: 10.3389/feart.2020.00122

Reynolds, R. L., Goldstein, H. L., Moskowitz, B. M., Kokaly, R. F., Munson, S. M., Solheid, P., et al. (2020). Dust deposited on snow cover in the San Juan Mountains, Colorado, 2011–2016: Compositional variability bearing on snow-melt effects. Journal of Geophysical Research: Atmospheres, 125, e2019JD032210. https://doi.org/10.1029/2019JD032210

Follum ML, Niemann JD, Fassnacht SR. A comparison of snowmelt-derived streamflow from temperature-index and modified-temperature-index snow models. Hydrological Processes. 2019;1–16. https://doi.org/10.1002/hyp.13545

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

Ménard, C. B., Essery, R., Barr, A., Bartlett, P., Derry, J., Dumont, M., Fierz, C., Kim, H., Kontu, A., Lejeune, Y., Marks, D., Niwano, M., Raleigh, M., Wang, L., and Wever, N.: Meteorological and evaluation datasets for snow modelling at 10 reference sites: description of in situ and bias-corrected reanalysis data, Earth Syst. Sci. Data, 11, 865–880, https://doi.org/10.5194/essd-11-865-2019, 2019.

Painter, T. H,S. M. Skiles, J. S. Deems, W. T. Brandt, and J. Dozier (2017), Variation in rising limb of Colorado River snowmelt runoff hydrograph controlled by dust radiative forcing in snow, Geophysical Research Letters, 44. https://doi.org/10.1002/2017GL075826.

Zhuojun Zhang, Harland L. Goldstein, Richard L. Reynolds, Yongfeng Hu, Xiaoming Wang, and

Mengqiang Zhu (2018), Phosphorus Speciation and Solubility in Aeolian Dust Deposited in the Interior American West, Environ. Sci. Technol., 2018, 52 (5), pp 2658–2667. doi: 10.1021/acs.est.7b04729

ChenglaiWu, Xiaohong Liu, Zhaohui Lin, Stefan R. Rahimi-Esfarjani, and Zheng Lu (2018), Impacts of absorbing aerosol deposition on snowpack and hydrologic cycle in the Rocky Mountain region based on variable-resolution CESM (VR-CESM) simulations, Atmospheric Chemisrty and Physics, 18, 511–533, 2018. https://doi.org/10.5194/acp-18-511-2018

Skiles, S.M. and Painter, T. (2017) 'Daily evolution in dust and black carbon content, snow grain size, and snow albedo during snowmelt, Rocky Mountains, Colorado', *Journal of Glaciology*, 63(237), pp. 118–132. doi: 10.1017/jog.2016.125.

Skiles, S.M., Painter, T. and Okin, G.S. (2017) 'A method to retrieve the spectral complex refractive index and single scattering optical properties of dust deposited in mountain snow', *Journal of Glaciology*, 63(237), pp. 133–147. doi: 10.1017/jog.2016.126.

Guy, Z.M., Deems, J. (2016), Unusual Dry Slab Avalanche Releases Involving Dust-on-Snow Layers in Colorado, Proceedings, International Snow Science Workshop, Breckenridge, Colorado.

Axson, J. L., H. Shen, A. L. Bondy, C. C. Landry, J. Welz, J. M. Creamean, A. P. Ault (2016), Transported Mineral Dust Deposition Case Study at a Hydrologically Sensitive Mountain Site: Size and Composition Shifts in Ambient Aerosol and Snowpack, *Aerosol and Air Quality Res.*, 16: 555-567, doi:10.4209/aaqr.2015.05.0346

Lapo, K. E., L. M. Hinkelman, C. C. Landry, A. K. Massmann, and J. D. Lundquist (2015), A simple algorithm for identifying periods of snow accumulation on a radiometer, Water Resour. Res., 51, doi:10.1002/2015WR017590.

