



International Network for Alpine Research Catchment Hydrology (INARCH)

2022 Annual INARCH Workshop

Baños de Panticosa, Spain

October 18–20, 2022

Local Host: Professor Ignacio López Moreno, INARCH Co-Chair, Pyrenean Institute of Ecology

Workshop Agenda

Monday, October 17		
Participants can meet in Zaragoza, Spain. Recommended hotels are Hotel Reino de Aragón, Hotel Vincci Zaragoza Zentro, and Hostal Cataluña.		
Evening	Informal gathering and tapas; those who want to join, meet at 8 PM at Hotel Reino de Aragón	
Tuesday, October 18		
10:00 AM	Bus departs Hotel Reino de Aragón, Zaragoza. (Bus will stop at the train station after this, if necessary.)	
10:00 AM–4:00 PM	Bus from Zaragoza to mountains, stop at Portalet Pass (12:30), alpine hydrology and climate change discussion in French/Spanish headwaters, lunch at 2 PM, then to Baños de Panticosa, arriving 4 PM to hotel for check in.	
7:00 PM	Ignacio López Moreno and John Pomeroy	Welcome, Introductory presentation on status of INARCH, goals for the workshop, overview of planned activities.
8:00 PM	<i>Dinner</i>	
Wednesday, October 19		
7:00–8:30 AM	<i>Breakfast</i>	
Observatories and Measurement Techniques (Chair: María José Polo)		
INARCH Phase II Science Questions:		
1. How different are the observation and measurement approaches amongst INARCH basins and do we expect distinctive differences in our understanding of basin response and hydrological predictability because of the sampling schemes, and data quality and quantity?		
8:30–8:45 AM	Ekaterina Rets	Studying scale effects in streamflow response in glacierized Baksan river catchment in the North Caucasus using natural stable isotopes
8:45–9:00 AM	Simon Gascoin	Sentinel-2, Pléiades, Icesat-2, Trishna... Hijacking Earth observation satellites for snow science
9:00–9:15 AM	Lahoucine Hanich	Hydro-climatic observatory of the Rharaya watershed in the Moroccan High Atlas Mountains

9:15–9:30 AM	Franziska Koch	Influence of snow on the integrative signal of a superconducting gravimeter installed on top of Mount Zugspitze, Germany (Northern Calcareous Alps)
<i>Lightning presentations on posters (3-min rapid oral summaries and highlights of posters)</i>		
9:30–9:33 AM	Esteban Alonso González	MuSA: The Multiscale Snow Data Assimilation System
9:33–9:36 AM	Cesar Deschamps	Future evolution of the snowpack in the Iberic peninsula
9:36–9:39 AM	Francisco Rojas Heredia	Glacier monitoring system in Colombia: insights on one of the last tropical glacier zones
9:39–9:42 AM	Dhiraj Pradhananga	Meteorological forcing data and change in precipitation phase in Langtang Glacier Research Basin (in the Nepal Himalayas)
9:42–9:45 AM	Duanne White	Flow modulation by deep regolith in the Snowy Mountains, Australia
9:45–10:15 AM	<i>Discussion</i>	
10:15–11:00 AM	<i>Break and Poster Viewing</i>	
Observatories and Measurement Techniques (continued) (Chair: James McPhee)		
11:00–11:15 AM	John Pomeroy	Canadian Rockies Hydrological Observatory additional process and aerial UAV measurements
11:15–11:30 AM	Tom Gribbin	Glaciohydrology of the Vilcanota basin, Peru
11:30–11:45 AM	Ernesto Trujillo	SNOWEX-2020 dataset and recent rain-snow transition zone hydrological research at the Reynolds Creek Experimental Watershed
<i>Lightning presentations on posters (3-min rapid oral summaries and highlights of posters)</i>		
11:45–11:48 AM	Michael Matiu	Downscaling approaches for climate model projections in complex terrain - from snow cover duration to meteorology
11:48–11:51 AM	Ixeia Vidaller	Monitoring activities of the last Pyrenean glaciers
11:51–11:54 AM	Sebastián Krogh	Tree regrowth impacts on high-resolution snowpack modeling in a Mediterranean montane catchment
11:54–11:57 AM	Achille Jouberton	Establishment of a catchment monitoring network in the mountains of Tajikistan
11:57–12:00 PM	Stefan Fugger	Mechanistic land surface modeling in an Amu Darya headwater catchment
12:00–12:03 PM	Ekaterina Rets	High Arctic Fuglebekken experimental catchment on Spitsbergen, Svalbard
12:03–12:30 PM	<i>Discussion</i>	
12:30–2:00 PM	<i>Lunch and Poster Viewing</i>	
Predictability, Comparisons, and Global Validity (Chair: Ethan Gutmann)		
INARCH Phase II Science Questions:		
<ol style="list-style-type: none"> 2. How do the predictability, uncertainty and sensitivity of energy and water exchanges vary with changing atmospheric thermodynamics, ecosystem structure and water management in various high mountain regions of the Earth? 3. What improvements to high mountain energy and water exchange predictability are possible through improved physics in, coupling of, and downscaling of models in complex terrain, and improved and expanded approaches to data collection and assimilation? 		

