Available online at www.sciencedirect.com
ScienceDirect
Cold Regions Science and Technology 51 (2008) 85–86
cold regions science and technology
www.elsevier.com/locate/coldregions

Editorial

International Snow Science Workshop 2006

The International Snow Science Workshop (ISSW) was held in Telluride, Colorado, USA on 1–6 October 2006. The ISSW is a unique conference that brings together practitioners from various snow and avalanche related industries and academics whose research supports and encourages those working out in the snow fields. Over 800 attendees from 15 countries participated in the meeting. There were more than 140 contributions from snow practitioners and researchers that fit well with the theme of the ISSW — *The Merging of Theory and Practice* (Gleason, 2006). This Special Issue of Cold Regions Science and Technology contains 15 papers based on ISSW 2006 contributions. These papers reflect the recent advances and some of the current research fields in snow and avalanche science.

Engineering methods continue to evolve to better explain the mechanics of avalanche release. The following papers focus on fracture propagation which appears to be a key to understanding the behaviour of avalanche initiation. Gauthier and Jamieson present a new field test to measure propagation of the weak layer fracture and failure that they relate to shear fracture models. Mahajan and Joshi used a model to simulate crack propagation and determine the speed of crack growth along an interface under a shear and compressive load. Schweizer et al. investigated field data to estimate slope stability using stability test score, fracture character and an index of structural stability.

Accurately measuring the dynamics of a moving avalanche has been a challenge that researchers in Switzerland, Norway and Austria have been addressing to help with predicting avalanche impacts on structures. This information is increasingly important as populations rise in the mountains and people are building closer to avalanche paths. New instrumentation in controlled avalanche paths is being used to further develop and refine parameters used in avalanche dynamics models. Sovilla et al. measured impact pressure to obtain load distribution and size effects for different avalanche typologies. Gauer et al. used Doppler radar and load cells to derive velocities on retarding acceleration. Jaedicke et al. investigated the flow rheology of small slush flows to estimate the magnitude of the drag factor. All of these authors found that commonly used factors for current models do not sufficiently describe avalanche behaviour and need to be further improved.

As population pressures drive more people close to avalanche zones, we need to improve our ability to mitigate potential avalanche impacts and improve the speed with which we can find avalanche victims. Margreth and Roth investigated the interaction of flexible rockfall barriers with the impact pressures associated with avalanches. Heilig et al. used ground penetrating radar (GPR) mounted on a helicopter and a new post-processing algorithm to determine if GPR can be used to help better locate avalanche victims.

Avalanche forecasting remains a daunting task for workers around the world. Research to improve forecasting techniques continues to be a critical area of study. In Japan, Hirashima et al. utilize SNOWPACK and other models with inputs from an automated meteorological data acquisition system to better explain snowpack stability. They found that there is still room for improvement in using models for operational forecasting. Jamieson et al. compared local ratings of current avalanche dangers, or "snowcasts" to the ratings from public avalanche bulletins and found that spatial scale effects were relevant. Hendrikx and Owens have modified avalanche risk equations to account for stopped traffic in avalanche paths on highways in New Zealand. Lazar and Williams evaluated how climate changes as predicted by five general circulation models could affect the timing of wet-snow avalanches in the United States.

Models that attempt to predict avalanche behaviour and timing need reliable data for accurate results.

0165-232X/$ - see front matter
doi:10.1016/j.coldregions.2007.09.004

Seemingly simple parameters such as snow depth become more complex when wind is considered. Sato et al. looked at how wind speeds affect the accumulation and fracture of snowflakes with both natural and artificial snowflakes. Their results will be useful for understanding wind speed dependence of new snow density for future wind related models. Lehning and Fierz present a new drift index to better quantify snow transport in avalanche terrain. They concluded that the FlowCapt sensor and the SNOWPACK model are suitable means to quantify snow transport.

As spatial variability of the snowpack has been studied over the last decade, some conclusions seemed to be contradictory and have caused some avalanche workers to ask if they should even bother to dig snow pits. Geostatistical analysis techniques are being applied, and the causes of spatial variability are being addressed. Schweizer et al. provide a timely and comprehensive review on spatial variability studies of snowpack properties and – in particular – on the importance of spatial variations on avalanche formation.

We would like to dedicate this Special Issue to two special members of the ISSW community who recently passed away. Ed LaChapelle, a pioneer in our field and in avalanche research in the San Juan Mountains of Colorado, passed away this past winter of an apparent heart attack after skiing powder with friends in the eastern San Juans. Ed's contributions are too numerous to comprehensively list, but in addition to his many research papers he authored a handbook on snow crystals, books on avalanche safety, and an early edition of The Avalanche Handbook. Luckily for us, Ed also gave a rousing keynote speech at the banquet at this ISSW. Ed's PhD student Sue Ferguson died in December of 2005 after a battle with cancer. Sue's roots ran deep in the avalanche community. She was a long time avalanche researcher, a forecaster with the Utah and Northwest Avalanche Centers, the founding editor of *The Avalanche Review*, and a co-editor of the first Cold Regions Science and Technology ISSW special issue in 1998. Both Ed and Sue continued to actively contribute to our field up to their deaths and they will both be missed.

A big thank you to Craig Sterbenz and Nicolle Greene, the General Chair and Co-Chair of the 2006 ISSW, and all the volunteers who made the conference a great success. Thank you to Ed Adams, Bert Davis, Bruce Jamieson, Stefan Margreth, and Dave McClung who assisted as Associate Editors. We would also like to thank all the reviewers for their reports and in particular the Editor-in-Chief Garry Timco.

Reference

Gleason, J.A. (Ed.), 2006. Proceedings ISSW 2006. International Snow Science Workshop, Telluride CO, U.S.A., 1–6 October 2006. ISSW Papers Committee, 705 Kearney St, Durango, CO 81301, U.S.A.

J. Andrew Gleason
University of Wyoming, USA
E-mail address: agleason@trautnergeotech.com.
Corresponding author.

Karl W. Birkeland
U.S. Forest Service National Avalanche Center, USA

Jürg Schweizer
WSL/SLF, Switzerland