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Chen, Y., C. M. Naud, I. Rangwala, C. C. Landry, and J. R. Miller, Comparison of the sensitivity of surface downward longwave radiation to changes in water vapor at two high elevation sites, Environ. Res. Lett. 9 (2014) doi:10.1088/1748-9326/9/11/114015

Landry, C. C., K. A. Buck, M. S. Raleigh, and M. P. Clark (2014), Mountain system monitoring at Senator Beck Basin, San Juan Mountains, Colorado: A new integrative data source to develop and evaluate models of snow and hydrologic processes, Water Resour. Res., 50, 1773–1788, doi:10.1002/2013WR013711.

Bryant, A. B., T. H. Painter, J. S. Deems, and S. M. Bender (2013), Impact of dust radiative forcing in snow on accuracy of operational runoff prediction in the Upper Colorado River Basin, *Geophys. Res. Lett.*, *40*, doi: 10.1002/grl.50773, 2013.

J. Brahney, A.P. Ballantyne, C. Sievers, J.C. Neff. Increasing Ca2+ deposition in the western US: the role of mineral aerosols. *Aeolian Research* (2013),http://dx.doi.org/10.1016/j.aeolia.2013.04.003

Raleigh, M. S., C. C. Landry, M. Hayashi, W. L. Quinton, and J. D. Lundquist (2013), Approximating snow surface temperature from standard temperature and humidity data: New possibilities for snow model and remote sensing evaluation, Water Resour. Res., 49, 8053–8069, doi:10.1002/2013WR013958.

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current and future dust deposition and regional warming on Colorado River Basin snow dynamics and hydrology, Hydrol. Earth Syst. Sci., 17, 4401-4413, doi:10.5194/hess-17-4401-2013.

Naud, C. M., Y. Chen, I. Rangwala, and J. R. Miller (2013), Sensitivity of downward longwave surface radiation to moisture and cloud changes in a high-elevation region, J. Geophys. Res. Atmos., 118,10,072–10,081, doi:10.1002/jgrd.50644.

Painter, T. H., A. C. Bryant, and S. M. Skiles (2012), Radiative forcing by light absorbing impurities in snow from MODIS surface reflectance data, *Geophys. Res. Lett.*, 39, L17502, doi:10.1029/2012GL052457.

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Skiles, S. M., T. H. Painter, J. S. Deems, A. C. Bryant, and C. Landry (2012), Dust radiative forcing in snow of the Upper Colorado River Basin: Part II. Interannual variability in radiative forcing and snowmelt rates, *Water Resour. Res.*, doi:10.1029/2012WR011986.

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Marshall, H.P., C. Pielmeier, S. Havens, and F. Techel (2010), Slope-scale Snowpack Stability Derived from Multiple Snowmicropen Measurements and High-resolution Terrestrial FMCW Radar Surveys. *Proceedings of the 2010 International Snow Science Workshop*, Squaw Valley, California.

Simonson, S.E., E. Greene, S. Fasnacht, T. Stohlgren and C. Landry (2010) Practical Methods for Using Vegetation Patterns to Estimate Avalanche Frequency Magnitude. *Proceedings of the 2010 International Snow Science Workshop*, Squaw Valley, California.

Painter, T. H., J. Deems, J. Belnap, A. Hamlet, C. C. Landry, and B. Udall (2010), Response of Colorado River runoff to dust radiative forcing in snow, *Proceedings of the National Academy of Sciences*, published ahead of print September 20, 2010,doi:10.1073/pnas.0913139107.

Lawrence, C. R., T. H. Painter, C. C. Landry, and J. C. Neff (2010), Contemporary geochemical composition and flux of aeolian dust to the San Juan Mountains, Colorado, United States, *Journal of Geophysical Research*, 115, G03007, doi:10.1029/2009JG001077.

Steltzer, H., C. Landry, T. H. Painter, J. Anderson, and E. Ayres. 2009.Biological consequences of earlier snowmelt from desert dust deposition in alpine landscapes. *Proceedings of the National Academy of Sciences.* 106: 11629-11634, doi_10.1073_pnas.0900758106.