4. To what extent do existing model routines have global validity, are transferable, and meaningful in different mountain environments for providing service to society?		
2:00–2:15 PM	Caroline Aubry-Wake	Vulnerability to climate change in glacierized headwater mountain basins in the Canadian Rockies and the Austrian Alps is controlled by summer snow dynamics
2:15–2:30 PM	Vincent Vionnet	Snow level from post-processing of atmospheric model improves snowfall estimate and snowpack prediction in mountains
2:30–2:45 PM	María José Polo	How can we better describe the hydrological impacts of snow droughts in semiarid environments?
2:45–3:00 PM	James McNamara	Snow, grow and flow: Ecohydrological processes in the rain-snow transition zone
<i>Lightning presentations on posters (3-min rapid oral summaries and highlights of posters)</i>		
3:00–3:03 PM	Josep Bonsoms	Rain on snow responses to climate warming in the Pyrenees
3:03–3:06 PM	Jesús Revuelto	Not too soon, nor too late: intermediate snowpack melt-out dates guarantee the highest seasonal grasslands greening in the Pyrenees
3:06–3:09 PM	Louis Le Toumelin	A deep learning approach to downscale and correct wind fields in complex terrain
3:09–3:12 PM	Rafael Pimentel	Are precipitation and snowfall droughts concomitant in semiarid mountainous areas?
3:12–3:15 PM	Ekaterina Rets	Combined physically-based and machine learning approach for operational estimation of snow water equivalent across the Western U.S.: Snowcast Showdown
3:15–3:18 PM	Sabine Radanovics	Towards downscaling of precipitation phase from high resolution meteorological forecast model output over complex terrain
3:18–3:21 PM	Ange Haddjeri	Opportunities and challenges for hectometric scale simulations of alpine snow cover: wind-induced snow transport and precipitation uncertainties
3:21–3:50 PM	<i>Discussion</i>	
3:50–4:10 PM	<i>Break</i>	
Predictability and Comparisons continued (Chair: Franziska Koch)		
4:10–4:25 PM	Chris Marsh	New developments in the Canadian Hydrological Model (CHM) and large-extent simulations
4:25–4:40 PM	Ethan Gutmann	Climate and Snow Model Simulations over INARCH basins for the COPE
4:40–4:55 PM	Sean Carey	How ecosystems and catchment characteristics influence blue-green water fluxes and solute transport in a mountainous subarctic catchment, Yukon, Canada
4:55–5:10 PM	<i>Discussion</i>	
5:10 PM–	<i>Poster viewing, socializing, drinks</i>	
8:00 PM	<i>Dinner</i>	

Thursday, October 20		
7:00–8:30 AM	<i>Breakfast</i>	
Predictability and Comparisons continued (Chair: Sean Carey)		
8:30–8:45 AM	Jesús Revuelto	The study of snowpack in the Balneario de Panticosa: An unique location to study the transition from forested to alpine environments
8:45–9:00 AM	Ignacio López Moreno	The study of marginal snowpacks: interest and difficulty
9:00–9:15 AM	James McPhee	Parameter uncertainty of Hydro-glaciological model estimates derived from non-stationary climate conditions
9:15–9:35 AM	<i>Discussion</i>	
Common Observation Period Experiment (COPE) and Synthesis (Chair: John Pomeroy) INARCH Phase II Science Questions: 5. Can mountain systems be predicted and managed to find solutions to help achieve water sustainability in river basins under climate change? <i>Eventually contribute to answering - How have mountain atmospheric-cryospheric-hydrological-ecosystem-human systems co-evolved to their current states and how will they respond to climate change over the next century?</i>		
9:35 – 9:45 AM	Chris DeBeer	Status and activities of COPE
9:45–10:00 AM	Stephen O’Hearn	COPE data management system
10:00–10:30 AM	<i>Discussion</i>	
10:30–11:15 AM	<i>Break and Poster Viewing</i>	
11:15–11:45 AM	John Pomeroy, Ignacio López Moreno, James McPhee	Synthesis and wrap-up, workshop closing statements
12:30–2:30 PM	Panticosa Forest snow research site visit and bag lunch	
3:00 PM	Bus departs to Zaragoza	
Evening	Informal tapas evening in Zaragoza	