

**CGU-CSAFM National Meeting  
UGC-SCMAF Réunion Nationale**



**University of British Columbia, Vancouver campus**

**May 28<sup>th</sup> to 31<sup>st</sup> 2017**

# CGU/CSAFM 2017 CONFERENCE PROGRAM

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## CGU/CSAFM 2017 CONFERENCE PROGRAM

### **Welcome,**

The Canadian Geophysical Union (CGU) and Canadian Society of Agricultural and Forest Meteorology (CSAFM) welcome all attendees of the 2017 CGU-CSAFM Joint Meeting, held at the University of British Columbia Vancouver campus from May 28<sup>th</sup> to 31<sup>st</sup> 2017.

This meeting provides an excellent opportunity for members of the scientific and professional communities to exchange ideas and knowledge across sub-disciplines of earth, environmental, and ecological fields. This year, presentations in nearly forty sessions over three days promise to highlight the valuable scientific contributions from Canadians and other members of the international scientific community.

The CGU and CSAFM would like to express sincere gratitude to all involved in conference organization and planning. In particular, many student volunteers played an essential role in coordination of this event.

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**CONFERENCE AT A GLANCE**

<b>SUNDAY, 28 MAY 2017</b>		
1730 to 1900	PLENARY SPEAKERS: MARCUS WEILER AND ANDREAS CHRISTEN	ESB 1013
1900 to 2100	ICEBREAKER AND REGISTRATION	ESB Atrium

<b>MONDAY, 29 MAY 2017</b>				
0800 to 0845	PLENARY: ELOWYN YAGER	ESB 1013		
0900 to 1030	<b>CONCURRENT SESSIONS 1</b>		<b>POSTER SESSIONS 1</b>	
	ES04a: Morphodynamics of river systems	GEOG 229	ES01: Forms and processes of bedrock erosion in fluvial landscapes (1)* ES04: Morphodynamics of river systems (5) ES05: Late Cenozoic landscape evolution (2) ES12: Coastal sediment dynamics (4) H09: Measuring and modelling glacier change (5) H01: Hydro-climatic impacts and adaptation (3) J01: Satellite remote sensing for earth sci. app. (1) *Number indicates number of posters for that session	ESB Atrium
	B04a: Mine reclamation: Multidisciplinary studies	AERL 120		
	H06a: Advances in cold regions hydrology	ESB 1012		
	S01a: Structure & tectonics of the Can. Cordillera	ESB 2012		
H14a: General hydrology	EOSC 135			
1030 TO 1100: COFFEE BREAK	ESB Atrium			
1100 to 1230	<b>CONCURRENT SESSIONS 2</b>			
	ES15a: Advances in cold regions geomorphology	GEOG 229		
	B04b: Mine reclamation: Multidisciplinary studies	AERL 120		
	H06b: Advances in cold regions hydrology	ESB 1012		
	S04a: Recent trends in exploration geophysics	ESB 2012		
	H10a: Hydrological & biogeochemical behaviour in human-dominated landscapes	EOSC 135		
1230 TO 1400: LUNCH		ESB Atrium	<b>LUNCH MEETINGS</b>	
			Biogeosciences AGM	GEOG 130A
			Earth Surf. Proc. AGM	GEOG 229
			Hydrology AGM	GEOG 200
			Solid Earth AGM	GEOG 223
		Geodesy AGM	EOSC 135	
1400 to 1530	<b>CONCURRENT SESSIONS 3</b>		<b>POSTER SESSIONS 2</b>	
	ES04b: Morphodynamics of river systems	GEOG 229	H14: General hydrology (4) H06: Advances in cold regions hydrology (14) S01: Structure & tectonics of the Can. Cordillera (2) S04: Recent trends in exploration geophysics (2)	ESB Atrium
	B04c: Mine reclamation: Multidisciplinary studies	AERL 120		
	J01a: Satellite remote sensing for earth sci. app.	ESB 1012		
	S01b: Structure & tectonics of the Can. Cordillera	ESB 2012		
H14b: General hydrology	EOSC 135			
1530 TO 1600: COFFEE BREAK	ESB Atrium			
1600 to 1730	<b>CONCURRENT SESSIONS 4</b>			
	ES04c: Morphodynamics of river systems	GEOG 229		
	B04d: Mine reclamation: Multidisciplinary studies	AERL 120		
	H06c: Advances in cold regions hydrology	ESB 1012		
	ES05a: Late Cenozoic landscape evolution	ESB 2012		
	H10b: Hydrological & biogeochemical behaviour in human-dominated landscapes	EOSC 135		
1730 to 1800	CGU AGM			ESB 2012

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**CONFERENCE AT A GLANCE**

<b>TUESDAY, 30 MAY 2017</b>			
0800 to 0845	PLENARY: JESSICA LUNDQUIST		ESB 1013
0900 to 1030	<b>CONCURRENT SESSIONS 1</b>		<b>POSTER SESSIONS</b>
	ES06a: River restoration in Canada	GEOG 229	B04: Mine reclamation: Multidisciplinary studies (8) H10: Hydrological & biogeochemical behaviour in human-dominated landscapes (2) S05: Induced earthquakes: Source processes and hazard assessment (4) S06: Solid Earth general contributions (11)
	C01a: What the flux?! Surface-atmosphere exchange of energy and mass	AERL 120	
	H06d: Advances in cold regions hydrology	ESB 1012	
	S02a: The earthquake cycle: squaring the circle	ESB 2012	
H09a: Measuring and modelling glacier change	GEOG 200		
1030 TO 1100: COFFEE BREAK		ESB Atrium	
1100 to 1230	<b>CONCURRENT SESSIONS 2</b>		ESB Atrium
	ES07a: From natural science to regional practices in Canada	GEOG 229	
	B03a: Physical and biogeochemical land surface processes in a changing climate	AERL 120	
	H06e: Advances in cold regions hydrology	ESB 1012	
	ES12a: Coastal sediment dynamics	ESB 2012	
H01a: Hydro-climatic impacts and adaptation		EOSC 135	
1230 TO 1400: LUNCH		<b>LUNCH MEETINGS</b>	
		NSERC WORKSHOP	GEOG 229
1400 to 1530	<b>CONCURRENT SESSIONS 3</b>		<b>POSTER SESSIONS</b>
	ES14a: Advances in earth surface processes	GEOG 229	ES14: Advances in earth surface processes (2) ES06: River restoration in Canada (1) ES07: From natural science to regional practices in Canada (3) H02: Peatland hydrology: Peatland restoration and ecohydrological processes (5) H04: Peatland hydrology: Flow and transport of water, solute, and energy in organic soils (4) H11: Hydrogeomorphic impacts of forest disturbance and management (8)
	C01b: What the flux?! Surface-atmosphere exchange of energy and mass	AERL 120	
	S02b: The earthquake cycle: squaring the circle	ESB 2012	
H09b: Measuring and modelling glacier change	GEOG 200		
1530 TO 1600: COFFEE BREAK		ESB Atrium	
1600 to 1730	<b>CONCURRENT SESSIONS 4</b>		ESB Atrium
	ES01a: Forms and processes of bedrock erosion in fluvial and glacial landscapes	GEOG 229	
	C01c: What the flux?! Surface-atmosphere exchange of energy and mass	AERL 120	
	H06f: Advances in cold regions hydrology	ESB 1012	
	ES12b: Coastal sediment dynamics	ESB 2012	
	H01b: Hydro-climatic impacts and adaptation	EOSC 135	
H08a: Snow level and precipitation		GEOG 200	

<b>WEDNESDAY, 31 MAY 2017</b>			
0800 To 0845	WOO LECTURE: JONATHAN PRICE		ESB 1013

# CGU/CSAFM 2017 CONFERENCE PROGRAM

## CONFERENCE AT A GLANCE

### WEDNESDAY, 31 MAY 2017 Continued

WEDNESDAY, 31 MAY 2017 Continued			
0900 to 1030	<b>CONCURRENT SESSIONS 1</b>		<b>POSTER SESSIONS</b>
	ES09a: In honour of John Clague	GEOG 229	ES09: In honour of John Clague (2) B03: Physical and biogeochemical land surface processes in a changing climate (2) B07: Terrestrial-aquatic interactions: measurement and modelling (5) C01: What the flux?! Surface-atmosphere exchange of energy and mass (2) G03: General Geodesy (5) H03a: Isotopes as tracers (6)
	B02a: That biogeochemistry has a short attention span! Insights for scaling	AERL 120	
	H02a: Peatland hydrology: Peatland restoration and ecohydrological processes	ESB 1012	
	S05a: Induced earthquakes: Source processes and hazard assessment	ESB 2012	
	H05a: Insights into env./hydrological models	EOSC 135	
ES13a: Computer models and statistical methods in earth sciences	GEOG 100		
1030 TO 1100: COFFEE BREAK		ESB Atrium	ESB Atrium
1100 to 1230	<b>CONCURRENT SESSIONS 2</b>		
	ES02a: Hazards and landscape response in the high mountains	GEOG 229	
	B08a: General biogeosciences	AERL 120	
	H02b: Peatland hydrology: Peatland restoration and ecohydrological processes	ESB 1012	
	S06a: Solid Earth general contributions	ESB 2012	
	H11a: Hydrogeomorphic impacts of forest disturbance and management	EOSC 135	
C02a: Agrometeorological and satellite derived decision support tools for agriculture	GEOG 100		
1230 TO 1400: LUNCH		ESB Atrium	<b>LUNCH MEETINGS</b>
			CGRG AGM CSAFM AGM
			GEOG 229 GEOG 223
1400 to 1530	<b>CONCURRENT SESSIONS 3</b>		<b>POSTER SESSIONS</b>
	ES09b: In honour of John Clague	GEOG 229	B08: General biogeosciences ES13: Computer models and statistical methods in earth sciences H08: Snow level and precipitation H05: Insights into env./hydrological models S02: The earthquake cycle: squaring the circle H13: Advances in hydroecology in Canada
	B07a: Terrestrial-aquatic interactions: measurement and modelling	AERL 120	
	H13a: Advances in hydroecology in Canada	ESB 1012	
	G03a: General Geodesy	ESB 2012	
	H05b: Insights into env./hydrological models	EOSC 135	
ES16a: The CGRG MacKay Lectures	GEOG 200		
1530 TO 1600: COFFEE BREAK		ESB Atrium	ESB Atrium
1600 to 1730	<b>CONCURRENT SESSIONS 4</b>		
	ES09c: In honour of John Clague	GEOG 229	
	B06a: Microplastics in marine, freshwater, and soil environments	AERL 120	
	H04a: Peatland hydrology: Flow and transport of water, solute, and energy in organic soils	ESB 1012	
	S05b: Induced earthquakes: Source processes and hazard assessment	ESB 2012	
	H11b: Hydrogeomorphic impacts of forest disturbance and management	EOSC 135	
H03a: Isotopes as tracers			

CGU/CSAFM 2017 CONFERENCE PROGRAM  
SUNDAY, MAY 28<sup>TH</sup> KEYNOTE

Sunday, May 28<sup>th</sup>

KEYNOTE SPEAKERS

TIME: 1730 TO 1900 ROOM: ESB 1013

**Plenary 1: The complexity of urban hydrology – capturing drivers and processes in human-modified landscapes**

**Markus Weiler**, Tobias Schütz, Hannes Leistert, Axel Schaffitel, Merle Koelbing, Andreas Steinbrich

Chair of Hydrology, Faculty of Environment and natural Resources, University of Freiburg, Germany

Mankind is altering the natural landscape and hence hydrological processes with increasing speed and magnitude, with urban areas reflecting one of the most prominent alteration. In the past, cities were developed to drain rainwater efficiently without considering long-term alteration on the water balance. The result were severe changes in water quality, quantity and even climate. In order to mitigate these influences, approaches for stormwater management, green infrastructure and low impact development now target a reduction of the mostly negative impacts on hydrology and climate. These structures and approaches brought more “natural” hydrological processes back into urban areas, but they also complicate estimates of the overall water balance, runoff prediction and flooding potential and associated contamination by pollutants. In particular, the various partly sealed surfaces, green roofs and urban trees, the small scale lateral redistribution of water from sealed or partly sealed area to soils or specific bio-retention systems, and the small-scale variability of meteorological drivers and fluxes are major challenges in the development of adequate model representations of these landscapes. Data from several long-term observatories of urban catchments in Germany obtained with fix and mobile sensor networks allow a number of analyses of these competing influences, including for example approaches of paired catchment hydrology. Based on insights from experimental data a new model framework (Urban-RoGeR) for the simulation and prediction of the highly spatial and temporally variable drivers and fluxes of urban hydrology has been developed that adapts approaches from catchment and soil hydrology of natural landscapes to urban situations. The talk will demonstrate the challenges of urban hydrology with several examples and show the potential for more process based modelling to predict urban water balance as well as short-term flash flood events.

**Bio:** A hydrologist by training, Markus Weiler has worked in fields ranging from hydrology, soil science, isotope geochemistry, solute transport to plant physiology using field experiments, statistical approaches and conceptual and numerical modelling. After graduating in Hydrology from the University of Freiburg, Germany, he obtained his PhD in 2001 from the ETH Zürich, Switzerland working on preferential flow processes in soils. After a 2 year post-doc at Oregon State University, USA, he was appointed Assistant Professor and Chair of Forest Hydrology at the University of British Columbia in Vancouver, Canada. Since 2008, Markus Weiler is Professor in Hydrology and was director of the Centre of Water Research at the University of Freiburg, Germany. Markus Weiler established a modern stable water isotope laboratory and set-up several hydrological observatories in urban, agricultural and forested catchments. He also founded the MSc programme in Hydrology offered at the University of Freiburg.



**Contact Info**

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**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**SUNDAY, MAY 28<sup>TH</sup> KEYNOTE**

**Plenary 2: Measuring and attributing greenhouse gas emissions in complex urban landscapes**

**Andreas Christen**

Associate Professor, Department of Geography and Atmospheric Science Program  
The University of British Columbia, Vancouver, BC, Canada

More than 50% of the global population and 80% of Canadians live in cities. Cities are ‘hot spots’ for greenhouse gas (GHG) emissions and also key areas for reduction efforts. Although economic fossil fuel inventories at coarse scales can provide accurate national and provincial emissions estimates that can be downscaled — there is growing interest to constrain and quantify GHG emissions at urban and intra-urban scales. Measurements of GHG emissions in the urban atmosphere have the potential to (i) validate fine-scale emission inventories and models, (ii) determine realistic emission factors, (iii) identify and quantify poorly-known sources (e.g. gas leaks), and (iv) account for the effects of urban land-cover change — all at the scale of decision making and planning. Developing and improving techniques for directly measuring GHG emissions into (and uptake from) the urban atmosphere, however, requires us to combine atmospheric data, various models, and surface databases.

This keynote presentation will focus on measurement approaches we developed at UBC, and tested in the city of Vancouver, Canada, with the aim to highlight the potential of atmospheric measurements to quantify and attribute GHG emissions in cities at various scales. We start with exploring whether boundary layer budgeting approaches, using sensors on balloons, can be used to quantify and temporally resolve anthropogenic carbon dioxide emissions from the entire urban region and compare results against municipal inventories. We then show how we can exploit data from direct eddy covariance flux measurements on towers in cities to determine fleet-scale emission factors. Next, we will ask the question whether stable isotope ratios in emitted greenhouse gases add additional information on fuel sources?. Finally, we will explore the potential of mobile sensor-networks to spatially map and quantify CO<sub>2</sub> emissions at block and street level using low-cost sensors on car-sharing vehicles. In summary, the application of established and the development of new techniques to map, quantify and attribute emissions in complex configurations poses challenges but also great opportunities to contribute to urban system science. We conclude that similar methods should be used to characterize emissions in otherwise complex and transient landscapes — from GHG exchange in wetlands in the Canadian Arctic, attacked or disturbed forests, to patchy agricultural landscapes.

**Bio:** Andreas Christen is Associate Professor in the Department of Geography and in the Atmospheric Science Program at the University of British Columbia in Vancouver. He obtained a PhD in Meteorology (2005) from the University of Basel (Switzerland), worked as post-doc at the Technical University of Berlin (Germany), and was visiting professor at the École Polytechnique Fédérale de Lausanne (Switzerland, 2012-13).

Andreas works on methods to quantify and model interactions of energy, water, and trace-gases between complex and three-dimensional land surfaces and the atmosphere – studying flow and turbulence studies and biogeochemical cycling. His group develops tools to attribute trace-gas and energy exchange in complex land configurations, including microscale dispersion modelling, high frequency thermal imaging, stable isotope approaches, and urban mobile sensing. Andreas is an Editorial Board Member of *Boundary-Layer Meteorology* and *Theoretical and Applied Climatology*, and a co-author of the urban climatology textbook *Urban Climates* (Cambridge University Press, 2017).

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MONDAY, MAY 29<sup>TH</sup>

PLENARY

TIME: 0800 TO 0845 ROOM: ESB 1013

## The geomorphologic perils of neglecting history: why preexisting conditions matter

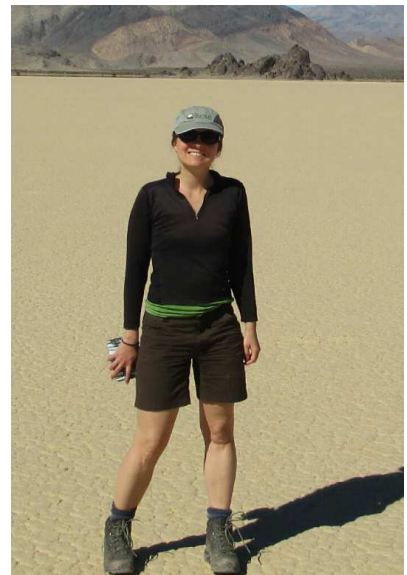
Eolwyn Yager

Department of Civil Engineering and Center for Ecohydraulics Research, University of Idaho.

