Submitted Abstract

ID IMC22-FSAbstr- 307

First Author First Name Last Name	 Lauren Dorothy (1) Somers
Submitting Author First Name Last Name	 Lauren Dorothy Somers
Correspondence	Lauren.Somers@dal.ca
Co-Authors **>> E-Mails will be not listed**	Samways, Jenacy (1); Mckenzie, Jeffrey (2)
Organisations	1: Dalhousie University, Canada 2: McGill University, Canada
Country	Canada
Region	North America
Title	High-Drogeology: Mountain Groundwater Under Climate Change.
Keywords	Groundwater, Hydrology, Hydrogeology, Water Resources, Trends
Type	List Of Focus Session
Focus Session ID	72

Abstract

Mountain water resources are of particular importance for downstream populations but are threatened by decreasing water storage in snowpack and glaciers. Baseflow (groundwater discharge) sustains mountain streamflow during times of low precipitation, snowmelt or ice melt. Recent advances suggest that high mountain groundwater may provide some resilience—at least temporarily—to mountain water resources under climate-driven glacier and snowpack recession. However, as mountain climates change, modelling suggests that increasing evapotranspiration could lead to declining groundwater recharge in some mountain ranges. Given the lack of observation wells in mountains, little field evidence is available to confirm if, where, and when this occurs, and the consequences for water resources.

In this presentation, we first outline key groundwater processes and aquifers in mountain regions based on our recent review paper. We will summarize the hypothesized direct and indirect impacts of climate change on mountain groundwater systems. These impacts include direct mechanisms (more/less precipitation and increased evaporation with rising air temperatures) as well as indirect impacts through the cryosphere (e.g., loss of glacier melt recharge, changing snow-rain fraction), ecosystem (increasing evapotranspiration) and human interventions (e.g., land use and adaptation).

Second, we will present preliminary results investigating long-term changes in groundwater levels in mountain regions of Canada and the United States. We compile and analyze a large dataset of public groundwater observation well records, filtered to include mountain wells with more than ten years of continuous monthly (minimum frequency) data. We apply the Seasonal Kendall test for monotonic trend to determine if there is field evidence for changing groundwater levels in these mountains. Next, we apply multivariate statistical methods to determine which factors (e.g., climate, topography, elevation, and geology) are linked to temporal trends in mountain groundwater storage and therefore vulnerability of mountain water resources under climate change.