Neff, J.C., A.P. Ballantyne, G.L. Farmer, N.M. Mahowald, J.L. Conroy, C.C. Landry, J.T. Overpeck, T.H. Painter, C.R. Lawrence and R.L. Reynolds. 2008. Increasing eolian dust deposition in the western United States linked to human activity, *Nature Geoscience,* Vol. 1, No. 3, pp. 189-195, March 2008, doi: 10.1038/ngeo136

Painter, T. H., A. P. Barrett, C. C. Landry, J. C. Neff, M. P. Cassidy, C. R. Lawrence, K. P. Thatcher, L. Farmer. (2007) Impact of disturbed desert soils on duration of mountain snow cover. *Geophysical Research Letters*. V34, 12, L12502, 10.1029/2007GL030208.

Selected Presentations and Outreach:

December 2014: AGU Fall Meeting:
Mark S. Raleigh, JD Lundquist, and MP Clark (2014), Which forcing data errors matter most when modeling seasonal snowpacks?, Abstract C43E-0444 presented at the 2014 Fall Meeting AGU, San Francisco, CA 15-19 Dec.
Michael Follum, C Downer, and J Niemann (2014), Simulating the spatial distribution of snow pack and snow melt runoff with different snow melt algorithms in a physics based watershed model. Abstract H42B-03 presented at the 2014 Fall Meeting AGU, San Francisco, CA 15-19 Dec.

Sept 29, 2014: Chris Landry presented a poster and paper on “Desert Dust and Snow Stability” at the International Snow Science Workshop in Banff, Alberta.
July 17, 2014: Mark Raleigh presented, on behalf of CSAS, a talk titled “High elevation headwaters hydrology and snow monitoring at Senator Beck Basin, San Juan Mountains, Colorado, USA: a 7 year dataset” at the international Global Fair and Workshop on Mountain Observatories, Reno, NV.
December 2013: AGU Fall Meeting
Mark S. Raleigh, CC Landry, M Hayashi, WL Quinton, and JD Lundquist (2013), Approximating snow surface temperature from standard temperature and humidity data: New possibilities for snow model and remote sensing evaluation, Abstract C43E-08 presented at the 2013 Fall Meeting AGU, San Francisco, CA 9-13 Dec.
December 2012: AGU Fall Meeting
Imtiaz Rangwala, JR Miller, CM Naud, Y Chen (2012), Quantifying Climate Feedbacks in High Elevation Regions, Abstract A21D-0080 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.
Martyn P Clark, D Kavetski, AG Slater, JD Lundquist, AW Wood, DJ Gochis, ED Gutmann, R Rasmussen (2012), A computational framework to advance hydrometeorological prediction capabilities in cold regions, Abstract C33A-0630 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.
McKenzie Skiles, T Painter, JS Deems, C Landry, A Bryant (2012), Dust in Snow in the Colorado River Basin: Spatial Variability in Dust Concentrations, Radiative Forcing, and Snowmelt Rates, Abstract C53C-0864 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Thomas Painter, A C Bryant, JS Deems, M Skiles (2012), Hydrological and ecological implications of radiative forcing by dust in snow *(Invited)*, Abstract B21I-01 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Jeffrey S Deems, T Painter, J Barsugli (2012), Multiscale hydrologic impacts of dust deposition and climate warming in the Upper Colorado River Basin *(Invited)*, Abstract C41D-07 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Jeffrey S Deems, DC Finnegan, A Fowler, T Painter (2012), Integration of ground-based and airborne lidar data for improved terrain model generation, Abstract G23A-0888 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Heidi Steltzer, J Korb, K Daly, E Sienicki, G Fullmer, E Cornell, S Bangert, M Remke (2012), When Snow Melts Early: The Unusual Alpine Plant Life Histories During the Summer of 2012, Abstract B21I-08 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Felix C Seidel, T Painter, AC Bryant, M Skiles, KE Rittger (2012), Retrievals of Dust and Black Carbon Radiative Forcing in Snow using Imaging Spectroscopy, Abstract C53C-0866 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Ann C Bryant, T Painter, M Skiles (2012), Radiative forcing by light absorbing impurities in snow in the Upper Colorado River Basin using MODIS surface reflectance data *(Invited)*, Abstract C53C-0865 presented at the 2012 Fall Meeting AGU, San Francisco, CA 3-7 Dec.