A wide range of processes from the long-term evolution of mountain ranges, to the complex interactions of vegetation, flow and sediment involve the use of geomorphologic models. In such models, the histories (e.g. sequences of flows) of a channel, hillslope or even an individual particle are often neglected either for the sake of simplicity or because little is known about preexisting conditions. Here, we use a combination of field measurements, laboratory experiments and numerical modeling to demonstrate the importance of geomorphic history at a range of temporal (minutes to decades) and spatial scales. We specifically focus on three key assumptions made about bedload transport in rivers, predictions of which can be inaccurate by many orders of magnitude.

First, the sediment supply to mountain rivers can often temporally vary depending on episodic hillslope erosion events such as landslides or debris flows. Sediment supply is often neglected in calculations of bedload transport or channel morphology because it is difficult to measure. We demonstrate, using field measurements, that the histories of sediment supply and extreme flood events are essential to understand current river conditions, and that a simple proxy for sediment supply can be used to accurately predict bedload fluxes. Second, bedload transport hysteresis (different sediment fluxes on rising and falling limbs of hydrographs) is often observed in rivers but few observations of streambed properties during hydrographs exist to explain this temporal variation. We use laboratory flume experiments to show that hysteresis is caused by changes in bed structure, which in turn depend on the history of flow discharges in a channel. Third, the critical Shields stress (stress needed for the onset of sediment motion) is often expected to be temporally constant although empirical values of this parameter can vary by almost an order of magnitude. We use Discrete Element Method (DEM) modeling of individual grains to show that the critical Shields stress is unlikely to be constant, but instead will depend on grain-scale processes such as the concurrent sequence (history) of turbulence fluctuations and local bed structure changes. These three examples imply that the history of flow, sediment supply and channel conditions are integral to both understanding and predicting geomorphic change.

**Bio:** Dr. Eolwyn Yager is an Associate Professor in the Department of Civil Engineering and the Center for Ecohydraulics Research at the University of Idaho. Eolwyn obtained her B.S. and Ph.D. in Geology at SUNY Buffalo and the University of California at Berkeley, respectively. She has received a number of awards for her research and teaching including an NSF Career Award and a Fulbright Fellowship. Eolwyn's research is focused on understanding the mechanics of geomorphic processes from the grain to the landscape scale. She is also particularly interested in the interactions between physical and ecological processes.



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**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**MONDAY, MAY 29<sup>TH</sup> TECHNICAL SESSIONS**

**CONCURRENT SESSIONS (0900 TO 1030)**

B04A: MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS		ROOM: AERL 120
TIME	AUTHORS	TITLE
9:00	<u>D. Heisler</u> , C. Wytrykush, T. Penner, & G. Halferdahl	Base Mine Lake: The First End-Pit Lake for the Alberta Oil Sands
9:15	<u>G. Lawrence</u> , E. Tedford, L. Irvine, S. Chang & R. Pieters	Seasonal Variation of Turbidity in Base Mine Lake
9:30	<u>S.K. Carey</u> & G.B. Drewitt	Multi-Year Water Balance and Gas Exchanges from an End Pit Lake, Fort McMurray, Alberta
9:45	<u>E. Tedford</u> , D. Hurley, R. Pieters, & G. Lawrence	Physical Limnology of Base Mine Lake
10:00	<u>D.Hurley*</u> , E. Tedford, R. Pieters, & G. Lawrence	Wind Waves in Base Mine Lake
10:15	<u>J.D. Zettl</u> , S.L. Barbour, M.B.J. Lindsay, & S.K. Carey	Base Mine Lake Chemical Mass Balance 2013-2016

ES04A: MORPHODYNAMICS OF RIVER SYSTEMS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
9:00	<u>Jeffrey A. Nittrouer</u> , and Hongbo Ma	On the Exceptional Sediment Load of the Huanghe (Yellow River), and its Capacity to Produce Subaerial Deltaic Landscape
9:30	<u>Ray Kostaschuk</u> and Jeremy G. Venditti	The scale of river dunes
9:45	<u>Ryan W. Bradley*</u> , Jeremy G. Venditti	What Controls Dune Dimensions in Rivers?
10:00	Matilde Welber, <u>Peter Ashmore</u> , Bruce MacVicar	Sediment dynamics in semi-alluvial urban streams
10:15	<u>Ashley Dudill*</u> , Michael Church, and Jeremy Venditti	Formal testing of reproducibility in fluvial geomorphology

H06A: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
9:00	<u>P. Lamontagne-Halle</u> , J.M. McKenzie, B. Kurylyk & S.C. Zipper	Groundwater models for cold regions: How do surface-layer boundary conditions affect hydrology simulation outcomes?
9:15	<u>M. Elshamy</u> , A. Pietroniro & H. Wheeler	Initializing deeper soil profiles in land surface models for better representation of permafrost in cold regions
9:30	<u>R. Connon</u> , W. Quinton, E. Devoie & M. Hayashi	The influence of shallow taliks on permafrost thaw and active layer thickness in subarctic Canada
9:45	<u>L.E. Stone</u> , X. Fang, J.W. Pomeroy, O. Sonnentag & W.L Quinton	Modelling the effects of permafrost loss on discharge from wetland dominated basins in the discontinuous permafrost zone
10:00	<u>M. Hayashi</u> , J. Harrington & A. Paznekas	Hydrogeological characteristics of coarse blocky sediments in alpine watersheds
10:15	<u>S.C. Zipper</u> , J.M. McKenzie & S. Gruber	Permafrost response to fire-induced changes in the energy and water balance

H14A: GENERAL HYDROLOGY		ROOM: EOSC 135
TIME	AUTHORS	TITLE
9:00	<u>A. Thiboult</u> & F. Ancil	Accounting for hydrologic model uncertainty in data assimilation
9:15	<u>A. Haghnegahdar*</u> , M. Elshamy, F. Yassin, D. Princz, S. Razavi, H. Wheeler & A. Pietroniro	A comprehensive sensitivity assessment approach for analyzing the behavior of a land surface-hydrology model
9:30	G. Seiller, <u>F. Ancil</u> , R. Roy	An empirical multistructure framework for accurate, sharp, and reliable hydrological ensembles

## CGU/CSAFM 2017 CONFERENCE PROGRAM

### MONDAY, MAY 29<sup>TH</sup> TECHNICAL SESSIONS

H14A: GENERAL HYDROLOGY - CONTINUED		
9:45	<u>J. Lin*</u> , R. Ma & Z. Sun	Numerical Simulation of Multi-well Pumping Tests to Estimate Spatial Heterogeneity of a Fractured Formation
10:00	<u>S. Gharari</u> & S. Razavi	Do small-scale hysteretic processes affect the larger-scale behavior of watersheds?
10:15	<u>S. Gurrapu*</u> , D.J. Sauchyn, K.R. Hodder & J.M St. Jacques	Assessment of the standardised precipitation-evapotranspiration index in relation to streamflow prediction in the rivers of western Canada

SE01A: GEOPHYSICAL STUDIES OF STRUCTURE AND TECTONICS OF THE CANADIAN CORDILLERA		ROOM: ESB 2012
TIME	AUTHORS	TITLE
9:00	<u>P. J.A. McCausland</u>	Assembly of the Northern Cordillera: Mesozoic to present terrane motions and their evolving relationship with North America
9:15	<u>A. Graham*</u> , K. Morell, L. Leonard, V. Levson & C. Regalla	Field mapping, LiDAR analysis and shallow geophysical methods define the geometry and kinematics of the Leech River fault
9:30	<u>G. Li*</u> , Y. Liu, C. Regalla & K. Morell	Fault Structure and Seismic behavior revealed by earthquake relocations near the Leech River Fault, southern Vancouver Island
9:45	<u>G. Rogers</u> , R. Meldrum, M. Heesemann & M. Scherwath	Ocean Networks Canada's underwater and coastal geophysical monitoring on the Canadian Cordillera's Pacific edge
10:00	<u>R. Hyndman</u> , D. Chapman & W. Thatcher	Temperatures in the crust and upper mantle of the North American Cordillera
10:15	<u>C.A. Currie</u> , H. Wang & R. D. Hyndman	Lower crustal flow in western North America

### CONCURRENT SESSIONS (1100 TO 1230)

B04B: MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS		ROOM: AERL 120
TIME	AUTHORS	TITLE
11:00	<u>G. McKenna</u>	Multidisciplinary Teams for Landform Design and Mine Reclamation
11:30	<u>O. Sutton</u> & J. Price	Simulating the Hydrologic Trajectory of a Constructed Fen Watershed, Athabasca Oil Sands Region, Alberta
11:45	<u>M.C. Lukenbach</u> , C.S. Spencer, C.A. Mendoza, K.J. Devito, S.M. Landhausser, S.K. Carey	Variably Saturated Flow Between Constructed Upland Hummocks and a Wetland in a Reclaimed Watershed Following Oil Sands Mining
12:00	<u>S. DeMars*</u> , A. Ireson, & L. Barbour	Importance of Winter Processes on Salt Redistribution in a Reclamation Cover
12:15	<u>M.G. Clark*</u> , E.R. Humphreys, S.K. Carey	Downscaling Eddy Covariance Measurements of Energy and Carbon Dioxide Fluxes in a Constructed Boreal Wetland

H06B: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
11:00	<u>C. Marsh</u> , J. Pomeroy, H. Wheeler & R. Spiteri	The Canadian Hydrological Model: A multiscale, Multiphysics, variable-complexity hydrological model
11:15	<u>N.E. Wayand</u> , C. Marsh & J. Pomeroy	Evaluation blowing snow and avalanche models over the Canadian Rockies

## CGU/CSAFM 2017 CONFERENCE PROGRAM

### MONDAY, MAY 29<sup>TH</sup> TECHNICAL SESSIONS

H06B: ADVANCES IN COLD REGIONS HYDROLOGY - CONTINUED		
11:30	<u>X. Fang</u> , J. Pomeroy & N. Wayand	Evaluating meteorological forcing sources for simulation of snowpack and streamflow in the Canadian Rockies
11:45	<u>M. Queinnec</u> & S.V. Weijs	Use of a mountain shading model for spatial snowmelt predictions
12:00	<u>P. Harder</u> , W. Helgason & J. Pomeroy	Modelling the snow surface energy balance during melt considering the effect of exposed crop stubble
12:15	<u>K. Smith</u> , M. Richardson & J. Shirley	A comparison of empirical vs physically-based approaches for modeling end of winter snow distribution on South Baffin Island near Iqaluit, Nunavut

H10A: CATCHMENT HYDROLOGICAL AND BIOGEOCHEMICAL BEHAVIOUR IN HUMAN-DOMINATED LANDSCAPES		ROOM: EOSC 135
TIME	AUTHORS	TITLE
11:00	M. Walker, <u>G. Ali</u> , M. Macrae, L. Blunden & K. Vivekananthan	On the importance of preferential flow in agricultural soils: do organic amendments matter?
11:15	V. Kokulan*, M. Macrae, G. Ali & D. Lobb	Climatic controls on activation of runoff pathways in a vertisolic heavy clay soil in an artificially drained near-level landscape
11:30	<u>M. Shafii*</u> , N. Basu, S. Schiff & P. Van Cappellen	Impact of changes in snowmelt dynamics on hydrology and Nitrogen fluxes in the Grand River watershed
11:45	S. Satchithanatham, B. English & H. Wilson	Effect of vegetation type and season on uptake of dissolved nutrients with runoff through riparian buffers in Southwestern Manitoba
12:00	<u>E. Hassanzadeh</u> , G. Strickert, B. Noble, H. Baulch, K.E. Lindenschmidt	Socio-hydrology component of Water Quality Modeling in the Qu'Appelle River Valley
12:15	<u>J. Richardson</u> , L. Garcia, L. Kuglerova, B. Kielstra, A. Chara Serna & I. Pardo	Stream food webs and their ecological functions are compromised by catchment land-use intensity

ES15A: ADVANCES IN COLD REGIONS GEOMORPHOLOGY		ROOM: GEOG 229
TIME	AUTHORS	TITLE
11:00	Gabriel Chiasson-Poirier, <u>Jan Franssen</u> , Dan Fortier, Tommy Tremblay, Melissa Lafrenière, Jamal Shirley, Scott Lamoureux	Hydrogeomorphic factors controlling the routing of surface and shallow groundwater flows in permafrost environments
11:30	<u>Doug M. Bonno*</u> , Daniel H. Shugar, Jeremy Venditti	Rapid kettle formation due to tsunami erosion of submarine glacier ice, Taan Fiord, Alaska
11:45	<u>Kristen Kennedy</u> , Panya Lipovsky, and Louis-Philippe Roy	Controls on the distribution and frequency of rapid periglacial wasting events in Old Crow, Yukon
12:00	<u>Jonathan Cripps*</u> , Tracy Brennand, Julien Seguinot, Andrew Perkins & John Gosse	Empirically testing the Cordilleran Parallel Ice Sheet Model over the southern Interior Plateau of BC
12:15	Alun Hubbard, Henry Patton, Karin Andreassen, Monica Winsborrow, Arjen P. Stroeven, Amandine Auriac, Jakob Heyman	The evolution and geological legacy of the last Eurasian ice sheet complex

SE04A: RECENT TRENDS IN EXPLORATION GEOPHYSICS		ROOM: ESB 2012
TIME	AUTHORS	TITLE
11:00	<u>R. Clowes</u>	Geophysics and geology: An essential combination illustrated by <i>LITHOPROBE</i> interpretations – Exploration examples
11:15	<u>S.L. Butler</u>	Forward modeling of geophysical electromagnetic techniques using Comsol Multiphysics finite element software
11:30	<u>E. Goldfarb</u> , M. Ramos & N. Tisato	Using Computed Tomography to Map Orientation, Quality, and Quantity of Microfractures in Shale Samples, Before and After Induced Failure from Triaxial Testing

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### MONDAY, MAY 29<sup>TH</sup> TECHNICAL SESSIONS

SE04A: RECENT TRENDS IN EXPLORATION GEOPHYSICS - CONTINUED		
11:45	<u>D. Schouten</u> , J. van Nieuwkoop, R. Gazit, B. Koestlmaeir & D. Furseth	Recent Advances Incorporating Muon Geotomography and Joint Geophysical Inversion for 3D Density Imaging and Monitoring
12:00	<u>A. Braun</u> , E. J. Elliott & O. Daboor	Monitoring SAGD Reservoirs - a Synergistic Approach

### CONCURRENT SESSIONS (1400 TO 1530)

B04C: MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS		ROOM: AERL 120
TIME	AUTHORS	TITLE
14:00	<u>A.K. Hamilton</u> , B.E. Laval, E.L. Petticrew, S.J. Albers, M. Allchin, S.A. Baldwin, E.C. Carmack, S.J. Déry, T.D. French, B. Granger, K.E. Graves, P.N. Owens, D.T. Selbie, & S. Vagle	Impact of a Catastrophic Mine Tailings Impoundment Spill on the Physical Limnology of Quesnel Lake, British Columbia, Canada: Two Years Post-Spill
14:15	<u>D. Wilson</u> <sup>*</sup> , R.T. Amos, D.W. Blowes, J.B. Langman, L. Smith, & D.C. Segó	Diavik Waste Rock Project: Development of an Integrated Conceptual Model of Mine Waste Rock Weathering for Scale-Up of Laboratory Experiment Results
14:30	<u>F. Risacher</u> <sup>*</sup> , P. Morris, D. Arriaga, C. Goad, G.F. Slater, & L.A. Warren	Early Water Cap Oxygen and Geochemical Developmental Trends within the First Oil Sands End Pit Lake, Base Mine Lake
14:45	<u>Goad, C.</u> <sup>*</sup> , Slater G.F, Arriaga, D., Risacher, F., Morris, P., Lindsay, M., Warren, L.A.	Methane Biogeochemical Cycling Over Seasonal and Annual Scales in an Oil Sands Tailings End Pit Lake
15:00	<u>P. Morris</u> <sup>*</sup> , F. Risacher, D. Arriaga, C. Goad, G. Slater & L.A. Warren	Depth Dependent Roles of Methane, Hydrogen Sulfide and Ammonia in Water Cap Oxygen Consumption within Base Mine Lake, the first Oil Sands End Pit Lake
15:15	<u>D. Arriaga</u> <sup>*</sup> , P. Morris, F. Risacher, C. Goad, G.F. Slater, & L.A. Warren	Physical and Geochemical Processes Affecting Water Cap Oxygen Concentrations within Base Mine Lake, the first Oil Sands End Pit Lake

ES04B: MORPHODYNAMICS OF RIVER SYSTEMS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
14:00	<u>Sarah Peirce</u> <sup>*</sup> , Pauline Leduc, and Peter Ashmore	Active width and bedload transport relationships in gravel-bed braided rivers
14:15	<u>Hamed Dashtpeyma</u> <sup>*</sup> , and Bruce MacVicar	Surface, Corner and Ramp Rollers: Numerical Analysis of Flow Patterns in Isolated Pool-Riffle Units
14:30	<u>Emma Buckrell</u> <sup>*</sup> , and Marwan Hassan	Formation and adjustment of pool-riffle sequences
14:45	<u>Matteo Saletti</u> <sup>*</sup> , Peter Molnar, and Marwan A. Hassan	Step formation and stability in steep streams: insight from a reduced-complexity model
15:00	<u>Laura Hempel</u> <sup>*</sup> , Brett Eaton, Marwan Hassan, and Gordon Grant	Hydrograph Shape Controls Channel Morphology and Organization in a Sand-Gravel Flume
15:15	<u>Sarah Davidson</u> and Brett Eaton	A stochastic model of channel width adjustment: how does the hydrologic regime influence the effective discharge?

