

# ICSIH Annual Report to IAHS Bureau

July 2013 John Pomeroy, ICSIH President



## 1. Introduction.

ICSIH, the International Commission on Snow and Ice Hydrology, continues its work in promoting and developing an exciting and growing area of hydrology – that which occurs at the triple phase change from snow and ice to water and water vapour and is dominant at the high altitude and high latitude cold regions and in cold seasons over much of the Earth's surface. Snow and ice hydrology has an inordinately effective role in generating runoff that is important outside of the cold regions and seasons and can form an important water source for temperate and tropical regions downstream. Snow and ice hydrological systems are relatively ungauged, difficult to predict and highly sensitive to the impacts of climate change. ICSIH has a special role within IAHS by fostering a connection between IAHS and the International Association of Cryospheric Sciences.

## 2. Organisation

ICSIH Bureau 2012-2013.

President: Professor John Pomeroy, University of Saskatchewan, Canada & Aberystwyth University, Aberystwyth, Wales – becomes Past President at IAHS Scientific Assembly in 2013

President Elect: Dr. Daniel Marks, Agricultural Research Service, Dept. of Agriculture, USA – becomes President at IAHS Scientific Assembly in 2013

Vice-President: Dr. Alexander Gelfan, Russian Academy of Sciences, Moscow, Russia

Vice-President: Dr. Tobias Jonas, Swiss Snow and Avalanche Institute, Davos, Switzerland

Vice-President: Dr. Tetsuya Hiyama, Research Institute for Humanity and Nature, Kyoto, Japan

Secretary: Dr. Regine Hock, Uppsala University, Sweden & University of Alaska, Fairbanks, USA

### 3. ICSIH Activities 2012-2013

ICSIH has been preparing its symposia and workshops for Gothenburg and Davos scientific assemblies for 2013. In Gothenburg ICSIH is convening a symposium (with ICCLAS) on cold region and mountain hydrology under climate change and co-convening a symposium with various associations and commissions on deltas for the International Year of Deltas. In DACA13 ICSIH is convening a session on changing mountain snow and ice hydrology and a session on distributed modelling of snow, ice and hydrology in mountains. With four symposiums in 2013 ICSIH has remained a very active commission.

ICSIH has signed a memorandum of understanding to coordinate activities of organisations with meetings in the cryospheric sciences to avoid temporal conflicts in the future with the following organisations:

Association of Polar Early Career Scientists, APECS

Climate and Cryosphere, CliC, a project of the World Climate Research Programme (WCRP), the International Arctic Science Committee (IASC), and the Scientific Committee on Antarctic Research (SCAR)

Cryosphere Research Focus Group, American Geophysical Union, AGU

Division on Cryospheric Sciences, European Geosciences Union, EGU

International Association of Cryospheric Sciences, IACS

International Glaciological Society, IGS

International Permafrost Association, IPA

Permafrost Young Researchers Network, PYRN

Scientific Committee on Antarctic Research, SCAR

Working Group on Cryosphere of the International Arctic Science Committee, IASC

### 4. ICSIH Sessions at Gothenburg 2013

#### **Cold and mountain region hydrological systems under climate change: towards improved projections**

Commissions

ICSIH, ICCLAS

Convener and co-conveners

Alexander Gelfan (Russia); Eugene Gusev (Russia), Harald Kunstmann (Germany), Daqing Yang (Canada)

Description text

Cold- and mountain regions are the areas of the Earth where some of the earliest and most profound climate-induced changes of hydrological systems are expected, probably because of the dominant contribution of snow and ice to hydrological processes. Our ability to understand changes in hydrological responses to a changing climate needs to be improved through enhancement of the modeling tools (hydrological and land surface

models) and observation techniques used for future projections. This symposium will address major issues both in modeling cold- and mountain regions hydrological processes (with an emphasis on snow and ice hydrology) and in adapting these models to changing climatic conditions. Among the issues related to cold region modeling *per se*, deepening the processes understanding and physical foundation of models, adapting models to new data sources, and PUB-related cold region issues will be addressed. Among the issues related to model adaptability, problems of model parameterization, calibration and validation taking into account changing climate conditions, and the demonstration of a model's readiness for use in these environmental conditions will be examined. Also, this session will bring together experimental and modeling experts to address a broad range of issues related to understanding specific features of cold region hydrological systems which are responsible for their visible sensitivity to climate change.

## 5. ICSIH Sessions at DACA13, Davos 2013

### **Changing snow and ice hydrology in mountain watersheds**

In mountain watersheds, snow and ice melt constitutes a critical component of the annual hydrological cycle. Climate warming is changing the dynamics of this meltwater generation throughout the world. Being able to predict the amount and timing of meltwater is important for managing water resources and preventing natural hazards, not only in the mountains but also for large areas downstream.

This session will focus on advances in mountain snow and ice hydrology, including process understanding, observational advances, model development and validation and projections of future snow and ice hydrology under a changing climate. Ecohydrological implications of changing snow and ice are also welcome.

#### **Session conveners**

Lead convener: Dany Marks ([ars.danny@gmail.com](mailto:ars.danny@gmail.com))

Co-conveners: Alexander Gelfan, Tetsuya Hiyama, Regine Hock, Tobias Jonas, John Pomeroy

### **Meteorological forcing data and distributed modelling of snow, ice and hydrology in mountain watersheds**

A primary constraint to spatially-explicit modelling in mountain basins is limited forcing data. Distributed snow, ice, and hydrological models have become a valuable tool for water resources and ecosystems research in alpine regions. But while the capabilities of such models have made significant progress in recent years, it remains challenging to provide the models with accurate meteorological forcing fields. This session will cover

all aspects of distributing forcing data over complex mountain topography, including innovative mapping methods for precipitation, temperature, and wind, model sensitivity to different approaches, distributed sensing experiments, and scaling issues

### **Session conveners**

Lead convener: Tobias Jonas ([jonas@slf.ch](mailto:jonas@slf.ch))

Co-conveners: Danny Marks, Richard Essery

### 6. Mountain Flooding

Severe mountain flooding involving snow and ice processes has occurred in the Alps, Pyrenees, Canadian Rockies and Himalayas in 2013. ICSIH has been active in liaising with local authorities to better describe the formation and consequences of rain-on-snow floods and to outline better predictive methods for these floods. Many occur in ungauged basins and so this effort benefits from improved scientific understanding gleaned in the PUB decade.

ICSIH Bureau, July 2012.