ICSIH Annual Report to IAHS Bureau

May 31, 2016; Dr. Tobias Jonas, ICSIH President-Elect

1. Introduction

ICSIH, the International Commission on Snow and Ice Hydrology, continues to promote the scientific study of the processes of snow, permafrost and ice dynamics, the interactions between snow, permafrost, ice and ecosystems, and impact of snow, permafrost and ice on runoff generation, rivers and lakes, with an emphasis on the seasons and regions where the solid phase of water and its subsequent runoff are prevalent.

Cold regions are particular responsive to changing environmental conditions, and small shifts can result in hydrological regimes that have not been observed in the past. Key to improve our understanding of the involved complex and interacting processes is collaboration, both geographically and across disciplines.

ICSIH maintains a network with many organizations acting in the field of cryospheric sciences. ICSIH strives to integrate the communities' effort within IAHS, enabling us to foster exciting research at the interface between cryospheric and hydrological sciences.

2. Organization

ICSIH Bureau 2015-2016:

- President: Dr. Danny Marks, Agricultural Research Service, Dept. of Agriculture, USA
- President-Elect: Dr. Tobias Jonas, WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland
- Immediate Past President: Dr. John Pomeroy, University of Saskatchewan, Canada
- Vice-President: Dr. Timothy Link, University of Idaho, USA
- Vice-President: Dr. Sebastian Mernild, Sogn og Fjordane University College, Norway
- Vice-President: Dr. Melody Sandells, CORES Science & Engineering, Edinburgh, UK
- Secretary: Dr. Alexander Gelfan, Water Problems Institute of the Russian Academy of Sciences, Moscow, Russia

3. ICSIH Activities 2015-2016

3.1 Renewing ICSIH

Following the IAHS elections at the 26th General Assembly of the IUGG, the ICSIH bureau has been considerably renewed. With three new vice-presidents, and two former vice-presidents serving in different roles, ICSIH has gained new momentum. ICSIH has taken some time to discuss its mission, goals, networking, and future activities. This process has resulted in the following changes

- Updated mission statement: We have revised the ICSIH mission statement, which was originally formulated in 2007. The new mission statement is attached at the end of this report (c.f. section 4)
- Definition of three targets: ICSIH has decided to focus its attention on three targets: a) advancing the study of snow and ice dynamics in hydrology by enhancing collaboration and the exchange of information between various national research traditions; b) making the state of the art and practical tools available to researchers who deal infrequently with snow and ice hydrology through educational and informative initiatives; c) actively support early career training whilst also recognizing late career training needs.
- New activities: ICSIH has intensively discussed potential new fields of activity, in particular those that relate to the above targets. Aimed at people who only occasionally deal with snow and ice hydrology, ICSIH will start new series of featured articles. The articles will outline basic concepts, provide insights on current methods, point at interesting open-source tools, and host opinion papers. With regards to early career training, we plan to organize a dedicated winter school on snow hydrological modeling in 2017/18.
- New webpage: The web-presence of ICSIH has been suboptimal in the recent past. We have therefore decided to create a new website, which is now hosted by iahs.info. While a front page is already available, new content will be published by Jun-15.

3.2 Conferences and Meetings

ICSIH has been active with regards to both, the 26th General Assembly of the IUGG in Prague last summer, and the upcoming IAHS Assembly in Port Elisabeth next summer. The four sessions organized or to be organizes be ICSIH are listed below. Of course, ICSIH members are also being active with regards to other conferences such as AGU and EGU meetings. As an example, two interesting session proposals on snow and ice hydrology have been submitted by ICSIH bureau members for the upcoming AGU fall meeting. However for these type of conferences, it is the respective union members to suggest sessions, not organizations such as ICSIH. So these efforts may not be recognized and count as an ICSIH activity.

- 26th General Assembly of the IUGG, Prague, Czech Republic, 2015: Symposium on *Advances in Remote Observation of Snow*, organized by ICSIH, co-sponsored by IACS, convened by T.

Jonas, J. Deems, H.-P. Marshall, E. Trujillo, J. Parajka. The symposium received 29 abstracts allowing a full-day program with 18 oral presentations.