H14B: GENERAL HYDROLOGY		ROOM: EOSC 135
TIME	AUTHORS	TITLE
14:00	<u>E. Ueckermann</u> <sup>*</sup> , A. Berg, C. Champagne & A. Bonnycastle	Characterizing the SMOS Soil Moisture-Runoff Relationship over Canadian Catchments
14:15	M.A. Hernandez-Henriquez, <u>A.R. Sharma</u> , S.J. Dery	Variability and trends in runoff in the rivers of British Columbia's Coast and Insular mountains

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H14B: GENERAL HYDROLOGY - CONTINUED		
14:30	<u>J. Leach</u> & H. Laudon	Influence of a headwater lake on downstream discharge dynamics
14:45	<u>K.J. Hokanson</u> , K.J. Devito & C.A. Mendoza	Substrate layering and climate control water table configurations in sub-humid Boreal Plain landscapes
15:00	<u>B. Kurylyk</u> , S. Carey, D. Irvine, M. Briggs & M. Bonham	Heat as a hydrogeologic tracer in heterogeneous terrestrial and coastal environments
15:15	<u>R. Wu</u> , J. McKenzie, B. Bussiere, M. Aubertin, V. Martin & S. Broda	Monitoring moisture in waste rock with fiber optic distributed temperature sensing

J01A: SATELLITE REMOTE SENSING FOR EARTH SCIENCE APPLICATIONS		ROOM: ESB 1012
TIME	AUTHORS	TITLE
14:00	<u>Malek Singer</u> , Stephan Gruber, Murray Richardson <sup>2</sup>	Digital surface modelling with Terrestrial Laser Scanning and UAV-based photogrammetry: a comparison of approaches under different terrain and vegetation conditions
14:15	<u>K. Kornelsen</u> , B. Davison, M. Cosh & P. Coulibaly	A Bias Correction Approach for Downscaling Passive Microwave and Soil Moisture Data for Modelling Applications
14:30	<u>Jayson Eppler</u> , Bernhard Rabus <sup>1</sup> and Manuele Pichierri	Multi-Sensor InSAR Constrained Modeling of the Fels Glacier Slide
14:45	<u>K. Irwin</u> , A. Braun & G. Fotopoulos	Comparing Quad-Pol RADARSAT-2 and Single-Pol TerraSAR-X Data for Surface Water Monitoring

SE01B: GEOPHYSICAL STUDIES OF STRUCTURE AND TECTONICS OF THE CANADIAN CORDILLERA		ROOM: ESB 2012
TIME	AUTHORS	TITLE
14:00	<u>M. Unsworth</u>	Magnetotelluric studies of the Canadian Cordillera
14:15	A. Farahbod & <u>J.F Cassidy</u>	Coda Q Determination Across Western Canada: From a Region of Active Subduction to a Stable Craton
14:30	T. Zaporozan*, <u>A. W. Frederiksen</u> , A. Bryksin & F. Darbyshire	Surface-Wave Images of Western Canada: Lithospheric Variations Across the Cordillera/Craton Boundary
14:45	<u>Y. Chen*</u> , Y. J. Gu, S.-H. Hung, C. Currie, A. Schaeffer & P. Audet	Along-strike Variations in the Cordillera-Craton Boundary in Southwestern Canada
15:00	<u>A. Schaeffer</u> , P. Audet, D. Mallyon, C. Currie & J. Gu	Transient tectonic transition from Canadian Cordillera to stable shield?
15:15	<u>L. DiCaprio</u> & D. W. Eaton	Implications of an abrupt craton edge: Conditions for extrusion of the cratonic lithosphere

**CONCURRENT SESSIONS (1600 TO 1730)**

B04D: MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS		ROOM: AERL 120
TIME	AUTHORS	TITLE
16:00	<u>Q. Liu*</u> , S.B. Rudderham, M.B.J. Lindsay, & S.L. Barbour	Influences of Biogeochemical Processes on Mass Transport Across the Tailings-Water Interface of an Oil Sands End Pit Lake
16:15	<u>G. Slater</u> , D. Bowman, B. McCarry & L. Warren	Characterizing Naphthenic Acid Sources and Potential Processing during Oil Sands Tailing reclamation using Comprehensive Two-Dimensional Gas Chromatography

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B04D: MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS - CONTINUED		
16:30	<u>E. Asiedu</u> <sup>*</sup> , A. Ulrich, W. Zubot, J.W. Martin	Predicting the Future of Oil Sands End Pit Lakes by Profiling of Organic Chemicals in Aged and Fresh Oil Sands Process-Affected Water Samples
16:45	<u>B. Ma</u> , D. Cologgi, & A. Ulrich	Naphthenic Acids' Degrading Consortia Enriched from Pristine Sediments Beneath an Oil Sands Tailings Pond
17:00	<u>K. Wei</u> , P. Kuznetsov, T. Siddique, & A. Ulrich <sup>1</sup>	Investigating Chemical Flux Across Oil Sands Fluid Fine Tailings-Water Interface in Meso-columns Simulating An End Pit Lake
17:15	<u>M.R. Flynn</u> , S. Balakrishna, O. Mohammed, E. Naikyar, & C. Surma	A Laboratory Experimental Study of Mudline Mixing: Implications for Water Clarity in End-Pit Lakes

ES04C: MORPHODYNAMICS OF RIVER SYSTEMS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
16:00	<u>Claire Beveridge</u> <sup>*</sup> , Erkan Istanbuluoglu, Christina Bandaragoda and Christopher Curran	Reconstructing Sediment Supply and Transport Behind the Elwha River Dams Using a Watershed Modeling Approach
16:15	<u>Colin Brennan</u> <sup>*</sup> , Colin D Rennie, and Ousmane Seidou	Effects of Climate Change on Stream Erosion in a Small Watershed: Long-term simulation
16:30	<u>Jim Miller</u> <sup>*</sup> , Tony Curtis, David Chanasyk, and Walter Willms	Influence of Riparian Grazing Management on Channel Morphology and Riparian Health of the Lower Little Bow River
16:45	<u>Kat Woodrow</u> , Paul Villard, and Heather Gammie	Historical Meander Adjustment and Projections of Future Channel Planform
17:00	<u>Elli Papangelakis</u> <sup>*</sup> , Vernon Bevan, Kimisha Ghunowa, Bruce MacVicar	60 years of channel evolution in a suburban semi-alluvial creek: Wilket Creek, Toronto
17:15	<u>Carie-Ann Lau</u> <sup>*</sup> , Brent Ward, Matthias Jakob, and Carl Schwarz	Morphologic influence and recognition of channel scour hazards on fans in British Columbia

ES05A: THE INTERACTION BETWEEN CLIMATE AND TECTONICS IN LATE CENOZOIC LANDSCAPE EVOLUTION		ROOM: ESB 2012
TIME	AUTHORS	TITLE
16:00	<u>Katharine W. Huntington</u> , Karl A. Lang, and Michael D. Turzewski	Interactions of fluvial erosion, climate and tectonics in the Eastern Himalayan syntaxis
16:30	<u>Kristin Morell</u> , Trevor Mearce, and Talat Ahmad	Geomorphology highlights along-strike variations in active strain accumulation in the Northwest Himalaya
16:45	<u>Eric Kirby</u> , Huiping Zhang, and Chen Jie	River profiles and patterns of fluvial incision record deformation in the deep crust along the eastern margin of Tibet
17:15	<u>Gosse, John</u> , Manion, Patrick <sup>*</sup> , Braschi, Lea, Rybczynski, Natalia, Lakeman, Thomas	Landscape responses to Pliocene-Pleistocene climate changes and lithospheric flexure and the opening of the Northwest Passages, Arctic Canada

H10B: CATCHMENT HYDROLOGICAL AND BIOGEOCHEMICAL BEHAVIOUR IN HUMAN-DOMINATED LANDSCAPES		ROOM: EOSC 135
TIME	AUTHORS	TITLE
16:00	<u>A. Kayembe</u> <sup>*</sup> & C.P.J. Mitchell	Determination of the drainage boundaries of a complex urban watershed
16:15	<u>M. Carpenter</u> , C. Oswald, C. Wellen & S. Oni	Modelling the Transport and Retention of Chloride using INCA-Cl in the East Holland Watershed
16:30	<u>C. Ash</u> <sup>*</sup> , S. Melles & C. Oswald	Geostatistical modeling of road salt contributions to in-stream chloride concentrations across a gradient of urbanization
16:45	<u>M.R. Anis</u> <sup>*</sup> , A. Pietroniro, M. Elshamy, S. Razavi & H. Wheeler	Effects of irrigation on the water and energy balances of the Bow river basin in Alberta, Canada
17:00	<u>I.C. Ilampooranan</u> <sup>*</sup> & N. Basu	Modeling nitrogen legacies and time lags in agricultural landscapes using Soil Water Assessment Tool (SWAT)
17:15	<u>C. Wellen</u> , N. Basu, W. Sellier, J. Liu, A. To, P. Van Cappellen, M. Mohamed	A meta-analysis and review of the effectiveness of agricultural conservation measures at field and watershed scales

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H06C: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
16:00	<u>D.R. Casson</u> , M. Werner, A. Weerts, J Schellekens & D. Solomantine	Application of global datasets and data assimilation for hydrological modelling in the Canadian Sub-Arctic
16:15	<u>J. Murfitt</u> & L.C. Brown	Monitoring lake ice growth and decay in central Ontario using RADARSAT-2: 2008-2016
16:30	<u>F. Larue</u> , A. Royer, D. De Seve, A. Roy, G. Picard & V. Vionnet	Snow water equivalent monitoring using a coupled snowpack evolution and microwave emission models over North-Eastern Canada
16:45	<u>J.M. Shea</u> , P. Harder & J.W. Pomeroy	Improving quantification of mountain snowpack properties using observations from Unmanned Air Vehicles (UAVs)
17:00	<u>D. Tokarski</u> & M. Richardson	Temporal and spatial variability of snow water equivalent, snow depth, and snow density in a 15,000 km <sup>2</sup> sub-arctic basin
17:15	<u>N.J. Kinar</u> , J.W. Pomeroy, J. Shea, M. Schirmer & P. Harder	2D Frequency Analysis of Irregularly Sampled Snowpack Properties



**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**MONDAY, MAY 29<sup>TH</sup> POSTER SESSIONS**

**POSTER SESSIONS 1 (0900 TO 1230)**  
**ESB ATRIUM**

**ES01 (POSTER): FORMS AND PROCESSES OF BEDROCK EROSION IN FLUVIAL AND GLACIAL LANDSCAPES**

POSTER	AUTHORS	TITLE
P01-ES01	<u>Clare Wilkinson</u> *, David Harbor, and Simon D. Levy	Sensing fluid pressure during plucking events in a natural bedrock channel

**ES04 (POSTER): MORPHODYNAMICS OF RIVERS**

POSTER	AUTHORS	TITLE
P01-ES04	<u>Simon Gauthier-Fauteux</u> *, Brett Eaton	Linking fluvial dynamics to white sturgeon habitat in the Nechako River, BC
P02-ES04	<u>Kai Tsuruta</u> *, Marwan A. Hassan, Simon D. Donner, and Younes Alila	Development and application of a large-scale, mechanistic, distributed suspended sediment transport model on the Fraser River Basin, British Columbia, Canada
P03-ES04	<u>Dan Haught</u> *, Jeremy Venditti, and Michael Church	Acoustically derived annual and instantaneous sediment flux on the Fraser River, BC, Canada
P04-ES04	<u>Lucy MacKenzie</u> *, and Brett Eaton	Large grains and channel stability
P05-ES04	<u>Maria Elgueta</u> *, Marwan Hassan, and Garry Clarke	Experiment on the effects of episodic sediment supply on bedload transport variability and grain size dependence
P06-ES04	Lara Middleton, <u>Peter Ashmore</u> <sup>1</sup> , and Pauline Leduc	Braiding planform dynamics in a proglacial river

**ES05 (POSTER): THE INTERACTION BETWEEN CLIMATE AND TECTONICS IN LATE CENOZOIC LANDSCAPE EVOLUTION**

POSTER	AUTHORS	TITLE
P01-ES05	<u>Evelyn Moorhouse</u> *, and Lindsay M. Schoenbohm	Fold segment linkage and uplift rates along the Janauri and Chandigarh anticlines, Northwestern India
P02-ES05	<u>Jeremy Rimando</u> *, Lindsay Schoenbohm, Carlos Costa, Andres Richar	Quaternary deformation at the Andean orogenic front: testing tectonic models of surface faulting at the La Rinconada Fault Zone, West-Central Argentina
P03-ES05	<u>Lindsay M. Schoenbohm</u> , James A. McCarthy, Paul R. Bierman, Dylan Rood, and Alan J. Hidy	Late Quaternary Tectonics, Incision, and Landscape Evolution of the Calchaquí River Catchment, Eastern Cordillera, NW Argentina
P04-ES05	<u>Erin G. Seagren</u> * and Lindsay Schoenbohm	Morphometric and geomorphic evidence of drainage reorganization in intermontane basins of NW Argentina

**ES12 (POSTER): COASTAL SEDIMENT DYNAMICS AND MORPHOLOGICAL RESPONSE: ADVANCES IN OBSERVATION AND PREDICTION**

POSTER	AUTHORS	TITLE
P01-ES12	<u>Jonathan D. Brickman</u> *, Ryan P. Mulligan, W. Andy Take	Non-Hydrostatic Numerical Modelling of Landslide Tsunami Evolution
P02-ES12	<u>Guillaume Marie</u> and Alain Le Roux*	Boulder transport by sea ice on a shore platform of St. Lawrence marine estuary (Quebec, Canada)
P03-ES12	<u>Bernard Bauer</u> , Ian Walker, Robin Davidson-Arnott, Patrick Hesp, Irene Delgado-Fernandez, and Jeff Ollerhead	Scale-dependent perspectives on beach-dune dynamics: A decade of field research at Greenwich Dunes, Prince Edward Island
P04-ES12	<u>Chris Houser</u> , Phil Wernette and Bradley Weymer	Scale dependent behavior the foredune: Implications for barrier island response to storms and sea level rise

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**ES12 (POSTER): COASTAL SEDIMENT DYNAMICS AND MORPHOLOGICAL RESPONSE: ADVANCES IN OBSERVATION AND PREDICTION - CONTINUED**

P05-ES12	<u>Philip D. Osborne</u> , Greg Curtiss, and Eduardo Sierra-Carrascal	Morphodynamic response of a mixed beach, Puget Sound, WA
P06-ES12	<u>Nicole Couture</u> and Gavin Manson	A national-scale coastal sensitivity index

**H09 (POSTER): MEASURING AND MODELLING GLACIER CHANGE**

POSTER	AUTHORS	TITLE
P01-H09	<u>J. Crompton</u> *, G. Flowers	The influence of bedrock fracture intensity on glacier dynamics
P02- H09	<u>B. Pelto</u> , B. Menounos, V. Radic & S. Marshall	Evaluation of Methods Used to Estimate Ice Thickness, Columbia and Rocky Mountains, Canada
P03- H09	<u>H. Williams</u> , M. Koppes & V. Radic	Determining the influence of glacier hypsometry on sensitivity to climate change
P04- H09	<u>A. Pulwiski</u> & G. Flowers	Multi-scale investigation of snow accumulation on alpine glaciers
P05- H09	<u>L. Thomson</u>	The stability of White Glacier changes since 1960
P06- H09	<u>G.C. Racz</u> , C. Schoof & E. Haber	Estimating permeability of the subglacial drainage system using inverse modelling
P07- H09	M. <u>Tessema</u> , V. Radic & B. Menounos	Modeling surface glacier melt with the use of dynamically downscaled climate fields over Castle Creek Glacier, British Columbia, Canada

**H01 (POSTER): HYDRO-CLIMATIC IMPACTS AND ADAPTATION**

POSTER	AUTHORS	TITLE
P02-H01	<u>C. Muneeppeerakul</u> & R. Muneeppeerakul	Optimal use of weather index insurance with traditional coping strategies across geographical scales

**J01 (POSTER): SATELLITE REMOTE SENSING FOR EARTH SCIENCE APPLICATIONS**

POSTER	AUTHORS	TITLE
P01-J01	J. Murfitt, <u>A. Robinson</u> & L. Brown	Canadian Lake Depth Inventory using Landsat 8 OLI/TIRS

**POSTER SESSIONS 2 (1400 TO 1730)**

ESB ATRIUM

**H14 (POSTER): GENERAL HYDROLOGY**

POSTER	AUTHORS	TITLE
P01-H14	<u>L. Morales-Marin</u> , H. Wheeler, K. Lindenschmidt & F. Yassin	A new solute transport model for large scale cold region catchments: A theoretical framework
P02- H14	<u>J.M. Buttle</u>	Mediating stream baseflow response to climate change: the role of basin storage
P03- H14	<u>D.E. Carlyle-Moses</u> & T.G. Pypker	Rainfall Partitioning by the Canopy of a Lone Ponderosa Pine ( <i>Pinus ponderosa</i> )
P04-H14	<u>W. Floyd</u> , M. Korver, C. Owen, J. McPhail & R. Brunsting	Stage-discharge rating curve development using an automated salt dilution system on British Columbia's Central Coast
P05-H14	<u>M. Elshamy</u> , A. Pietroniro & H.S. Wheeler	Modelling the hydrology and streamflow of the Mackenzie River Basin

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**MONDAY, MAY 29<sup>TH</sup> POSTER SESSIONS**