Nov 8, 2012: Chris Landry presented "Snow system interannual variability case study – WY 2011 and WY 2012" at the Upper Colorado River Basin Conference in Grand Junction.

July 16-20, 2012: Presented Senator Beck Basin Mountain System Observatory poster at the CUHASI meeting in Boulder

April 19, 2012: Mountain System Processes and Change Presentation to the Seven Basin States Technical Committee in Las Vegas, NV

April 18, 2012: Guest Lecture on dust-on-snow and Senator Beck Basin for the Bureau of Reclamation Lower Basin Offices, Las Vegas, NV

Feb 24, 2011: Upper Rio Grande Watershed Snowmelt Impacts of Dust-on-Snow presented to the Annual Meeting of the Engineer Advisors to the Rio Grande Compact Commission in Albuquerque, NM

Jan 31, 2012: Dust-on-Snow is Affecting Colorado Snowmelt Water Supplies presented to the CSU Agricultural Advisory Committee, Southwestern Colorado Research Center

Nov 3, 2011: Dust-on-Snow in Colorado and its Hydrological Effects presented at the Public Lands Partnership meeting in Montrose, CO

December 2011: AGU Fall Meeting

Deeb, E.J., H.P. Marshall, D.C. Finnegan, J. Deems, and C. Landry (2011), Comparison of ground-based LiDAR and ground-based radar of southwestern Colorado snowpack, Abstract C33D-0673, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

Marshall, H., et al. (2011) Alpine snow distribution from-ground based radar measurements compared with a high resolution digital elevation model from ground-based LiDAR observations, Abstract C33D-0674, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

Bryant, A.C. and T.H. Painter (2100) Hydrologic response to dust radiative forcing of snow in the Upper Colorado River Basin, Abstract C31A-0585, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

Skiles, M., T.H. Painter, J.S. Deems, A.P. Barrett (2011) Interannual Variability in Dust Deposition, Radiative Forcing, and Snowmelt Rates in the Colorado River Basin, Abstract C41F-05, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

Oct 31, 2011: Proposed Alpine to Arid Hydrologic & Ecological Observatory presented at Mesa University in Grand Junction, CO

Dec 2010: Several posters and talks at the December 2010 American Geophysical Union (AGU) feature research supported by CSAS.

Oct 8, 2010: Dust-on-Snow and Colorado Avalanche Processes at CAIC's Colorado Snow and Avalanche Workshop in Leadville, CO

Oct 7, 2010: Presentation about the Colorado Dust-on-Snow Program at the Mountain Studies Institute Climate Conference in Silverton, CO

Oct 1, 2011: Mountain System and Plant Community Monitoring presented at the Colorado Native Plant Society meeting in Carbondale, CO

Aug 19, 2010: Dust-on-Snow in Colorado presented to Denver Water

Feb 11, 2010: How Dust-on-Snow is Complicating Ditch and Reservoir Operations presented to the Ditch and Reservoir Company Alliance (DARCA) Annual Convention in Durango, CO

Nov 19, 2009: The Martian Winter of 2008-2009 presented to the Colorado Cattlemen's

Association

Nov 18, 2009: USFS Climate and Water Presentation

August 20, 2009: The Martian Winter of 2008-2009 presented to the Colorado Water Congress

June 9-12, 2008: Mountain System Monitoring and Research Synergies talk at the MTNCLIM 2008 Conference, Silverton, CO.

March 2008: Colorado State 2008 Hydrology Days presentation: Integrated mountain system monitoring and snow system research at Senator Beck Basin, San Juan Mountains, Southwest Colorado

July 2007: CSAS Presents Dust-on-Snow Talk at Colorado Water Workshop, A Statewide Gathering of Water Managers and Stakeholders (see http://www.western.edu/water/ for archive of meeting)

April 2007: Talk Presented to the Spring Runoff Conference at Utah State University, Logan, UT.

Oct 2006: Mountain Studies Institute Convenes Scientists and Stakeholders to Discuss Variability and Change in San Juan Mountains Climate – CSAS Presents Talk and Hosts Field Tour of Senator Beck Basin Monitoring Facilities.

