

JEFFREY S. DEEMS, PH.D.

NASA EARTH SYSTEM SCIENCE FELLOW

Watershed Science
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PROFESSIONAL INTERESTS

My professional goals involve scientific research into mountain snowpack and hydrologic dynamics in a professional consulting, university, or research laboratory position. My research direction has aided in developing new methods for measuring snow depth with remote sensing, and has applied techniques from other geophysical fields to the characterization of spatial variability in snow properties. These research interests are motivated by a desire to further and apply our understanding of process dynamics that govern the evolution of seasonal snowpacks, and by a need for improved data products in support of hydrologic and global change interests.

RESEARCH INTERESTS

Spatial variation in snow properties
Scaling in snow hydrology
Snow depth mapping for water supply inventory
Climate change impacts at basin scales
Remote sensing applications in snow and avalanche science
Optimal spatial sampling of snow properties
Field instrumentation development
Avalanche hazard mapping
Nonlinear dynamical systems applications in snow hydrology and avalanches
Geographic Information Systems and earth systems modeling

EDUCATION

2007	Ph.D. , Watershed Science, Colorado State University (Advisor: Dr. Steven Fassnacht) Dissertation: <i>Quantifying scale relationships in snow hydrology.</i>
2002	M.S. , Geography, Montana State University, Bozeman (Advisor: Dr. Kathy Hansen) Thesis: <i>Topographic influence on spatial patterns of snow temperature gradients.</i>
1995	B.A. , Geological Sciences; Environmental Conservation, Minor: Geography, University of Colorado at Boulder

FELLOWSHIPS AND SCHOLARSHIPS

2004-2007	NASA Earth System Science Fellowship
2003	Randy Cook Memorial Scholarship , Colorado State University
2001-2002	Barry C. Bishop Scholarship for Mountain Research , Montana State University

TEACHING EXPERIENCE

- 2003 **Teaching Assistant** – Snow Dynamics and Accumulation, Montana State University
2000-2002 **Teaching Assistant** – Introduction to Physical Geography,
Department of Earth Sciences, Montana State University

PUBLICATIONS

Journal Articles

- Deems, J. S., S. R. Fassnacht, and K. J. Elder (2006), Fractal distribution of snow depth from LiDAR data, *Journal of Hydrometeorology*, 7(2) 285-297.
- Fassnacht, S. R. and J. S. Deems (2006), Measurement Sampling and Scaling for Deep Montane Snow Depth Data, *Hydrological Processes*, 20, 829-838.
- Deems, J. S., S. R. Fassnacht, and K. J. Elder (2007), Interannual consistency in fractal snow depth patterns at two Colorado mountain sites, *Journal of Hydrometeorology*, *in review*.
- Deems, J. S., K. J. Elder, and S. R. Fassnacht (2007), Spatial structure differences in snow depth distributions between forested and open sites, *in preparation*.
- Deems, J. S. and G. E. Liston (2007), Fractal analysis and multiscale process modeling of snow depth distributions, *in preparation*.
- Deems, J. S. and T. H. Painter (2007), Uncertainties in lidar measurements of snow depth, *in preparation*.

Conference Publications and Abstracts

- Deems, J. S. and G. E. Liston (2006), Multiscale process modeling of spatial snow depth distributions, *AGU Fall Meeting, San Francisco, CA*.
- Deems, J.S. and T. H. Painter, (2006), Lidar measurement of snow depth: accuracy and error sources, *Proceedings of the 2006 International Snow Science Workshop, Telluride, CO*.
- Deems, J. S., S. R. Fassnacht, and K. J. Elder (2005), Interannual consistency in fractal snow depth patterns at two Colorado mountain sites, *AGU Fall Meeting, San Francisco, CA*.
**Invited Paper*
- Deems, J. S., K. J. Elder, and S. R. Fassnacht (2005), Spatial structure differences in snow depth distributions between forested and open sites, *AGU Fall Meeting, San Francisco, CA*.
**Selected as the Best Student Paper by the Cryosphere Specialty Group*
- Deems, J. S., T. H. Painter, and C. C. Landry (2005), Contingent evolution of snowpack properties, *AAG Annual Meeting, Denver, CO*.
- Deems, J. S., K. J. Elder, and S. R. Fassnacht (2004), Fractal distribution of snow depth from LiDAR data, *AGU Fall Meeting, San Francisco, CA*.
- Deems, J. S., K. J. Elder, and S. R. Fassnacht (2003), Spectral signatures of snow depth time series, *AGU Fall Meeting, San Francisco, CA*.
- Deems, J. S., K. Birkeland, and K. Hansen. (2002), Topographic influence on the spatial patterns of snow temperature gradients in a mountain snowpack. *Proceedings of the 2002 International Snow Science Workshop, Penticton, BC, Canada*, 384-391.

Deems, J. S., K. Birkeland, and K. Hansen. (2002), Geographic variation in snow temperature gradients in a mountain snowpack. *Proceedings of the 2002 Western Snow Conference, Granby, Colorado*, May 20-23, 2002, p. 130-137.

**Selected for the Best Student Paper Award*

Deems, J. S. (2001), Topographic controls on spatial and temporal variation in snow temperatures in a mountain snowpack. *Proceedings of the 2001 Western Snow Conference, Sun Valley, ID*, May 20-23, 2001, p. 131-134.

INVITED LECTURES

Snow Avalanches, GEOG 4321 Snow Hydrology, Spring 2003, University of Colorado, Boulder

Seeing Snow from Space: Remote sensing of snow for hydrology and global change,
Aspen Center for Environmental Studies, Naturalist Nights Lecture, 2006

The World Under Your Skis: Global connections to a local snowpack,
Aspen Center for Environmental Studies, Naturalist Nights Lecture, 2005

Snow Science – A window to the world, Aspen Center for Environmental Studies,
Aspen Center for Environmental Studies, Naturalist Nights Lecture, 2004

COLLABORATIONS

Kelly Elder, US Forest Service

Steven Fassnacht, Colorado State University

Glen Liston, CIRA, Colorado State University

Thomas Painter, University of Utah/National Snow and Ice Data Center

Fred Kruse, Horizon Geolmaging

Chris Landry, Center for Snow and Avalanche Studies

Hans-Peter Marshall, INSTAAR/CRREL

Karl Birkeland, USFS National Avalanche Center/Montana State University

Kathy Hansen, Montana State University

FIELD EXPERIENCE

2004-2007 Dust Radiative Impacts in Snow,
San Juan Mountains, CO, Participant

2004-2006 CLPX Follow-up Surveys, Team Leader

2003 Temporal Changes in the Spatial Variability of Snow Stability,
southwest MT, Participant

2002-2003 Cold Land Processes Experiment, Team Leader

2000-2003 SW Montana Avalanche Center, Field Assistant

2000-2003 Spatial variations in snow stability on uniform slopes,
Bridger Range, MT, Team Leader

JOURNAL REVIEWS

Cold Regions Science and Technology

Hydrological Sciences Journal