H06 (POSTER): ADVANCES IN COLD REGIONS HYDROLOGY		
POSTER	AUTHORS	TITLE
P01-H06	<u>S. Budhathoki</u> , A. Ireson & J. Steeves	Quantifying snowmelt infiltration and runoff
P02-H06	<u>M. Rabie</u> , G. Ali, C. Spence, S. Bansah, V.T. Tang & S. Carey	Investigating streamflow generation and streamflow sources during a wetting-up period in an engineered prairie watershed
P03-H06	<u>W. Tang</u> , S.K. Carey, R. Rolick & B. Kurylyk	Using wavelet analysis to evaluate the spatio-temporal variability of stream temperature in two alpine watersheds
P04-H06	<u>A. Szeitz</u> & R.D. Moore	Modelling snow density from snow depth combined with air temperature time series interpolated from the North American Regional Re-analysis
P05-H06	<u>R.L. Rolick</u> , S.K. Carey & B.L. Kurylyk	Thermal regimes of streams within an alpine discontinuous permafrost catchment, southern Yukon Territory
P06-H06	<u>S.S. Ariano</u> & L.C. Brown	The influence of consecutive El Niño and La Niña events on lake ice in Central Ontario
P07-H06	<u>A. Robinson</u> & L.C. Brown	Lake ice modelling of two high arctic lakes
P08-H06	<u>J. Peters</u> & S.F. Lamoureux	Landscape controls over subsurface water flow pathways in the Canadian High Arctic
P09-H06	<u>J.R. Adams</u> & W.L. Quinton	On the similarity of land-cover among lowland peatland complexes in the southern Taiga Plains discontinuous permafrost region, NWT
P10-H06	<u>H. Gleason</u> , S. Déry, J. Rex, V. Foord, R. Kabzems & C. Mottishaw	Forecasting of Spring Runoff Events in the Kiskatinaw Watershed, Dawson Creek, British Columbia
P11-H06	<u>E. Mathieu</u> , W. Quinton & O. Sonnetag	The effects of wildfire on snowmelt and ground thaw on a permafrost peat plateau, Scotty Creek, Northwest Territories
P12-H06	<u>H. Bonn</u> , S. Carey & B.L. Kurylyk	Measuring and modeling infiltration and water movement in frozen ground, Wolf Creek, Yukon
P13-H06	<u>L. Langs</u> & R. Petrone	Methods investigating alpine forest water use under varying environmental conditions in the Canadian Rocky Mountains
P14-H06	<u>Z. Lv</u> & J.W. Pomeroy	Detecting intercepted snow on mountain needleleaf forest canopies using satellite remote sensing
P15-H06	<u>M.C. Elmes</u> , D.K. Thompson & J.S. Price	Monitoring the hydrological response of a burned moderate-rich fen watershed in the Athabasca Oil Sands Region, Alberta

SE01 (POSTER): GEOPHYSICAL STUDIES OF STRUCTURE AND TECTONICS OF THE CANADIAN CORDILLERA		
POSTER	AUTHORS	TITLE
P01-SE01	<u>P. Audet</u> , A. Schaeffer, M. McLellan, A. Tarayoun & C. Sole	Structure and deformation of the northern Canadian Cordillera: A broadband seismic reconnaissance study
P02-SE01	<u>C. Esteve</u> , A. Schaeffer, P. Audet, Louisa Murray-Berquist, S. Cairns, B. Elliott, H. Falck & D. Snyder	A preliminary teleseismic investigation of the crust and mantle lithosphere obtained from BISN in the western Canadian Arctic

SE04 (POSTER): RECENT TRENDS IN EXPLORATION GEOPHYSICS		
POSTER	AUTHORS	TITLE
P01-SE04	<u>D. W. Kouhi</u> & K. F. Tiampo	Applying structural joint inversion and lateral interpolation techniques to get the most out of airborne geophysical data at Thor Lake, NT
P02-SE04	<u>R. Maedel</u> , A. Braun & D. Ball	Forward and cooperative inverse modeling of petrophysical and geophysical data in Zone 58 at Raglan Mine, Québec, Canada
P03-SE04	C. Walter, <u>A. Braun</u> & G. Fotopolous	Orientation Considerations for Multi-Rotor UAV Magnetometry Surveys

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**MONDAY, MAY 29<sup>TH</sup> PLENARY**

**TUESDAY, MAY 30<sup>TH</sup>**

**PLENARY**

**TIME: 0800 TO 0845 ROOM: ESB 1013**

**Forests, Snow, and Change**

**Jessica Lundquist**

Dept. of Civil and Environmental Engineering, University of Washington

Forests cover about 40% of the North American snow zone and up to 100% of the snow zone in many key watersheds in British Columbia and the western United States. Many of these forests are actively managed, and many more are subject to disturbance from fire, insects, or drought. Because snowpack accumulation and melt rates depend on forest structure as well as climate, forest management (e.g., strategically retaining and/or removing forest cover in the right locations) has the potential to increase snow water storage, change the timing of snowmelt, and increase the overall resilience of terrestrial and aquatic ecosystems. Because of this importance, people have been studying forest-snow interactions for about a century, and still, these dynamics are not properly represented in models. Fortunately, several recent developments can be catalyzed to advance the science in this area: 1) a global framework for how local climate matters in forest-snow interactions; 2) a revolution in the precision and availability of lidar metrics and high-resolution aerial photos to characterize canopy properties and the snow underneath them, and 3) new widespread availability of time-lapse digital cameras to quantify spatio-temporal evolution of snow interception, accumulation, and melt under diverse forests. We discuss the current state of the science and propose the necessary steps to revolutionize how canopy processes are represented in distributed hydrologic models to better understand forest-snow interactions and to facilitate accurate numerical prediction related to prescribed (and unavoidable) forest change.

**Bio:** Dr. Jessica Lundquist grew up in California and spent every summer hiking in the Sierra Nevada. She received her B.S. in Atmospheric Science from University of California, Davis in 1999, her M.S. in Oceanography from Scripps Institution of Oceanography (SIO) at U.C. San Diego in 2000 (with a thesis on coastal fog), and her Ph.D. in Oceanography from SIO in 2004 (with a dissertation on diurnal cycles in mountain streamflow). She spent 2 years in Boulder as a CIRES postdoctoral fellow with the University of Colorado, Boulder and NOAA, where she finally learned to ski. She began her position as Assistant Professor at the University of Washington in fall 2006 and was promoted to Associate Professor in 2011, and to full Professor in 2017. Jessica received the American Geophysical Union's Cyrosphere Young Investigator Award in 2008, and the Water Resources Research Editor's Choice Award in 2014 for her paper on forest-snow interactions around the world. She became an Editor for Water Resources Research in 2017. Dr. Lundquist's research focuses on spatial patterns of snow and weather in the mountains and how those patterns are likely to affect streamflow and water resources in a changing climate.



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**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

**CONCURRENT SESSIONS (0900 TO 1030)**

C01A: WHAT THE FLUX?! SURFACE-ATMOSPHERE EXCHANGE OF ENERGY AND MASS		ROOM: AERL 120
TIME	AUTHORS	TITLE
9:00	<u>Chuixiang Yi</u> , George Hendrey, Shan Gao, Guangwei Mu, and Wei Fang	Potential links between tree-ring data and eddy-fluxes measurements
9:30	<u>Bharat Rastogi*</u> , Yueyang Jiang, Maxwell Berkelhammer, Sonia Wharton, David Noone, Christopher Still	Seasonal carbon fluxes for an old-growth temperate forest inferred from carbonyl sulfide
9:45	<u>Gesa Meyer1*</u> , T. Andrew Black, Rachhpal S. Jassal, Zoran Nestic, Nicholas J. Grant, David L. Spittlehouse, Arthur L. Fredeen, Andreas Christen, Vanessa N. Foord and Rebecca Bowler	Carbon and water balances of three lodgepole pine stands following mountain pine beetle attack in northern interior British Columbia
10:00	<u>Jilmarie Stephens*</u> , Andy Black, Rachhpal Jassal, Zoran Nestic, Nick Grant, Alan Barr, Andrew Richardson, Mark Johnson and Andreas Christen	Effects of forest tent caterpillar defoliation on carbon and water fluxes in a boreal aspen stand
10:15	<u>Pierre-Erik Isabelle*</u> , Daniel F. Nadeau, Marie-Hélène Asselin, Annie-Claude Parent, Sylvain Jutras and François Anctil	Spatiotemporal variability and modeling of solar irradiance transmissivity through a juvenile balsam fir humid boreal forest

ES06A: PROFESSIONAL GEOSCIENCE I: RIVER RESTORATION IN CANADA, FROM PLANNING TO EFFECTIVENESS MONITORING		ROOM: GEOG 229
TIME	AUTHORS	TITLE
09:00	D. Gaeuman*, R.L. Stewart and B.Schmandt	Gravel management downstream from dams: Geomorphic responses to gravel augmentations and dam-controlled floods
09:30	P. Padovan*, P. Villard, and J. Cockburn	Assessing Hydrogeomorphic Adjustment in Urban Hybrid Channel Restoration Projects: Highland Creek, Toronto, Ontario
09:45	S. Masse*, T. Buffan-Belanger, P. Bison and J. Ruiz	The "Freedom space for rivers" concept as a passive restoration approach for sustainable floodplain management
10:00	James Ogilvie*, Allan Bronsro, Lee Nikl and Mark Adams	Creek Rehabilitation Following a Tailings Dam Breach and Debris Flow: Mount Polley Mine, British Columbia
10:15	Shawn Chartrand*, Marcin Whitman, Brian Cluer, and Michael Burke -	San Clemente Dam Removal And Perspectives On Design Of Step-Pool Stream Channel Segments -

H06D: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
9:00	<u>S. Gharari</u> , S. Safaei, S. Razavi & H. Wheeler	On the closure of the water balance in the catchments of the Canadian Rockies
9:15	<u>M. Chernos</u> , R.J. MacDonald & J. Craig	Current and future projections of glacier contribution to streamflow in the upper Athabasca River Basin
9:30	<u>K. Stahl</u> , I. Kohn, M. Bohm, D. Freudiger, K. Gerlinger, J. Seibert & M. Weiler	Quantifying centurial changes in the contribution of upstream snow and glacier melt to downstream river discharge
9:45	<u>M.A. Schnorbus</u> , B. Menounos, A. Schoeneberg, F. Anslow, G. Jost & R.D. Moore	Improvements to Regional Hydrologic Modeling by Incorporating Ice Dynamics
10:00	<u>D. Pradhananga</u> & J. Pomeroy	Hydrological response of Peyto Glacier to climate change and glacier recession

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

H09A: MEASURING AND MODELLING GLACIER CHANGE		ROOM: GEOG 200
TIME	AUTHORS	TITLE
9:00	<u>D. Schroeder</u>	Advances in ice penetrating radar time series observations
9:30	<u>A. Bevington</u> & B. Menounos	Large area glacier change for western Canada over 31 years of satellite imagery
9:45	<u>J.M. Shea</u> , W.W. Immerzeel, P. Wagnon & P. Kraaijenbrink	Variability in debris-covered glacier change in the Nepal Himalayas
10:00	<u>A. Winter-Billington</u> , M. Koppes, S. Singh, A. Banerjee, R. Shakar & H.C. Nainwal	Seasonal variation of controls on ablation of debris-covered glaciers
10:15	<u>N. Fitzpatrick</u> , V. Radic & B. Menounos	The surface energy balance and turbulence characteristics of a mid-latitude glacier

SE02A: THE EARTHQUAKE CYCLE: SQUARING THE CIRCLE		ROOM: ESB 2012
TIME	AUTHORS	TITLE
9:00	<u>K. Wang</u> , S. Li, Y. Jiang & S. Dosso	Using a viscoelastic Earth model to invert geodetic data to determine the locking state of the Cascadia megathrust
9:15	<u>D. Li*</u> & Y. Liu	Modeling slow slip events and their interaction with Megathrust earthquakes in Cascadia Subduction Zone
9:30	<u>Y. Liu</u> , D. Li, H. Yu & H. Yang ( <i>Invited</i> )	Seismic rupture and slow slip events in a megathrust earthquake cycle model
9:45	<u>K. F. Tiampo</u> , J. Kazemian, W. Klein & R. Dominguez	The earthquake cycle in a simple earthquake asperity model
10:00	<u>H. Yu</u> , Y. Liu & H. Yang	Effects of fault geometry on earthquake ruptures: Modeling earthquake sequences along the central Chile subduction zone
10:15	<u>E. Nissen</u>	Recent observations and implications of a new class of cascading, multi-fault earthquake rupture

**CONCURRENT SESSIONS (1100 TO 1230)**

B03A: PHYSICAL AND BIOGEOCHEMICAL LAND SURFACE PROCESSES IN A CHANGING CLIMATE		ROOM: AERL 120
TIME	AUTHORS	TITLE
11:00	<u>P. Bartlett</u> & L. Wang	Factors affecting winter albedo simulations in boreal environments using CLASS
11:15	<u>M. Nazarbakhsh*</u> & A. Ireson	Understanding the trade-off between soil and vegetation characteristics in controlling the water balance in the southern boreal forest
11:30	<u>W. Skeeter*</u> , A. Christen, G. Henry & T. Lantz	Vegetation influence and environmental controls on greenhouse gas fluxes from a drained thermokarst lake
11:45	<u>A.-A. Laforce*</u> , E. Humphreys & C. Burn	Spatial variability of carbon emissions within a drained lake basin and its surrounding tundra, Illisarvik, NT.
12:00	<u>M. Helbig*</u> , L.E. Chasmer, A.R. Desai, M. Detto, N. Kljun, W.L. Quinton, C.C. Treat & O. Sonnentag	Thawing boreal forest-wetland landscapes as components of regional and global climate systems
12:15	<u>S.E. Irvine*</u> , M. Strack, & J.S. Price	DOC Transport in a Constructed Watershed in the Athabasca Oil Sands Region, Alberta

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

ES07A: PROFESSIONAL GEOSCIENCE II: FROM NATURAL SCIENCE TO REGIONAL PRACTICES IN CANADA		ROOM: GEOG 229
TIME	AUTHORS	TITLE
11:00	<u>Sally-Beth Betts</u> (Invited)	A Critical Review of the Application of Fluvial Geomorphology in Ontario's Conservation Authorities and Setting the Stage for a Path Forward
11:15	<u>Paul V. Villard</u> (Invited)	Degrees of Freedom, River Management, and Natural Channel Design
11:30	<u>Brett Eaton</u> , and Rob Millar	Predicting gravel bed river response to environmental change: the strengths and limitations of a regime-based approach
11:45	<u>Sarah Davidson</u> and Laurent Roberge	Incorporating river mechanics into geohazard management: a simple model for quantifying bank erosion
12:00	<u>Erica Ellis</u> , Amir Taleghani, and Chad Davey	Putting Sediment Mobility To The Test: Predicting Fish Habitat Impacts
12:15	<u>Andre Zimmermann</u> , Jamie Stirling, Tim Argast	Flood and Precipitation Warning Systems: Successes and Challenges

ES12A: COASTAL SEDIMENT DYNAMICS AND MORPHOLOGICAL RESPONSE: ADVANCES IN OBSERVATION AND PREDICTION		ROOM: ESB 2012
TIME	AUTHORS	TITLE
11:00	<u>Phillipe Wernette</u> *, Chris Houser, Bradley Weymer, Mark Everett, Bobby Reece, and Michael P. Bishop	Spatially variable framework geology as a driver of barrier island development
11:30	<u>Vanessa Bennett</u> , Ryan P. Mulligan, and Cheryl Hapke	Barrier island overwash and storm surge in a coastal bay during Hurricane Sandy
11:45	<u>Michael Grilliot</u> *, Ian J Walker, and Bernard O. Bauer	Airflow dynamics and sand transport over a coastal foredune with large woody debris
12:00	<u>Alex E. Hay</u>	Wave-driven sediment dynamics on a steep, mixed sand and gravel, megatidal beach
12:15	<u>Caroline Pinonnault</u> *, Guillaume Marie, and Pascal Bernatchez	Influence of the foreshore morphosedimentology on coastal erosion rate on the south shore of the St-Lawrence Estuary, Quebec

H06E: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
11:00	<u>S.A. Krogh</u> & J.W. Pomeroy	Trends in the hydrology of a small Arctic basin in the tundra-taiga treeline region
11:15	<u>O. Sonnentag</u> , M. Helbig, R. Connon, G.H. Gosselin, E. Haughton, K. Wischnewski, J. Hanisch, T. Moore & W. Quinton	The subcatchment- and catchment-scale hydrology of a boreal headwater peatland complex with sporadic permafrost
11:30	<u>A. Nazemi</u> , E. Melhe, J. Manashti & P. Jaramillo	Climate and Geographic Controls on Changing Landscape Freeze and Thaw Patterns in Quebec (1979 – 2010)
11:45	<u>P. Marsh</u> , P. Mann, B. Walker, A. Toure, E. Wilcox, M. Tusi, A. Jitnikovitch, O. Sonnentag & C. Derksen	The changing snow environment of the western Canadian Arctic
12:00	<u>K. Rasouli</u> , P.H. Whitfield, L.W. Martz, A.M. Ireson, J.R. Janowicz, D. Marks & J. Pomeroy	Are effects of transient vegetation and soil changes as important as climate change impacts on hydrological processes?
12:15	<u>M.C. Elmes</u> , D.K. Thompson, J.H. Sherwood, & J.S. Price	Exploring the hydrological and meteorological conditions leading to the 2016 Horse River Wildfire, and the subsequent burning of a fen watershed in Northern Alberta, Canada

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

H01A: HYDRO-CLIMATIC IMPACTS AND ADAPTATION		ROOM: EOSC 135
TIME	AUTHORS	TITLE
11:00	<u>G.W.K. Moore</u>	An assessment of the changing nature of the winter hydro-climate in Ontario and its impacts on risk management
11:15	<u>B.W. Newton</u> , T.D. Prowse, L.P. de Rham, T.W.D. Edwards	Extreme mid-winter hydro-climatic events in four major river basins in western Canada
11:30	<u>P. Rokaya</u> , L. Morales-Marin, H. Wheeler & K.E. Lindenschmidt	Hydro-climatic Variability and implications for ice-jam flooding in the Athabasca River Basin in western Canada
11:45	C. Irambona, B. Music, <u>D. Nadeau</u> , T. Mahdi & I. Strachan	Impacts of boreal hydroelectric reservoirs on local hydroclimatology and precipitation recycling: A case study of the La Grande River watershed, Canada
12:00	<u>Y. Dibike</u> , A. Shakibaenia, H.I Eum, T. Prowse & I. Droppo	Potential impacts of climate change on the hydrodynamic and sediment transport regime of the lower Athabasca River
12:15	<u>M. Kompanizare</u> , R. Petrone, D. Robinson & R. Rooney	Effect of climate change on hydrological connectivity among landscape units in the Athabasca Oil Sands Region