September 2006: CSAS featured or plays supporting role in seven presentations at 2006 International Snow Science Workshop Held in Telluride, Colorado in October (attended by 700 Participants from 15 Nations!)

Dec 2006: Landry presented a Poster at American Geophysical Union 2006 Fall Meeting in San Francisco on December 13, 2006: Mountain System Monitoring at Senator Beck Basin, San Juan Mountains, Colorado.

July 2006: CSAS Presents Dust-on-Snow Talk at Colorado Water Workshop, A Statewide Gathering of Water Managers and Stakeholders (see http://www.western.edu/water/ for archive of meeting) held on July 28, 2006 in Gunnison, CO.

May 2006: Shane Stradling Completes and Presents his Dust-On-Snow Research.

Oct 2005: CSAS co-hosts, with the University of Colorado ‘s Cooperative Institute for Research in Environmental Sciences, a Snow System Science Workshop.

March 2005: Presented at MTNCLIM2005, a conference held in Pray, Montana on March 1-4,

2005 concerning mountain climates and their effects on ecosystems. CSAS presented a poster describing the Senator Beck Basin Study Area research infrastructure and indicated CSAS's interest in the development of a mountain climate monitoring network.
December 2004: Presented at the Fall Meeting of the American Geophysical Union held in San Francisco December 13-17, 2004 with a poster titled, "Mountain Snow System Interactions" and featuring our dust on snow pilot study and a discussion of avalanche formation processes interactions.
Sept 2004: Presented at the 2004 International Snow Science Workshop Conference held September 19-24, 2004 in Jackson Hole, Wyoming to present a poster introducing the CSAS to the avalanche scientists in attendance.
May 2004: "Mountain Snow System Observation Protocol" concept presented to the Mountain Climate Sciences Symposium in Lake Tahoe, CA
April 2003: Center for Snow and Avalanche Studies introduced our Senator Beck Basin Study Areato the Western Snow Conference in Vancouver, BC

Student Theses:

Kevin S. J. Brown, Snow Depth Measurement Via Automated Image Recognition. Watershed Science, Colorado State University (MA 2019)
McKenzie Skiles, Dust and Black Carbon Radiative Forcing Controls on Snowmelt in the Colorado River Basin, Department of Geography, University of California-Los Angeles, (PhD 2014).
Annie Bryant Burgess, Hydrologic implications of Dust on Snow in the Upper Colorado River Basin, Department of Geography, University of Utah, (PhD 2013).
Corey P. Lawrence, Aeolian deposition in the San Juan Mountains of southwestern Colorado, USA: The biogeochemical role of dust in soil development and weathering. Department of Geological Sciences, University of Colorado, Boulder (PhD, May 2009).
Julie A. Crawford, Multi-scale investigations of alpine species of the northern hemisphere. University of Pavia, Italy. (PhD, 2010).
McKenzie Skiles, Interannual Variability in Radiative Forcing by Desert Dust in Snowcover in

the Colorado River Basin, Department of Geography, University of Utah, (MS, May 2010).
Sarah Castle, M.S. (GEOL), Nutrient cycling in geologically distinct alpine basins in the San Juan Mountains of Colorado. University of Colorado – Boulder, Geosciences Department. (MS, May 2008).
Kathleen McBride, A synoptic climatology of desert dust deposition to the snowpack in the San Juan Mountains, Colorado, U.S.A., Department of Geography, Northern Arizona University, Flagstaff (MA, December, 2007).
Shane Stradling, An investigation of how dust deposition affects snowpack and snow albedo, Swamp Angel Site, San Juan County, CO, Department of Geosciences, Fort Lewis College, Durango, Colorado (BS, May 2007).

More:

CSAS cover article: Know your snow (featured application). Campbell Scientific Update (2010, Vol. 21, Issue 1).
CSAS's Senator Beck Study Plot Featured on Cover of Book: *Snow and Climate: Physical Processes, Surface Energy Exchange and Modeling* by Armstrong and Brun, Cambridge University Press. 2008.