- 26th General Assembly of the IUGG, Prague, Czech Republic, 2015: Joint inter-association symposium on *Impact of Climate Warming on High-Latitude and High-Altitude Hydro- and Cryosphere*, organized by IACS, co-sponsored by ICSIH and IAMAS, convened by C. Fierz, W. Schoener, D. Marks, T. Jonas. This symposium was merged with the IACS *Open mountain cryosphere symposium* and received 31 abstracts allowing a full-day program with 18 oral presentations.
- IAHS assembly, Port Elisabeth, South Africa, 2017: Symposium on *Advances in cold-region hydrological models: Integration of process understanding and application to climate and landcover changes*, suggested by ICSIH, to be convened by T. Jonas, T. Link, M. Sandells, R. Essery, M. Dumont
- IAHS assembly, Port Elisabeth, South Africa, 2017: *Symposium on Operational snowmelt runoff modelling: Advances and prospects for water management*, suggested by ICSIH, to be convened by A. Gelfan, T. Jonas, J. Deems, V. Vionnet

3.3 Networking activities

While ICSIH is in contact with many organizations involved with cryospheric sciences, we would like to report on two current networking activities of note.

- INARCH, the international network for alpine research catchment hydrology has been founded following an inaugural workshop in Canada in November 2016. INARCH is a global research initiative, aiming at fostering collaborative research opportunities by promoting the exchange and open access to experimental datasets available from alpine research catchments. ICSIH is very supportive of INARCH's goals, has decided to co-sponsor the network, and is actively involved with the initiative. In fact, three current ICSIH bureau members are affiliated with the scientific steering group of INARCH.
- IACS, the International Association of Cryospheric Sciences is co-organizing the *International Symposium on the Cryosphere in a Changing Climate*, together with the International Glaciological Society IGS and the Climate and Cryosphere Project CliC, to be held in Wellington, New Zealand in 2017. IAHS as well as IACS has expressed its wish that ICSIH contributes to the symposium. ICSIH has offered its willingness to contribute to the science program of the symposium several times, in particular in direct discussions with IACS, to which ICSIH maintains a productive collaborative relationship. Unfortunately though, IACS does not have the lead in organizing the meeting, it is the IGS. Their conferences are organized by a science steering committee, which has been set up before ICSIH has sought to get involved. This is why ICSIH will unfortunately not be able to actively support the meeting.

4 ICSIH Missions Statement

The new ICSIH mission statement will be adopted as of Jun-15 and reads as follows:

Snow and ice have been core components of the science of hydrology since its inception. Their dynamics are key to hydrological functioning for much of the world.

Cold regions at high altitudes or latitudes store water as snow and ice. The timing of when that water is released as melt is a critical contribution to the available freshwater supply. The formation, metamorphism and melting of snow, ice and soil frost are dynamic components of the hydrological cycle and have an important role in runoff formation and streamflow. River flow from these source regions is extremely important to more temperate downstream areas, which often rely on meltwater feed during the dry season. Therefore, water originating from snow and ice melt is essential to the sustenance of natural ecosystems, agriculture and across a range of human societies from subsistence to urban.

Snow and Ice hydrology becomes both, more challenging and more relevant as the environment changes. A shift from snowfall to rainfall affects the timing of water delivery to soil, streams and rivers and may lead to catastrophic flooding. Even small changes can result in hydrological regimes that have not been observed in the past. It is therefore essential to advance our understanding of the involved processes to be able to assess the response of hydrological systems to new environmental conditions.

The goal of ICSIH is to promote the scientific study of the processes of snow, ice and permafrost dynamics and the impact of snow and ice on the environment, runoff generation, rivers and lakes, with an emphasis on the seasons and regions where the solid phase of water and its subsequent runoff are prevalent. Cold regions are particularly responsive to climate warming and other changes in environmental conditions occurring around the world. Therefore ICSIH strives to foster methodological advances in measurement, monitoring and modeling snow and ice that can help society to understand and prepare for the impact of environmental changes on hydrology.

In this context, the specific goals of ICSIH are to:

1) *Advance and promote the study of snow and ice dynamics in hydrology by enhancing collaboration and information exchange between various national research traditions relating to snow and ice hydrology;*
2) *Make the state of the art and practical tools available to researchers who deal infrequently with snow and ice hydrology through educational and informative initiatives; Actively support both early and late career training needs.*

ICSIH adds an exciting dimension to IAHS acting at the interface between cryospheric and hydrological sciences.

ICSIH Bureau, May 2016.