**CONCURRENT SESSIONS (1400 TO 1530)**

C01B: WHAT THE FLUX?! SURFACE-ATMOSPHERE EXCHANGE OF ENERGY AND MASS		ROOM: AERL 120
TIME	AUTHORS	TITLE
14:00	<u>John D. Wilson</u>	Micrometeorology of non-ideal sites: computing the wind field
14:30	<u>Amanda M. Taylor</u> *, Brian D. Amiro, Mario Tenuta, and Matt Gervais	The spatial variability of turbulent energy fluxes over agricultural fields
14:45	<u>Kelsey A. Everard</u> *, Andreas Christen <sup>1</sup> , Marco Giometto <sup>2</sup> , Holly J. Oldroyd <sup>3</sup> , Paul Skaloud <sup>1</sup>	Coherent structures controlling heat and momentum exchange in a nighttime drainage flow through a vineyard canopy
15:00	<u>H. Jones</u> *, T.A. Black, R. S. Jassal, Z. Nestic	Radiative properties of plastic films and their use as soil mulches and in low tunnels to modify crop microclimate
15:15	<u>Shannon E. Brown</u> , Claudia Wagner-Riddle, and Aaron Berg	The characterization of a new lysimeter facility measuring N transport via drainage and soil gas emissions

ES14A: ADVANCES IN EARTH SURFACE PROCESSES		ROOM: GEOG 229
TIME	AUTHORS	TITLE
14:00	<u>Brett Eaton</u> , Lucy MacKenzie, and Matthias Jakob	Steady states and extreme floods: experiments on the dynamics of steep gravel bed streams
14:15	<u>Anya Leenman</u> *, Jon Tunnicliffe, and Gary Brierley	Deciphering historic change in tributary-junction fans in response to catchment-wide sedimentary disturbance
14:30	<u>Collin Branton</u> *, Derek T. Robinson, and Rebecca Rooney	Quantifying topographic roughness and spatial pattern at the landscape scale in the prairie pothole region of Alberta, Canada
14:45	<u>Pamela E. Tetford</u> *, Joseph R. Desloges, and Dimitri Nakassis	Assessing geomorphic processes and their potential relationship with archaeological artifact exposure – NE Peloponnese, Greece
15:00	<u>Siobhan Whadcoat</u> , Nick Rosser, Matthew Brain, Richard Hardy	Identifying potential failure zones in rock slopes based on spatial and temporal patterns that characterize rockfall evolution
15:15	<u>Ronda Strauch</u> *, Erkan Istanbuluoglu, and Sai Siddhartha Nudurupati	A regional model of landslide susceptibility using Landlab and macro-scale hydrologic simulations



**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

H09B: MEASURING AND MODELLING GLACIER CHANGE		ROOM: GEOG 200
TIME	AUTHORS	TITLE
14:00	<u>A. Rempel</u>	Ice-rock-water interactions on a soft, wet bed
14:30	<u>A. Hubbard</u> & J. Ryan	Tidewater Dynamics at Store Glacier, West Greenland from Daily Repeat UAV Survey
14:45	<u>G.K.C. Clarke</u> & M. Hambrey	Structural evolution of Trapridge Glacier in response to cyclic surging: models and observations
15:00	<u>A. Whiteford</u> & C. Schoof	Pattern forming instabilities in the coupling of ice sheet and basal hydrology
15:15	<u>R. Nath</u> & S.J. Marshall	Applying Flow Line Modelling, and GIS to Reconstruct the Glacier Volume Loss for Athabasca Glacier, Canadian Rockies.

SE02B: THE EARTHQUAKE CYCLE: SQUARING THE CIRCLE		ROOM: ESB 2012
TIME	AUTHORS	TITLE
14:00	<u>T. Mulder</u>	Changing times, Meager Mountain Seismicity 1985 - 2017
14:15	<u>C. Regalla</u> , K. Morell, C. Amos, S. Bennett, L. Leonard & V. Levson	Tectono-geomorphic and paleoseismic evidence for Holocene surface ruptures along the Leech River fault near Victoria, British Columbia, Canada
14:30	<u>L. Broom</u> *, C. Campbell & J. Gosse	A high-resolution Holocene marine sedimentological record from Pond Inlet, Nunavut - Is there a paleoseismicity signal?
14:45	<u>J. Gosse</u> , E. Kirby, E. McDonald & J. D. Walker	Coupling cosmogenic nuclide ages and soils to constrain the interaction between multiple fault systems, Panamint Valley, California
15:00	<u>C. A. Paige</u> *, J. C. Gosse, K. Taylor, A. Margreth, E. Kirby & E. McDonald	An in-situ cosmogenic <sup>14</sup> C erosion-rate method to improve the reliability of exposure dating strain markers, Panamint Valley, California
15:15	<u>E. Kirby</u> , J. Gosse, E. McDonald & J. D. Walker	Geomorphic evidence for co-seismic slip on an active low-angle normal fault: Panamint Valley, California

**CONCURRENT SESSIONS (1600 TO 1730)**

C01C: WHAT THE FLUX?! SURFACE-ATMOSPHERE EXCHANGE OF ENERGY AND MASS		ROOM: AERL 120
TIME	AUTHORS	TITLE
16:00	<u>François Anctil</u> , Islem Hajji, Audrey Maheu, Charles Malenfant, Biljana Music, Daniel Nadeau, Vincent Fortin, Étienne Gaborit, Jingfeng Wang, and René Therrien	Construction of a hydrological surface model around Maximum entropy production
16:30	<u>Sung-Ching Lee</u> *, Andreas Christen, T. Andy Black, Mark S. Johnson, Rachhpal S.Jassal, Rick Ketler, Zoran Nestic, Markus Merkens	Greenhouse gas balance of a restored and rewetted bog in Metro Vancouver
16:45	<u>Brenda D'Acunha</u> *, Mark S. Johnson	Carbon drainage from a restored peatland in British Columbia, Canada: dissolved organic carbon (DOC) fluxes and characteristics
17:00	<u>Caitlin Semmens</u> *, Andreas Christen	Exchange efficiency of carbon dioxide fluxes over a heterogeneous urban landscape
17:15	<u>Manuel F. Schmid</u> *, Marco G. Giometto, Andreas Christen, Scott Krayenhoff, and Marc B. Parlange	Closure Models for Reynolds-Averaged Navier-Stokes Simulations of Flow Within and Above Urban Canopies

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

ES01A: FORMS AND PROCESSES OF BEDROCK EROSION IN FLUVIAL AND GLACIAL LANDSCAPES		ROOM: GEOG 229
TIME	AUTHORS	TITLE
16:00	<u>David J. Harbor</u> , Clare Wilkinson, Elliott Helgans, and Joel P. Kuehner	Initiation of plucking in rapidly varied flow: results of flume experiments
16:30	<u>Colin Rennie</u> , Michael Church, Jeremy G. Venditti	Influence of bedrock on river geometry and hydrodynamics: Fraser River
16:45	<u>Eva Kwohl</u> , Jeremy G. Venditti, Colin Rennie, Dan Haught, Kirsti Fairweather, and Michael Church	The effect of flow stage on velocity inversions and morphology in actively incising bedrock canyons
17:00	<u>Saber Ansari*</u> , Colin Rennie, Eva Kwohl, Jeremy G. Venditti	Shore-based monitoring of turbulent flow structure in a bedrock canyon river
17:15	<u>Jeremy G. Venditti</u> , Eva Kwohl, Colin Rennie, Michael Church	What is the formative flow in bedrock canyons?

ES12B: COASTAL SEDIMENT DYNAMICS AND MORPHOLOGICAL RESPONSE: ADVANCES IN OBSERVATION AND PREDICTION		ROOM: ESB 2012
TIME	AUTHORS	TITLE
16:00	<u>Philip D. Osborne</u> , and Alexandre Forest	Coast to Slope Sediment Fluxes in the Southern Canadian Beaufort Sea
16:30	<u>Siobhan Whadcoat</u> , Scott McDougall, Nick Rosser, Matthew Brain and Richard Hardy	The competing roles of weathering and internal stress redistribution in driving rock slope failure in a coastal environment
16:45	Ryan P. Mulligan, and W. Andy Take	Theoretical considerations on landslide momentum flux in the generation of tsunami
17:00	<u>Frank Oliva*</u> , André Viau, and Matthew Peros	Use of X-ray fluorescence (XRF) in Atlantic basin paleotempestology
17:15	Sanaz Mehrzad*, Ioan Nistor, and Colin D. Rennie	Scour and erosion due to tsunami-like bore around structures

H06F: ADVANCES IN COLD REGIONS HYDROLOGY		ROOM: ESB 1012
TIME	AUTHORS	TITLE
16:00	<u>D. Costa</u> , J. Pomeroy & H. Wheeler	An experimental tool for the simulation of snowmelt nutrient release and transport from cultivated areas – the WINTRA model
16:15	<u>H.J. Annand</u> , J.W. Pomeroy & H.S. Wheeler	Simulations of the influence of wetland drainage on the Canadian Prairies: an example at Smith Creek Research Basin, Saskatchewan
16:30	<u>K. Shook</u> & J. Pomeroy	Causes of the shapes of hysteretic connected-fraction curves of Prairie drainage basins
16:45	<u>S. Dery</u> , T. Stadnyk, M.K. MacDonald & K. Koenig	Flow regulation controls on daily river discharge into Hudson Bay
17:00	<u>J.R. Dierauer</u> , D.M. Allen & P.H. Whitfield	Water-Energy Nexus and Future Water Security in Northeast British Columbia
17:15	<u>F. Yassin</u> , S. Razavi & H. Wheeler	Improved representation of water management and reservoirs in a land surface-hydrology model

H01B: HYDRO-CLIMATIC IMPACTS AND ADAPTATION		ROOM: EOSC 135
TIME	AUTHORS	TITLE
16:00	<u>D.L. Spittlehouse</u>	Assessing the Risks of a Changing Climate to Forest Infrastructure
16:15	<u>K. Siemens</u> & T. Prowse	Applying the snowmelt runoff model to simulating streamflow for the upper Athabasca River

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> TECHNICAL SESSIONS**

H01B: HYDRO-CLIMATIC IMPACTS AND ADAPTATION - CONTINUED		
16:30	<u>M.B Masud</u> , T. McAllister, G. Goss & M. Faramarzi	Assessment of climate change impacts on crop production and water use in Alberta
16:45	<u>M.K. MacDonald</u> , T.A. Stadnyk, S.J Dery, M. Braun & K. Koenig	Uncertainty in runoff projections across the Hudson Bay Drainage Basin
17:00	<u>L. Somers</u> , J. McKenzie, S. Zipper, B. Mark, P. Lagos, O. Wigmore & M. Baraer	Climate change and enhanced recharge in a non-glacierized mountain catchment, Shullcas River, Peru
17:15	<u>G. McDowell</u> & M. Koppes	Principles for successful adaptation to 'Peak Water' in glaciated watersheds

H08A: SNOW LEVEL AND PRECIPITATION: TRENDS, EXTREMES AND IMPACTS		ROOM: GEOG 200
TIME	AUTHORS	TITLE
16:00	<u>Julie M. Thériault</u>	Formation mechanisms and evolution of winter precipitation types
16:15	<u>M.M. Brugman</u> , T. Smith, C. Emond, A. Coldwells, M. Loney & A. Chen	Snow level forecasting using precipitation feedbacks within the melting snow transition layer
16:30	<u>A.M. Snauffer</u> , W. Hsieh & A. Cannon	High-resolution mapping of snow water equivalent in British Columbia by artificial neural networks
16:45	<u>R. E. Stewart</u> , M.M. Brugman, R. Mo, G. Bramwell, J. Bau, M. MacDonald & J. Goosen	Recent high impact freezing rain events in BC
17:00	<u>J. Almonte</u> & R.E. Stewart	On the changing snow-rain transition regions of the southwestern Canadian Cordillera under a warmer climate
17:15	<u>P. Odon</u> , G. West & R. Stull	Extreme levels of temperatures, wind speeds, and precipitation over British Columbia, Canada

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**TUESDAY, MAY 30<sup>TH</sup> POSTER SESSIONS**

**POSTER SESSIONS 1 (0900 TO 1230)**  
**ESB ATRIUM**

<b>B04 (POSTER): MINE RECLAMATION: MULTIDISCIPLINARY STUDIES FROM ACROSS MINING SECTORS</b>		
POSTER	AUTHORS	TITLE
B04-06	<u>D.L. Pratt</u> & J.J. McDonnell	A Freezable Environmental Test Slope for Cold Regions Reclamation Cover System Studies
B04-08	<u>X. Yu</u> * & A. Ulrich	Role of Microbial Mats in Water Capped Tailings: Turbidity Removal and Chemical Flux Mitigation
B04-17	<u>L.A. Swerhone</u> *, J.A. Nesbitt, VM.B.J. Lindsay	Geochemical Considerations for Including Petroleum Coke in Oil Sands Mine Closure Landscapes
B04-19	<u>C.R.C. Cilia</u> * C M.B.J. Lindsay	Assessing Salt Transport within Layered Oil Sands Mine Wastes: Field and Laboratory Experiments
B04-22	<u>S.L. Strilesky</u> *, S.K. Carey, E.R. Humphreys, R.M. Petrone, G.B. Drewitt, & G. Sutherland	Filling in a Forest Patchwork: A Multi-Site Analysis of Conventional and Constructed Patches of the Canadian Boreal Forest
B04-23	<u>C.J. Vessey</u> * & M.B.J. Lindsay	Influence of Ion Exchange Reactions on Salt Migration in Oil Sands Reclamation Soil Cover Materials: Laboratory Column Experiments
B04-24	<u>K. Dompierre</u> , L. Barbour, & J. Zettl	Characterizing Mass Release from Oil Sands Fluid Fine Tailings with Multiple Tracers
B04-29	<u>S. Chang</u> *, E. Tedford, & G Lawrence	Heat Budget and Fluxes at Base Mine Lake
B04-30	<u>S.E. Irvine</u> *, M. Strack, & J.S. Price	DOC Transport in a Constructed Watershed in the Athabasca Oil Sands Region, Alberta
B04-31	<u>S. Poon</u> *, J. Brandon, & A. Ulrich	A Mechanistic Study of CO <sub>2</sub> -Induced Turbidity Reduction in Water Capped Tailings

<b>H010 (POSTER): CATCHMENT HYDROLOGICAL AND BIOGEOCHEMICAL BEHAVIOUR IN HUMAN-DOMINATED LANDSCAPES</b>		
POSTER	AUTHORS	TITLE
P01-B01	<u>C.J. Oswald</u> , S. Melles, M. Macrae & C. Wellen	Untangling the hydrologic and land use/cover drivers of impaired water quality in an agricultural catchment in southern Ontario
P02-B01	<u>A. Kayembe</u> * & C.P.J. Mitchell	Assessing nested and cumulative hydrological and chloride behaviour of a highly urbanized watershed

<b>SE05 (POSTER): INDUCED EARTHQUAKES: SOURCE PROCESSES AND HAZARD ASSESSMENT</b>		
POSTER	AUTHORS	TITLE
P01-SE05	<u>S. D. Thorpe</u> , K. F. Tiampo, S. V. Samsonov, M. Shirzaei & P. J. González	Time series analysis of surface deformation associated with fluid injection and induced seismicity in Timpson, Texas using DInSAR methods
P02-SE05	<u>J. Kubanek</u> , Y. Liu & R. M. Harrington	Monitoring ground motion associated with fluid injection and earthquakes in the western Canadian sedimentary basin (WCSB)
P03-SE05	<u>A. Amini</u> , E. Eberhardt	An investigation on the effects of hydraulic fracturing injection volume and rate on the magnitude of induced seismic events

<b>SE06 (POSTER): SOLID EARTH GEOPHYSICS: GENERAL CONTRIBUTIONS</b>		
POSTER	AUTHORS	TITLE
P01-SE06	<u>J. Onwuemeka</u> *, Y. Liu, R. Harrington, A. Pena-Castro, A. Martell & F. A. Darbyshire	Events Relocation and Stress Inversion for Charlevoix Seismic Zone using Recent Earthquake and Newly Recorded Waveform Data

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<b>SE06 (POSTER): SOLID EARTH GEOPHYSICS: GENERAL CONTRIBUTIONS - CONTINUED</b>		
P02-SE06	<u>A. Pena-Castro*</u> , J. Onwuemeka, Y. Liu, R. Harrington, A. Martell & F. Darbyshire	Earthquake Focal Mechanism solutions in the Charlevoix Seismic zone suggest stress heterogeneity in the impact structure
P03-SE06	A. Esmaeilzadeh, G. R. Brooks & <u>C. Samson</u>	Evidence of synchronous mass transport deposits from sub-bottom profiling at Lac de l'Argile, Quebec
P04-SE06	<u>J. Hutchinson*</u> , H. Kao, K. Obana & G. Spence	Initial results from the SeaJade 2 project: Characteristics of the April 2014 Nootka sequence and the corresponding seismogenic structures
P05-SE06	<u>G. Savard*</u> & M. G. Bostock	Updated 3D Seismic Model of southern Vancouver Island and Earthquake Relocations Using Double-Difference Tomography and Low Frequency Earthquakes
P06-SE06	T. Akuhara, <u>M. Bostock</u> & A. Kato	Low velocity zones along subducting plates: comparative study between southwest Japan and Cascadia subduction zones
P07-SE06	<u>R. Campbell*</u> & A. W. Frederiksen	Layer Stripping the Effect of Sedimentary Basins on Teleseismic Data Using Transfer Functions
P08-SE06	<u>F. Vervaeet*</u> & F. A. Darbyshire	Moho depth and bulk crustal properties in northern Quebec and Labrador
P09-SE06	<u>A. Foster</u> , F. A. Darbyshire & A. Schaeffer	Preliminary phase-velocity structure of the central Canadian Shield
P10-SE06	<u>A. P. Kuponyi*</u> , H. Kao, J. Cassidy, F. Darbyshire, S. E. Dosso & J. Gosselin	Broadband Dispersion Measurement and Implications for Constraining Deep Earth Structures
P11-SE06	<u>P. J.A. McCausland</u> , M. Deng, J. Umoh & D. W. Holdsworth	Reliable, non-destructive bulk volume and density determination of meteorites using medical X-ray micro computed tomography (microCT)
P12-SE06	<u>B. Lynch</u> , C. McAnuff, C. Samson	Computing synthetic 3D images of rock walls for various sensors and mobile platforms
P13-SE06	C. McAnuff, <u>C. Samson</u> , D. Melanson & C. Polowick	Imagine rock walls with a Lidar mounted on an unmanned aerial vehicle

**POSTER SESSIONS 2 (1400 TO 1730)**

ESB ATRIUM

<b>ES14 (POSTER): ADVANCES IN EARTH SURFACE PROCESSES</b>		
POSTER	AUTHORS	TITLE
ES14-07	<u>Marco G. Jorge*</u> , Tracy A. Brennand, Jonathan E. Cripps	Canada's digital elevation
ES14-08	<u>Antoine Prince*</u> , Jan Franssen, and Jean-François Lapierre	Modelling of depth to bedrock and soil composition attributes at the catchment scale

<b>ES06 (POSTER): PROFESSIONAL GEOSCIENCE I: RIVER RESTORATION IN CANADA, FROM PLANNING TO EFFECTIVENESS MONITORING</b>		
POSTER	AUTHORS	TITLE
P01-ES06	<u>Kimisha Ghunowa*</u> , Bruce MacVicar, and Peter Ashmore	Spatial Decision Support Tool for Cumulative Stream Power Modeling

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### TUESDAY, MAY 30<sup>TH</sup> POSTER SESSIONS

ES07 (POSTER): FROM NATURAL SCIENCE TO REGIONAL PRACTICES IN CANADA		
POSTER	AUTHORS	TITLE
P01-ES07	<u>Peter Ashmore</u> , Julia Howett, and Imran Khan	Meander Belt Width Procedures: Developing a Regional Model for Southern Ontario
P02-ES07	<u>Roger T.J. Phillips</u>	Defining Geoscience: Facing the challenges of professional regulation and environmental geoscience education
P03-ES07	<u>Joanna Eyquem</u> and Roger T.J. Phillips	Challenges for the regulation of increasingly diverse and mobile: Professional Geoscientists within and between the Canadian Provinces

H02 (POSTER): RECENT ADVANCES IN PEATLAND HYDROLOGY, PART 1: PEATLAND RESTORATION AND ECOHYDROLOGICAL PROCESSES		
POSTER	AUTHORS	TITLE
P01-H02	<u>E. Kessel</u> , G. Sutherland, C.M. Wells, T. Weber & R.M. Petrone	Impacts of road construction and removal on the hydrologic and geochemical function of two peatlands within the Athabasca oil sands region, Alberta, Canada
P05-H02	<u>R. Ingram</u> & J. Waddington	Peatland recovery from wildfire in northern Alberta: Implications for reclamation design of oil sands mining leases
P02-H02	<u>S. Touchette</u> , M. Strack & I. Strachan	Impact of spatial variability on carbon dioxide and methane exchange from graminoid species in restored peatlands
P04-H02	<u>G. Sutherland</u> , R.M. Petrone and J.S. Price	Examining site-scale fluxes of carbon and water over the first four years of a constructed fen-upland watershed in Alberta, Canada.
P03-H02	<u>M. Gaultier</u> , J. Hughes and S. Howie	Inferring bog hydrology and soil chemistry using testate amoebae in the Fraser Lowland, British Columbia

H04 (POSTER): RECENT ADVANCES IN PEATLAND HYDROLOGY, PART 2: FLOW AND TRANSPORT OF WATER, SOLUTE, AND ENERGY IN ORGANIC SOILS		
POSTER	AUTHORS	TITLE
P01-H04	<u>C. Ackley*</u> , S. Tank, F. Rezanezhad, W. Quinton & C. McCarter	Hydro-ecological impacts of wildfire on a permafrost plateau, Scotty Creek, NWT
P02- H04	<u>B. Gharedaghlou*</u> , F. Rezanezhad, & J. Price	Using pore scale simulations to characterize transport properties of peat in variably saturated condition: a micro- to meso-scale approach
P03- H04	<u>O. Sutton*</u> & J. Price	Numerical modelling of sodium transport and fate at a constructed fen watershed, Athabasca Oil Sands Region, Alberta
P04- H04	<u>E.D. Kessel</u> & J.S. Price	The field scale transport of Na <sup>+</sup> and Cl <sup>-</sup> through a peat deposit of a constructed fen peatland in a post-mined landscape of the Athabasca Oil Sands Region

H11 (POSTER): HYDRO-ECOLOGICAL AND HYDROGEOMORPHIC IMPACTS OF FOREST DISTURBANCE AND MANAGEMENT		
POSTER	AUTHORS	TITLE
P01-H11	<u>K.D. Bladon</u> & R.P. Cole	Soil hydraulic properties and subsurface flow pathways following wildfire in the Cascade Mountains, Oregon
P02- H11	<u>A.M. Martens*</u> , U. Silins, K.D. Bladon, C.H.S. Williams, M. Wagner & E. Luchkow	Stable isotope analysis of food web dynamics in aquatic ecosystems following severe wildfire in Alberta's Rocky Mountains
P04- H11	<u>S. Spencer*</u> , U. Silins & A. Anderson	Temporal variation in precipitation-runoff dynamics and implications for resilience in the eastern slopes of Alberta's Rocky Mountains
P05- H11	<u>M. Howard*</u> , U. Silins & A. Anderson	Quantifying and forecasting erosion from off highway vehicle trails in Front-Range Rocky Mountain watersheds

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**TUESDAY, MAY 30<sup>TH</sup> POSTER SESSIONS**

H11 (POSTER): HYDRO-ECOLOGICAL AND HYDROGEOMORPHIC IMPACTS OF FOREST DISTURBANCE AND MANAGEMENT - CONTINUED		
P06- H11	<u>D. Greenacre</u> *, U. Silins & M. Dyck	Influence of alternative forest harvesting strategies on coupled spatial patterns of snowpack accumulation/melt and soil moisture storage
P07- H11	<u>S. Karpyshin</u> *, U. Silins & M. Dyck	Transpiration response of residual Lodgepole pine after strip and partial-cut harvesting in Alberta's southern Rocky Mountains
P08- H11	<u>C.H.S. Williams</u> *, U. Silins, K.D. Bladon & A. Anderson	Muted rainfall-runoff response to increased net rainfall after wildfire in Alberta's mountain headwaters
P09- H11	<u>K. Herlein</u> , U. Silins, C.H.S. Williams, A.M. Martens, M.J. Wagner, K. Hawthorn, M. Stone & M.B. Emelko	Long-term suspended sediment yields in wildfire affected mountain streams in southwestern Alberta

CGU/CSAFM 2017 CONFERENCE PROGRAM  
WEDNESDAY, MAY 31<sup>ST</sup> WOO LECTURE

WEDNESDAY, MAY 31<sup>ST</sup>

WOO LECTURE

TIME: 0800 TO 0845 ROOM: ESB 1013

**Braking Bad: Wetlands in need of a fix**

**Jonathan Price**

Department of Geography and Environmental Management, University of Waterloo

Wetlands, mostly peatlands, cover about 14% of Canada's land area, including vast tracts of the boreal ecozone, where they commonly cover 50-90% of the landscape. We have come a long way from seeing a wetland as "a repulsive, forbidding thing" (Hector Charlesworth – art critic, 1921), recognizing the important ecosystem services they provide. However, there are countless ways they have been degraded (Braking Bad), ranging from drainage for agriculture and peat harvesting, collateral damage in mine operations and contaminant spills, to direct intentional assault (removing them for urban, industrial and mine expansion). Early attempts at "land improvement" typically involved drainage, often for agriculture, which almost always failed. Resource development and infrastructure in the boreal zone disrupts wetland drainage, and increases the risk of contamination through deposits and spills, and in the case of oil sands mining, bulldozes them away. Their ecosystem value can be severely degraded, or completely lost. Many of Canada's boreal wetlands are *in need of a fix*. This presentation reviews some of the damage to boreal peatlands caused by resource development, its implications for peatland function, and ways to address it.

**Bio:** Professor Jonathan Price specializes in the hydrology of peat-dominated wetlands. His focus is on peatland restoration and most recently on creating peatlands following oil sands extraction. His research examines how surface water, groundwater, water quality and carbon biogeochemistry respond to disturbances, and if these functions can be recreated. Dr. Price has also done pioneering work on contaminant transport in peatlands, including solutes and hydrocarbons. He has authored and co-authored over 160 peer-reviewed journal articles on topics including soil-water physics, micrometeorology, water quality, contaminant transport, ecology, soil development as well as basin-scale hydrology of wetlands.

1994-present: Professor of Geography and Environmental Management, University of Waterloo, Canada

1988: PhD (Geography), McMaster University, Canada

1983: MSc (Civil Engineering), University of Saskatchewan, Canada

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<http://www.wetlandshydrology.com>





**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**WEDNESDAY, MAY 31<sup>ST</sup> TECHNICAL SESSIONS**

**CONCURRENT SESSIONS (0900 TO 1030)**

B02A: THAT BIOGEOCHEMISTRY HAS A SHORT ATTENTION SPAN! INSIGHTS FOR SCALING		ROOM: AERL 120
TIME	AUTHORS	TITLE
9:00	<u>M.Q. Morison</u> *, R.M. Petrone, M.L. Macrae & L. Fishback [Invited]	Capturing temporal and spatial variability in the chemistry of shallow permafrost ponds
9:15	<u>Cavaliere, E.*</u> , Baulch, H., & Koehler, G.	The rise and fall of nutrients in ice-covered wetlands
9:30	O. Ahmed, J. Leathers, K. Nugent, T. Prentice, M. Sauer, H. Baulch, N. Casson, R. North, J. Venkiteswaran, & <u>C. Whitfield</u>	The effect of freeze-thaw cycles on nutrient release from wetland macrophytes in North America
9:45	<u>A. Ducharme</u> *, N. Casson, S. Higgins, M. Paterson & C. Emmerton	The Effect of Topography and Hydrology on DOC Export to Streams at the Experimental Lakes Area in Northwestern Ontario
10:00	<u>N.J. Casson</u> & A. Ducharme	The relative importance of internal vs. external controls on DOC concentrations in streams and lakes: insights for scaling

ES09A: IN HONOUR OF JOHN CLAGUE, ONE OF CANADA'S FOREMOST EARTH SCIENTISTS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
9:00	<u>N.W. Rutter</u>	John Clague: Friend and Colleague
9:30	<u>Gerald Osborn</u> , Kaylee Norsworthy, and Chuck Blay	Development and maintenance of the fluted cliffs of the Na Pali coast, Kauai, Hawaiian Islands
9:45	<u>Douglas H. Clark</u>	Showdown at the border: revisiting the long-standing Sumas controversy across the 49 <sup>th</sup> Parallel
10:00	<u>Marten Geertsema</u> , John Clague, Brian Menounos and Timothy Jull	Radiocarbon constraints on ice sheet cover in northeastern British Columbia
10:15	Olav B. Lian	The Timing and Character of Postglacial Fluvial Incision, Fraser River Valley, South-central British Columbia

ES13A: COMPUTER MODELS AND STATISTICAL METHODS IN EARTH SCIENCES		ROOM: GEOG 100
TIME	AUTHORS	TITLE
9:00	Ofir Harari, Nadya Moisseeva, Rachel M. Altman, Douw Steyn and <u>William J. Welch</u>	Statistical Modelling of Seasonal Patterns and the Effect of the Oceanic Niño Index on Rainfall in the Nicoya Peninsula, Costa Rica
9:15	<u>Matthew Pratola</u> and Ying Sun	A Comparison of Approximate Bayesian Computation and Stochastic Calibration for Spatio-Temporal Models of High-Frequency Rainfall Patterns
9:30	<u>Sonja Surjanovic</u> *, Derek Bingham, and Gwenn Flowers	Using computer model uncertainty to determine optimal design of mass-balance stake networks
9:45	<u>Sam Pimentel</u> , Simon Tse, Andrea Storto, Gerasimos Korres, Dimitra Denaxa, Eric Jansen, and Isabelle Mirouze	A statistical-dynamical operator for assimilating sea surface temperature observations in ocean models
10:00	<u>Thomas J. Aubry</u> * and A. Mark Jellinek	Parameterization of entrainment and condensation in an integral model of volcanic plume
10:15	<u>Jordan Aaron</u> *, Scott McDougall, and Natalia Nolde	A Methodology for Probabilistic Prediction of Rock Avalanche Motion Using a Numerical Runout Model

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**WEDNESDAY, MAY 31<sup>ST</sup> TECHNICAL SESSIONS**

H02A: RECENT ADVANCES IN PEATLAND HYDROLOGY, PART 1: PEATLAND RESTORATION AND ECOHYDROLOGICAL PROCESSES		ROOM: ESB 1012
TIME	AUTHORS	TITLE
9:00	<u>M. Hawes*</u> & P. Whittington	Hydrological conditions pre- and post- surface re-contouring in a peatland restoration project, southeast Manitoba
9:15	<u>T. Gauthier*</u> & J. Price	Overcoming hydrological barriers in cut-over peatland restoration: mechanical compression reduces capillary barrier effect
9:30	<u>A. Elves*</u> & R. Hebda	Accelerated Sphagnum spp. regeneration in cutover cranberry fields, and repeat multi-spectral imaging survey
9:45	<u>J.M. Waddington</u> , B. Didemus & P. Moore	The effect of peat depth on peatland ecohydrological resilience to drought: survival of the thickest?
10:00	<u>S. Howie</u> & R. Hebda	Mire breathing as a useful measure in raised bog restoration
10:15	<u>P. Whittington</u> , D. Wiseman & C. McGorman	Using drones to assess soil moisture patterns following peatland restoration

H05A: INSIGHTS INTO ENVIRONMENTAL/HYDROLOGICAL MODELS USING SENSITIVITY AND UNCERTAINTY ANALYSIS, AND INFORMATION THEORY		ROOM: EOSC 135
TIME	AUTHORS	TITLE
9:00	<u>K.C. Kornelsen</u> & P. Coulibaly	Interdependence of hydrological model parameters and precipitation
9:15	<u>B. Nijssen</u> , G.S. Nearing & Martyn P. Clark	Benchmarking of land models to guide model development and improvement ( <b>Invited</b> )
9:30	<u>T. Smith</u> , C. Perera & C. Corrigan	Understanding the parameter sensitivities of simple snowmelt-runoff models: Strategies for improved performance and robustness?
9:45	<u>C.A. Kellerher</u> & S.B. Shaw	Hydrologic model suitability over decades: Exploring changes in model performance and parameter sensitivity over 50+ year records
10:00	<u>S. Razavi</u> , R. Sheikholeslami & A. Haghnegahdar	A Comprehensive, Efficient, and Robust Approach for Global Sensitivity Analysis
10:15	<u>J.R. Craig</u> , N. Sgro & B.A. Tolson	How to appraise “new and improved” hydrological model algorithms? – An uncertainty-based evaluation approach

SE05A: INDUCED EARTHQUAKES: SOURCE PROCESSES AND HAZARD ASSESSMENT		ROOM: ESB 2012
TIME	AUTHORS	TITLE
9:00	<u>H. Kao</u> , R. Hyndman, Y. Jiang & L. Leonard (invited)	Tectonic Strain Rate and Injection-Induced Earthquakes (IIE) in western Canada: Implications for Short-Term and Long-Term Seismic Hazard Assessments
9:15	<u>B. Wang</u> , R. M. Harrington, Y. Liu, H. Kao & H. Yu	Static stress drop of the largest recorded M4.6 hydraulic fracturing induced earthquake and its aftershock pattern in the northern Montney Play, British Columbia, Canada
9:30	R. Wang, Y. J. Gu, <u>Y. Chen</u> & M. Zhang	The January 2016 Earthquake Sequence near Fox Creek and its Relation to Hydraulic Fracturing
9:45	<u>Y. Vaezi</u> & M. van der Baan	Interferometric time-lapse velocity analysis: Application to a salt-water disposal well in British Columbia, Canada
10:00	<u>Y. Liu</u> , K. Deng & R. Harrington	Poroelastic stress change and fault slip induced by fluid injection
10:15	<u>K. Assatourians</u> & G. Atkinson	Processed Ground-Motion Records for Induced Earthquakes for Use in Engineering Applications

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**WEDNESDAY, MAY 31<sup>ST</sup> TECHNICAL SESSIONS**

**CONCURRENT SESSIONS (1100 TO 1230)**

B08A: GENERAL BIOGEOSCIENCES		ROOM: AERL 120
TIME	AUTHORS	TITLE
11:00	S. Morgan, <u>M. Oelbermann</u> & L. Echarte	Impact of elevated CO <sub>2</sub> and temperature on soil carbon and nitrogen dynamics in cereal-legume intercrops and sole crops
11:15	<u>R. Muneeppeerakul</u> , E. Bertuzzo, A. Rinaldo, & I. Rodriguez-Iturbe	Evolving biodiversity patterns in evolving river networks
11:30	<u>D. Beaulne*</u> , G. Fotopoulos, & S. C. Lougheed	Effect of errors in LiDAR measurements and processing techniques on the correlation between natural landscape and genetic data
11:45	C. Murray, <u>C. Whitfield</u>	Steady-state critical loads of acidity and nutrient nitrogen under a changing climate in northern Saskatchewan
12:00	N. De Carlo, <u>M. Oelbermann</u> & A. Gordon	Impact of soil microclimate and available nitrogen on greenhouse gas spatial variation in a rehabilitated and natural riparian forest
12:15	<u>C.P.J. Mitchell</u> & R.J. Strickman	Methylmercury production in urban created wetlands and stormwater ponds

C02A: AGROMETEOROLOGICAL AND SATELLITE DERIVED DECISION SUPPORT TOOLS FOR AGRICULTURE IN A CHANGING CLIMATE		ROOM: GEOG 100
TIME	AUTHORS	TITLE
11:00	<u>Tao Li</u> , Tri Deri Setiyono, Tianyi Zhang, Samaredu Mohanty, Manuel Marcaida III, Emmali Manalo	Enabling ORYZA to use remote sensing data for real-time crop growth monitoring and accurate yield prediction
11:15	<u>Antoun El Khoury*</u> , Catherine Champagne, Bahram Daneshfar, Yinsuo Zhang, and Ousmane Seidou	Identifying, evaluating and mitigating the impact of drought and excess moisture on agriculture in Canada under current and future climate using DSSAT model
11:30	<u>Yinsuo Zhang</u> , Bahram Daneshfar, Aston Chipanshi, Catherine Champagne, Andrew Davidson and Jacob Mardian	Forecasting Canola Yield at Township Scale in the Canadian Prairies Using Earth Observation-Based Data
11:45	<u>Manasah S. Mkhabela</u> , Paul R. Bullock and Harry D. Sapirstein	Characterising the most critical climatic parameters that impact wheat quality on the Canadian Prairies using Partial Least Square (PLS) analysis
12:00	<u>Pierre-Yves Gasser</u> , Scott Smith, Michael Bock, Peter Schut and Denise Neilsen	Investigating the Impact of Future Climate Scenarios on Small Grain Production in Peace River AB using the Land Suitability Rating System
12:15	<u>Yinsuo Zhang</u> , Bahram Daneshfar, Aston Chipanshi, Lauren Koiter, Catherine Champagne, Andrew Davidson, Tommy Gui, Benjamin Deschamps, Frederic Bedard and Gordon Reichert	Development of the Crop Extent Maps for Major Canadian Crops and their Application in Earth Observation-Based Crop Yield Forecasting

ES02A: LANDSCAPE RESPONSE IN THE HIGH MOUNTAINS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
11:00	<u>Rebecca Hudson*</u> , Vidyavathy Renganathan, Alexander Braun and Georgia Fotopoulos	High Resolution TerraSAR-X Data for the Detection of Rockfalls in Canada
11:15	<u>G.W.K. Moore</u> , Paolo Cristofanelli, Paolo Bonasoni, Gian Pietro Verza, J.L. Semple	In-situ observations of the April 2014 Mount Everest Avalanche
11:30	<u>John J. Clague</u> , Andreas von Poschinger, and Nancy C. Calhoun	Cataclysmic events in the upper Rhine River valley, Switzerland, during one hour in the early Holocene

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ES02A: LANDSCAPE RESPONSE IN THE HIGH MOUNTAINS - CONTINUED		
11:45	<u>Daniel H. Shugar</u> , Peter J. Haeussler, Colin P. Stark, ...	Preliminary findings from the seismologically detected Taan Fiord landslide and tsunami of 17 October 2015
12:00	<u>Tim Giles</u>	The Pinaus Lake Earthflow
12:15	<u>Marten Geertsema</u> , Gabriel Wolken, Anja Dufresne, Panya Lipovsky and Colin Stark	Ice/rock avalanches in Glacier Bay National Park, Alaska

H02B: RECENT ADVANCES IN PEATLAND HYDROLOGY, PART 1: PEATLAND RESTORATION AND ECOHYDROLOGICAL PROCESSES		ROOM: ESB 1012
TIME	AUTHORS	TITLE
11:00	<u>S. Wilkinson</u> , P. Moore, D. Thompson & J.M. Waddington	Quantifying peatland ecohydrological tipping points to catastrophic peat burning
11:15	<u>O. Carpino*</u> , A. Berg, J. Adams & W. Quinton	Permafrost-thaw-induced forest loss across boreal peatland environments in the Canadian subarctic
11:30	<u>A. Green*</u> , G. Bohrer & R.M. Petrone	The effects of forest sheltering on peatland evapotranspiration in the Boreal Plains, Alberta, Canada
11:45	<u>P. Moore</u> , S. Wilkinson, N. Kettridge, R. Petrone, K. Devito & M. Waddington	Assessing the potential role of peat properties and peatland configuration in maintaining shallow water table in a sub-humid climate
12:00	<u>S. Touchette*</u> , M. Strack & I. Strachan	Carbon dioxide and methane exchange from a restored peatland: evaluating the role of graminoid species as a plant functional type
12:15	<u>O. Volik*</u> , R. Petrone, C. Wells & J. Price	Salinity change and long-term carbon accumulation in a saline boreal fen: implications from paleoecology to wetland reclamation in Athabasca Oil Sands Region

H11A: HYDRO-ECOLOGICAL AND HYDROGEOMORPHIC IMPACTS OF FOREST DISTURBANCE AND MANAGEMENT		ROOM: EOSC 135
TIME	AUTHORS	TITLE
11:00	<u>U. Silins</u> , M.B. Emelko, K.D. Bladon, C.H.S. Williams, A.M. Martens, M.J. Wagner, M. Stone & S.A. Spencer	Ecohydrological drivers of watershed resilience: crystal balling nitrogen production a decade after wildfire and beyond (invited)
11:30	<u>K.E. Bennett</u> , N. McDowell, C. Xu & R. Middleton	The sensitivity of the Colorado River basin to temperature, precipitation and land cover change
11:45	<u>M.A. Arain</u> , B. Xu, M. Peichl, J.J. Brodeur, N. Restrepo-Coupé, M. Khomik, R. Thorne, E. Beamesderfer & S. McKenzie	Ecohydrological response of age-sequence of managed temperate pine forests to climate variability and extreme weather events from 2003 to 2015
12:00	<u>Q. Li*</u> & X. Wei	The cumulative effects of forest disturbance and climate variability on flow components in a large forested watershed
12:15	<u>R. Winkler</u> , D. Spittlehouse & S. Boon	A comparison of water yield response to extensive clearcut logging in two small watersheds at Upper Penticton Creek, BC

SE06A: SOLID EARTH GEOPHYSICS: GENERAL CONTRIBUTIONS		ROOM: ESB 2012
TIME	AUTHORS	TITLE
11:00	<u>L. Chuang*</u> , M. Bostock, A. Wech & A. Plourde	Plateau subduction, intraslab seismicity and the Denali volcanic gap
11:15	<u>J. M. Gosselin</u> , J. F. Cassidy, S. E. Dosso & Camille Brillon	Earthquake site response characterization in Kitimat, BC, via Bayesian gradient-based inversion of surface-wave dispersion
11:30	<u>M. D. Cambaz</u> & A. Mutlu	Investigation of the Bimaterial Interface Velocity Contrast along the North Anatolian Fault Zone

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SE06A: SOLID EARTH GEOPHYSICS: GENERAL CONTRIBUTIONS - CONTINUED		
11:45	<u>A. Plourde*</u> & M. Bostock	Multichannel deconvolution for earthquake apparent source-time functions
12:00	<u>T. K. Asafuah*</u> & A. J. Calvert	Shallow tomographic velocity estimation across the Mariana island arc
12:15	<u>F. A. Darbyshire</u>	Crustal Structure from Craton to Margin in Eastern Canada From Receiver Function Studies

<b>CONCURRENT SESSIONS (1400 TO 1530)</b>
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B07A: TERRESTRIAL-AQUATIC INTERACTIONS: MEASUREMENT AND MODELLING		ROOM: AERL 120
TIME	AUTHORS	TITLE
14:00	<u>B. Branfireun</u> , H.Swanson, & N Zabel	Mercury and methylmercury in tributary inputs to Kluane Lake, Yukon Territory, Canada
14:15	<u>C. Watt*</u> , M. Stone, and U. Silins	Abiotic controls of fine sediment on the mobility of phosphorus in gravel bed rivers
14:30	<u>K. Rasmus*</u> , E. Petticrew & J. Rex	The Seasonal Contribution of Marine Derived Nutrients to the Fine Bed Sediment in the Horsefly River
14:45	<u>D. Tavernini*</u> , T. Hoover, S. Woodman, & S. Rood	Dynamic biophysical interactions in large river ecosystem linkages: a case of leaf litter transport across the terrestrial-aquatic boundary
15:00	<u>M.E. Brummell</u> , L. Tourmel-Courchesne, L. Rochefort, P. Whittington, & M. Strack	Nitrous Oxide emissions at restored, extracted peatland in Manitoba

ES09B: IN HONOUR OF JOHN CLAGUE, ONE OF CANADA'S FOREMOST EARTH SCIENTISTS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
14:00	<u>Pierre Friele</u> , James Wetherill, Tom Millard, Ryan McQueen and John Clague	Temporal and spatial patterns of debris flow activity, Hatzic Valley, Lower Mainland BC: implications for geomorphic risk assessment
14:15	<u>Giacomo Falorni</u> , Leila Ertolahti, Gioachino Roberti, Brent Ward, Jean Pascal Iannacone, Geidy Baldeon and John Clague	Applications of InSAR ground deformation measurements in southern British Columbia
14:30	<u>Marco Giardino</u> , Luigi Perotti, John Clague, Brent Ward	The "geoNatHaz" experience and the enhancement of international Earth science competence in natural hazards and risks
14:45	<u>Carie-Ann Lau</u> , Caterina Zei, John Clague, ...	Effects of landslide and flood-induced sediment pulses on the geomorphology of the Upper Lillooet River Valley
15:00	<u>Lambertus C. Struik</u> and Laurie D. Pearce	A research – policy connection to reduce urban disaster losses: Risk-based land use
15:15	<u>Nicholas J. Roberts</u> , René W. Barendregt, John J. Clague	Late Pliocene and Early Pleistocene glaciation of the tropical Andes

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ES16A: J. ROSS MACKAY LECTURE		ROOM: GEOG 200
TIME	AUTHORS	TITLE
14:00	<u>CGRG Executive</u>	2016 J. Ross Mackay Award Presentation to Dr. Alberto Reyes Progress towards unraveling the controversial multimillion-year history of the Greenland ice sheet
14:10	<u>Alberto V. Reyes</u>	
15:00	<u>Audience</u>	

G03A: GENERAL GEODESY		ROOM: ESB 2012
TIME	AUTHORS	TITLE
14:00	<u>T. Nikolaidou</u> and M. Santos	Effect of regional Numerical Weather Models on GNSS Positioning. A case study under non-standard atmospheric conditions
14:15	<u>Ismael Foroughi</u> , Robert Kingdon, Michael Sheng, Petr Vaniček and Marcelo Santos	Local spectral model of geoid-to-quasigeoid separation in North America
14:30	<u>Yan Jiang</u> , Simone Barani, John Cassidy, Roy Hyndman	Crustal Shortening in the Southern Canadian Rockies, Evidence from Geodesy and Seismology
14:45	<u>Julie Elliott</u> , Lucinda Leonard, Roy Hyndman, Yan Jiang, and Jeff Freymueller	Active Deformation in Alaska and Western Canada Observed with GPS
15:00	<u>Joseph Henton</u> , Andreas Rosenberger, Paul Collins, Ryan Key, Lisa Nykolaishen, Yuan Lu, Herb Dragert, Mark Caissy, Simon Banville Ken MacLeod, Nikola Vassilev, and François Lahaye	Development & Testing of a Low-Cost, Station-Based, Broad-Band, Real-Time Positioning Stream for Use in Earthquake & Tsunami Early Warning

H13A: ADVANCES IN HYDROECOLOGY IN CANADA		ROOM: ESB 1012
TIME	AUTHORS	TITLE
14:00	G. Ali, <u>C. Oswald</u> , C. Spence & C. Wellen	From a trendy concept to a unified approach: The T-TEL connectivity assessment method
14:15	<u>A. Tamminga</u> & B. Eaton	Linking stream channel change due to floods to ecological impacts
14:30	<u>R.R. Shrestha</u> , T.D. Prowse, L. Tso	Water quality analysis and modelling for the Western Canadian River basins
14:45	<u>D. West</u> & Yehya Imam	Assessing thermal habitat management strategies using the process-based Ecofish Water Temperature Model (ETMP)
15:00	<u>J. Franssen</u>	A new approach for modeling the quality of gravel-bed spawning habitats.
15:15	<u>D.L. Peters</u> , O. Niemann, R. Skelly & D.J. Baird	Water Level Fluctuation and Surface Water Connectivity in Wetland Basins of a Cold Region Deltaic Ecosystem

H05B: INSIGHTS INTO ENVIRONMENTAL/HYDROLOGICAL MODELS USING SENSITIVITY AND UNCERTAINTY ANALYSIS, AND INFORMATION THEORY		ROOM: EOSC 135
TIME	AUTHORS	TITLE
14:00	<u>A. Haghnegahdar</u> , S. Razavi & R. Sheikholeslami	Dealing with model crashes in global sensitivity analysis
14:15	<u>S. Ul Islam</u> & S. Dery	Evaluating uncertainties in modelling the snow hydrology of the Fraser River Basin, British Columbia, Canada <b>(Invited)</b>
14:30	<u>R. Sheikholeslami</u> & S. Razavi	An Efficient and Robust Sampling Strategy for Uncertainty and Sensitivity Analysis of Environmental Systems Models
14:45	<u>S.V. Weijs</u>	You cannot be surprised about the same thing twice, or the art of reducing predictive uncertainty.
15:00	<u>L.C. Galindo*</u> & S.V. Weijs	An evaluation of rating curve uncertainty through information theory
15:15	<u>A. Kumar*</u> & S.V. Weijs	Exploring the Optimal Channels of Information Flow in BC Hydro's Hydro-meteorological Stations

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**CONCURRENT SESSIONS (1600 TO 1730)**

B06A: MICROPLASTICS IN MARINE, FRESHWATER, AND SOIL ENVIRONMENTS		ROOM: AERL 120
TIME	AUTHORS	TITLE
16:00	<u>P.S. Ross</u> & M. Noel	Widespread distribution of microplastics in the Northeastern Pacific Ocean
16:15	<u>M. Néauport</u> , M. Noel & P. Ross	Microplastics contamination in marine sediments along the coast of British Columbia, Canada
16:30	<u>T. N. Kazmiruk</u> , V. D. Kazmiruk & L.I. Bendell	Abundance and distribution of microplastics within surface sediments of a key shellfish growing region of Canada
16:45	<u>M. Dietterle</u>	Determining the Efficacy of Depurating Microplastics from Pacific Oysters ( <i>Crassostrea gigas</i> )
17:00	<u>M.R. Miller</u> , & S. Dudas	Microplastic contamination in cultured Pacific oysters ( <i>Crassostrea gigas</i> ): Does aquaculture method play a role?
17:15	<u>S.H. Campbell</u> , G.L. Simpson, & B.D. Hall	Rates of sedimentary removal of microplastics in a eutrophic prairie lake

ES09C: IN HONOUR OF JOHN CLAGUE, ONE OF CANADA'S FOREMOST EARTH SCIENTISTS		ROOM: GEOG 229
TIME	AUTHORS	TITLE
16:00	<u>Duane Froese</u>	The end of the Pleistocene in the northern Cordillera and the importance of Allerod warming on rapid ecosystem changes
16:30	<u>Britta J.L. Jensen</u> , Alwynne B. Beaudoin	Revising the Tephrostratigraphy of Alberta
16:45	<u>Alberto V. Reyes</u>	Glacier fluctuations, ice-dammed lakes, and regional hydrology: John Clague's geological crystal ball in the St. Elias Mountains
17:00	<u>Daniel H. Shugar</u> , John J. Clague, James L. Best, Christian Schoof, Michael J. Willis, Luke Copland, Gerard H. Roe	Inspector Kaskawulsh and the Case of the Disappearing River
17:15	<u>Jon L. Riedel</u>	From the Halls of Simon Fraser to the Shores of Lake Concrete: Applying the Clague Method to Skagit Valley, Washington and British Columbia
17:30	<u>Brian Menounos</u> , Jeremy Venditti, Eva Kwoil, John J. Clague, Michael Church, Brent Goehring	Evolution of Fraser Canyon, British Columbia, Canada

H04A: RECENT ADVANCES IN PEATLAND HYDROLOGY, PART 2: FLOW AND TRANSPORT OF WATER, SOLUTE, AND ENERGY IN ORGANIC SOILS		ROOM: ESB 1012
TIME	AUTHORS	TITLE
16:00	<u>T. Weber*</u> , S. Iden & W. Durner	Peatland bog pedogenesis is reflected in effective unsaturated hydraulic properties
16:15	<u>M.F. Nehemy*</u> & C.P. Laroque	Tree-rings: a proxy for peatland water-table variability
16:30	<u>B. Gharedaghloo*</u> & J. Price	Investigating the influence of pore surface heterogeneity on adsorption and retardation of dissolved-hydrocarbon solutes in peat soils
16:45	R.B. Simhayov, T. Weber & <u>J.S. Price</u>	Reactive and non-reactive solute transport in peat from a constructed fen
17:00	<u>N. Balliston</u> & J. Price	Saturated and vadose zone solute dynamics of a sodium chloride tracer in sub-arctic bog peat
17:15	<u>C. McCarter</u> , B. Branfireun & J. Price	Effect of decomposition due to the treatment of domestic wastewater on the hydrochemical transport properties of peat

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H03A: RECENT ADVANCES IN ISOTOPES AS TRACERS OF HYDROLOGY AND EARTH-SYSTEM SCIENCE (WITH H11B)		ROOM: EOSC 135
TIME	AUTHORS	TITLE
16:00	<u>M. Weiler</u> , M. Sprenger, T. Volkmann, S. Seeger & H. Leistert	Coupled field sampling and modelling of soil and plant water stable isotopes to quantify site specific hydrological fluxes
16:15	<u>T. Holmes</u> , T. Stadnyk & C. Welch	Improving Hydrological Model Calibration using Stable Water Isotope Tracers
16:30	<u>J. Gibson</u> , Y. Yi, J. Birks, E. Taylor & M. Moncur	Isotope-based hydrograph separation in large rivers: assessing flow sources and water quality controls in the Athabasca oil sands region

H011B: HYDRO-ECOLOGICAL AND HYDROGEOMORPHIC IMPACTS OF FOREST DISTURBANCE AND MANAGEMENT (WITH H03A)		ROOM: EOSC 135
TIME	AUTHORS	TITLE
16:45	<u>A. Corrigan*</u> , U. Silins & M. Stone	Impacts of rapid harvest and subsequent haul road decommissioning on sediment production and ingress
17:00	<u>A. Goodbrand*</u> & A. Anderson	Hydrological impact of forest harvest in a Foothills watershed
17:15	<u>J.M. Buttle</u> , F.D. Beall, P.W. Hazlett, K. Webster & I.F. Creed	Hydrologic response to and recovery from differing harvesting strategies in a deciduous forest: the Turkey Lakes Forest Harvesting Experiment

SE05B: INDUCED EARTHQUAKES: SOURCE PROCESSES AND HAZARD ASSESSMENT (WITH SE06B)		ROOM: ESB 2012
TIME	AUTHORS	TITLE
16:00	<u>M. R. Canales</u> & M. van der Baan	Probabilistic Seismic Hazard Analysis for Induced Seismicity: suggested approaches and application to the Horn River Basin, Northeast B.C.
16:15	<u>H. Ghofrani</u> & G. M. Atkinson	Rates of Induced-Earthquake Activation in Western Canada and Implications for Hazard
16:30	<u>G. M. Atkinson</u>	Mitigation strategies to prevent damage to critical infrastructure due to induced seismicity

SE06B: SOLID EARTH GEOPHYSICS: GENERAL CONTRIBUTIONS (WITH SE05B)		ROOM: ESB 2012
TIME	AUTHORS	TITLE
16:45	<u>S.L. Butler</u>	Shear induced porosity bands in Earth's upper mantle: do they exist and if so, what do they do?
17:00	<u>A. Schaeffer</u> , S. Lebedev, J. Fullea & P. Audet	Seismic Tomography of the Circum-Arctic Lithosphere and Asthenosphere
17:15	<u>A. W. Frederiksen</u>	Transfer-Function Analysis of Teleseismic P and S



**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**WEDNESDAY, MAY 31<sup>ST</sup> POSTER SESSIONS**

**POSTER SESSIONS 1 (0900 TO 1230)**

ESB ATRIUM

B03 (POSTER): PHYSICAL AND BIOGEOCHEMICAL LAND SURFACE PROCESSES IN A CHANGING CLIMATE		
POSTER	AUTHORS	TITLE
P01-B03	<u>M.Q. Morison*</u> , R.M. Petrone, M.L. Macrae & L. Fishback	Impacts of hydroclimatic change on nutrient cycling in thermokarst-impacted northern peatlands
P02-B03	<u>J. Tian*</u> , Z. Lindo & B. Branfireun	Climate change alters peatland carbon cycling through plant biomass allocation

B07 (POSTER): TERRESTRIAL-AQUATIC INTERACTIONS: MEASUREMENT AND MODELLING		
POSTER	AUTHORS	TITLE
P01-B07	<u>M. Strack</u> , V. Daté, F. Nwaishi, R. Andersen & J. Price	Methane emissions from fens in the Athabasca Oil Sands Region, Alberta
P03-B07	<u>G. Thiel*</u> , M. Lafrenière, J. Fouché, & S. Lamoureux	Spatial controls on the lability of dissolved organic matter in a High Arctic watershed
P04-B07	<u>J. Vanrobaeys*</u> , D. Lobb & P. Owens	The effectiveness of vegetative buffers for reducing phosphorus losses from agricultural runoff in northern climates
P05-B07	<u>H. Yao</u> , A. Paterson, C. McConnell, R. Ingram, T. Field, A. James, & L. Molot	Non-significant trends in ammonia, nitrate and organic nitrogen at headwater lakes of south-central Ontario under declined loading
P06-B07	<u>M.J. McDowell*</u> & M.S. Johnson	Investigating water balance impacts of Mountain Pine Beetle infestation and forest harvest in British Columbia
P07-B07	<u>K. Kieta</u> & P. Owens	Phosphorus loss from grass buffer strip species undergoing freezing and thawing

C01 (POSTER): WHAT THE FLUX?! SURFACE-ATMOSPHERE EXCHANGE OF ENERGY AND MASS		
POSTER	AUTHORS	TITLE
P01-C01	<u>Megan Cowan*</u> , Jon Warland, Claudia Wagner-Riddle, Shannon Brown, Aaron Berg	Comprehensive measurement of all energy budget components to improve closure
P02-C01	<u>Tobias KD Weber</u> , Lars Gerling, Sascha Iden, Wolfgang Durner, and Stephan Weber	Inverse modelling of net ecosystem exchange in a mountainous peatland: influence of distributional assumptions on parameter estimates and total carbon fluxes
P03-C01	Amal Roy, <u>Aaron J. Glenn</u> , Sanjayan Satchithanatham, and Henry F. Wilson	Soil nitrous oxide and methane fluxes in contrasting riparian plant communities on a stream reach floodplain in southwestern Manitoba
P04-C01	<u>Andrew VanderZaag</u> , Hambaliou Baldé, Sean McGinn, Aaron Glenn, and Ray Desjardins	Inverse dispersion measurements of methane emissions from manure storages in regions across Canada

ES09 (POSTER): IN HONOUR OF JOHN CLAGUE, ONE OF CANADA'S FOREMOST EARTH SCIENTISTS		
POSTER	AUTHORS	TITLE
P01-ES09	<u>Marta Chiarle</u> , Giovanni Mortara, Luigi Perotti, <u>Marco Giardino</u>	Glacier-related hazards in a changing mountain environment: an Italian-Canadian perspective
P02-ES09	<u>Janice Brahney1</u> , Brian Menounos2, Thomas W.D. Edwards3, and John Clague4	Cause and Consequence of Lake Level Change in Kluane Lake, Yukon Territory
P03-ES09	<u>Andrée Blais-Stevens</u> , John J. Clague, Menounos, B., and Brahney, J.	Paleoseismic evidence for repeated Holocene displacements along the Denali Fault in southwest Yukon Territory
P04-ES09	<u>Nancy Calhoun</u> , John J. Clague, and Andreas von Poschinger	The catastrophic Flims landslide and associated Bonaduz gravel, Vorderrhein River Valley, Switzerland

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<b>ES09 (POSTER): IN HONOUR OF JOHN CLAGUE, ONE OF CANADA'S FOREMOST EARTH SCIENTISTS - CONTINUED</b>		
P05-ES09	<u>Lionel E. Jackson Jr.</u> <sup>1</sup> and Brent C. Ward <sup>1</sup>	A Late Pleistocene stratigraphic record from geotechnical drilling, Evergreen Line Tunnel, Greater Vancouver, BC

<b>G03 (POSTER): GENERAL GEODESY</b>		
POSTER	AUTHORS	TITLE
P01-G03	<u>Yara Mohajerani</u> , Isabella Velicogna, and Tyler Sutterley	Optimization of Spherical Cap Mascon Processing on the Ice Sheets for the GRACE and GRACE-FO Missions
P02-G03	<u>John Crowley</u> , Jianliang Huang, Goran Pavlic, and Marc Véronneau	Fewer stripes and more signals: a combined least-squares de-striping and statistical filter
P03-G03	<u>Hojjat Kabirzadeh</u> , Ricky Kao, Jeong Woo Kim, and Michael G. Sideris	Assessment of temporal gravity variations before large earthquakes in Western Canada
P04-G03	<u>Theron Finley</u> , Lucinda Leonard, Kristin Morell, Christine Regalla	Bending the Olympic Orocline: A neotectonic model of deformation in the northern Cascadia forearc

<b>H03 (POSTER): RECENT ADVANCES IN ISOTOPES AS TRACERS OF HYDROLOGY AND EARTH-SYSTEM SCIENCE</b>		
POSTER	AUTHORS	TITLE
P01-H03	<u>J. Taulu</u> , T. Prowse & T. Edwards	Quantifying seasonal contributions of snow and glacial melt to streamflow in the Upper Athabasca River, Alberta, Canada
P02-H03	A. Coles, <u>S. Chad</u> , A. Al Masum, M.F. Nehemy, A. Niazi, C.A. Ross, T. Vogel, K. Janzen & J.J. McDonnell	Improving prairie snowmelt process understanding with high-resolution stable isotope tracing
P03-H03	<u>J. Exler</u> , A. Christen, M. Merckens & R.D. Moore	Water and energy fluxes at a disturbed and rewetted white beakrush-sphagnum site in a raised bog near Vancouver, British Columbia.
P04-H03	<u>S. Bansah</u> , A. Haque, J. Laing & G. Ali	Spatio-temporal assessment of mean transit times in a Canadian prairie watershed
P05-H03	<u>Y. Yi</u> , J. Gibson, J. Birks & P. Shaw	Regional Survey of Lake Water for Isotopic Characterization and Water Yield Estimations in BC
P06-H03	<u>Q. Chang</u> , M. Hayashi, Z. Sun, S. Want & R. Ma	Using multiple tracers to identify source water and flow paths in an alpine catchment in the Qilian Mountain, Qinghai-Tibet Plateau, China

**POSTER SESSIONS 2 (1400 TO 1730)**  
**ESB ATRIUM**

<b>B08 (POSTER): GENERAL BIOGEOSCIENCES</b>		
POSTER	AUTHORS	TITLE
P01-B08	<u>A. Schevers</u> *, S. Lamoureux, & M. Lafrenière	Long-term dissolved inorganic nitrogen fluxes from paired watersheds in the Canadian High Arctic
P02-B08	<u>D.M. Stewart</u> *, U. Silins, M. Emelko, & M. Stone <sup>3</sup>	Regulation of post-logging N turnover and mobile N by solar insolation in a steep mountainous Rocky Mountain watershed
P03-B08	<u>M.A. Haque</u> *, C. Ross, A. Schmall, S. Bansah, M. Macrae & G. Ali	Phosphorus sorption dynamics in geographically isolated wetlands in the Prairie Pothole Region
P04-B08	F. Jalilian, <u>Z. Xu</u> *, C. Valeo, R.B. Bhiladvala, A. Chu, & J. He	Biofilm monitoring in situ of bioretention cells
P05-B08	<u>R. Thomas</u> *, C. Valeo, & U.T. Khan	Fuzzy set theory applied to spatial interpolation and modelling of dioxins and furans in marine sediments

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B08 (POSTER): GENERAL BIOGEOSCIENCES - CONTINUED		
P06-B08	<u>K. Xu*</u> , Z. Xu, C. Valeo, J. He	Influence of rainfall and temperature on the distribution of bacterial contaminants in nearshore areas of the southern Vancouver Island
P07-B08	M. Ricord, <u>M. Oelbermann</u> , L. Phillips, B. Seuradge, & L. Echarte	Impact of cereal-legume intercropping on greenhouse gas emissions and microbial functionality

ES13 (POSTER): COMPUTER MODELS AND STATISTICAL METHODS IN EARTH SCIENCES		
POSTER	AUTHORS	TITLE
P01-ES13	Matthew T. Pratola, <u>Ofir Harari</u> , Derek Bingham and Gwenn Flowers	Design and Analysis of Experiments on Non-Convex Regions, with Application to Glacier Mass-Balance Estimation
P02-ES13	<u>Valentina Radic</u> , Kathi Unglert, and Mark Jellinek	Machine Learning Method for Pattern Recognition in Volcano Seismic Spectra
P03-ES13	<u>Scott McDougall</u> , Nafis Jalil, Jordan Aaron, Andrew Mitchell, John Whittall, Damian McClarty and Marc-André Brideau	Development of an online database and empirical hazard mapping tool for rock avalanche runout estimation
P04-ES13	<u>Hossein Foroozand*</u> and Steven V. Weijs	Hydrologic Forecasting in Mountain Basin Using Ensembles of ANN and BNN Models: A Case Study of Kashkan River Basin
P05-ES13	<u>John Lindsay</u> , Wanhong Yang, Duncan D. Hornby	Drainage network analysis of topologically noisy vector stream data using a priority-flood algorithm
P06-ES13	<u>Kathryn De Rego*</u> , J. Wes Lauer, Brett Eaton and Marwan Hassan	Numerical modeling of channel width change and migration on decadal timescales

H08 (POSTER): SNOW LEVEL AND PRECIPITATION: TRENDS, EXTREMES, AND IMPACTS		
POSTER	AUTHORS	TITLE
P01-H08	<u>J.H. Sherwood</u> , S.J. Ketcheson, & J.S. Price	Landform controls on snow dynamics in a fen watershed in the Western Boreal Plains, Canada
P02- H08	<u>M.M. Brugman</u> , T. Smith, R. Mo, J. Goosen, G. Pearce, J. Bau, A. Besson, J. Hay, C. Yu, L. West, M. Loney & D. Simpson	Precipitation forecasting during major winter storms in Pacific and Yukon region
P03- H08	<u>T. Atkinson</u> , M.M. Brugman, C. Emond, J. Goosen & T. Smith	Validation of a new snow level algorithm for the winter of 2016/2017

H05 (POSTER): INSIGHTS INTO ENVIRONMENTAL/HYDROLOGICAL MODELS USING SENSITIVITY AND UNCERTAINTY ANALYSIS, AND INFORMATION THEORY		
POSTER	AUTHORS	TITLE
P01-H05	<u>M. Rohanizadegan</u> , J. Pomeroy & R. Petrone	Improving meteorological forcing of mountain evapotranspiration calculations

H13 (POSTER): ADVANCES IN HYDROECOLOGY IN CANADA		
POSTER	AUTHORS	TITLE
P01-H13	<u>J. Lindsay</u> , J. Cockburn, R. Bhamjee, J. Tweedie & K. Roberts	Evaluating low-flow conditions from channel characteristics and water level
P02-H13	<u>A.J.F. Mertens*</u> , K. Devito & D. Olefeldt	Controls on lake chemistry across the Western Boreal Forest: Setting reference conditions
P03-H13	<u>H. Jerreat-Poole*</u> , T.D. Prowse & D. Jelinski	A Review on Changing Water Temperature in Alpine Basins in the Western Cordillera of Canada and the Implications for Local Fish Populations

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SE02 (POSTER) : THE EARTHQUAKE CYCLE: SQUARING THE CIRCLE		
POSTER	AUTHORS	TITLE
P01-SE02	T. Hayward* & <u>M. Bostock</u>	Slip behaviour of the Queen Charlotte plate boundary before and after the 2012, M <sub>w</sub> 7.8 Haida Gwaii earthquake: evidence from repeating earthquakes
P02-SE02	<u>H. Yu</u> , Y. Liu & Y. Huang	Constraining the frictional parameters used in an earthquake cycle modeling
P03-SE02	<u>E. Nissen</u> , E. Karasozen, E. Bergman & A. Ghods	Rupture directivity effects in large Iranian seismic sequences reassessed with calibrated earthquake relocations

## Workshops, tours, and social events

### **Fun with Flumes: Hands-On experience with UBC's Adjustable-Boundary Experimental System**

The Introduction to Physical Experimentation Workshop will provide participants with a hands on crash course with flume-based research. We will spend some time reviewing the basic technical matters of experimentation. We will run a short experiment, and we will use previously reduced data to explore some of the outcomes. We endeavor to provide participants with a few reading items and perhaps an overview presentation for future reference. *Registration required*

**When:** Sunday, May 28<sup>th</sup> 10:00 to 16:00

**Where:** UBC Biogeomorphology experimental lab, 6488 University Blvd, Vancouver, BC V6Z 1Z4

### **Pacific Storm Prediction Center (PSPC MSC ECCC) Tour**

This trip involves visiting the Pacific Storm Prediction Center, which supports emergency warning and forecasting, in addition to climate services, avalanche, highways, and flood forecast operations in Western Canada. *Registration required*

**When:** Sunday, May 28<sup>th</sup> 11:30 to 12:30 and 12:30 to 13:30

**Where:** 401 Burrard St.

### **Canadian Young Hydrologic Society Workshop**

The second annual workshop of the Canadian branch of the Young Hydrologic Society, an international initiative which facilitates the interaction of young scientists within the hydrological community. *Registration required*

**When:** 13:30 to 17:00

**Where:** Geography Building, Room 200

### **CGU-CSAFM Meeting Icebreaker**

**Where:** ESB Atrium

**When:** 19:00 to 21:00

**CGU/CSAFM 2017 CONFERENCE PROGRAM**  
**WEDNESDAY, MAY 31<sup>ST</sup> POSTER SESSIONS**

**CGU-CSAFM Student Mixer**

Join us for drinks and a trivia night designed specifically for CGU student attendees!

**Where:** Coppertank Grill, 3135 W Broadway

**When:** Monday, May 29<sup>th</sup> at 18:30

**Directions:** Take the # 99 bus from UBC to the Macdonald stop, and then backtrack west on foot for three blocks. You can also take the # 14 or # 9 bus.

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**Women in Geoscience Breakfast**

Come join us to celebrate the accomplishments of women in the earth sciences with food, fellowship, and networking! Learn about the great work and experiences of our colleagues. Enjoy a FREE buffet! Everyone is welcome, but registration is required.

**Where:** GEOG room 229

**When:** Tuesday May 30<sup>th</sup>, 7:00 AM

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**NSERC Workshop: “What is new, results, and how to prepare an application”**

Registration required

**Where:** GEOG Room 229

**When:** Tuesday, May 30<sup>th</sup>, 12:45

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**CGU-CSAFM Banquet**

**Where:** AMS Nest Great Hall

**When:** Wednesday May 31<sup>st</sup>, 18:00, May 31<sup>st</sup>