



*The International Year for Glaciers' Preservation:
Observe, Predict and Protect the Mountain Cryosphere*

Professor **John Pomeroy**, FRSC, Fellow AGU
UNESCO Chair in Mountain Water Sustainability
Director, Global Water Futures, University of Saskatchewan, Canada



UNIVERSITY OF SASKATCHEWAN
Global Water Futures
GWF.USASK.CA

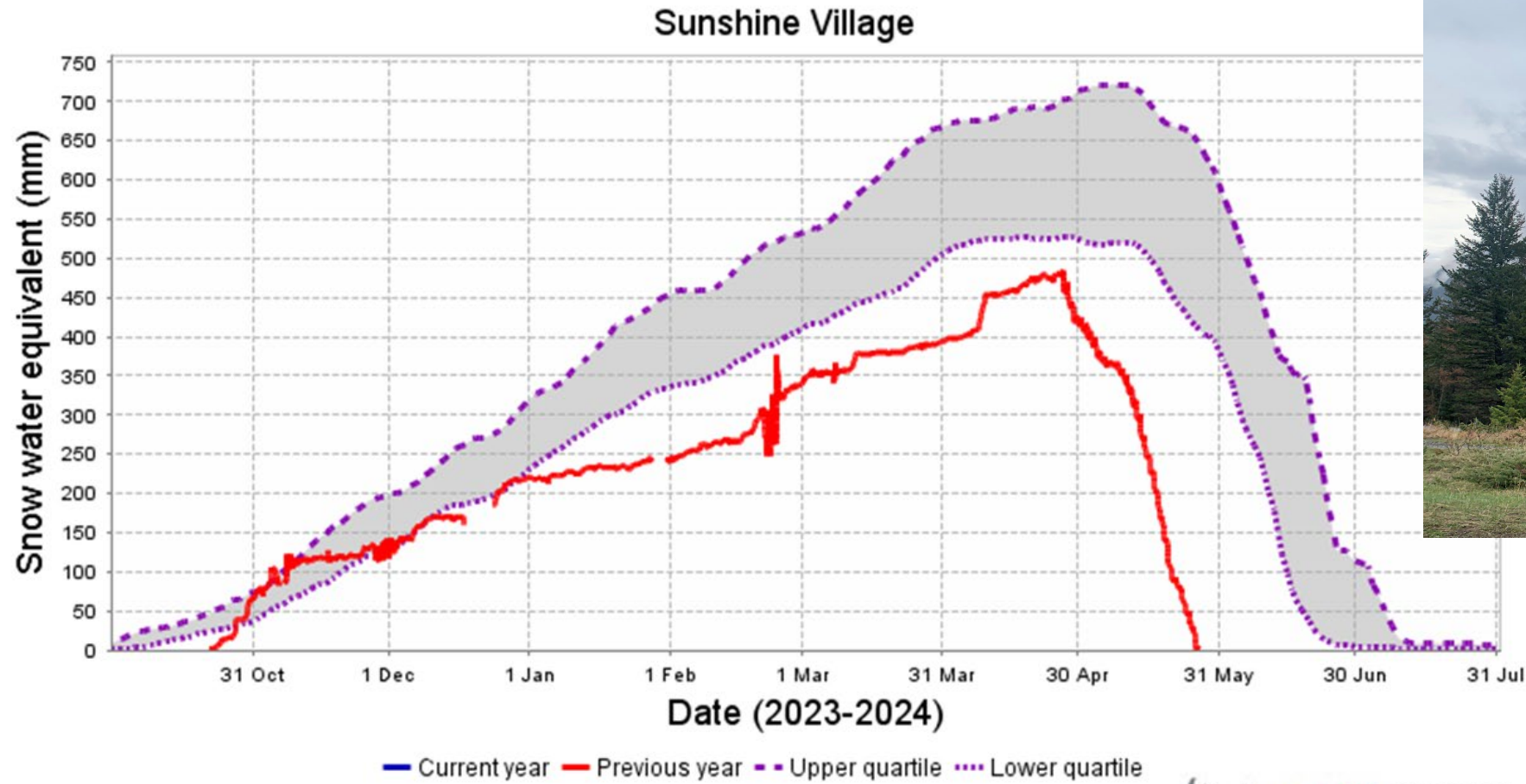


unesco
Chair

High Mountains: Where the rapidly changing atmosphere intersects with the cryosphere, key ecosystems, diverse societies and the headwaters for rivers that support over half of humanity



+1.5° C is too warm for mountain snowpacks!

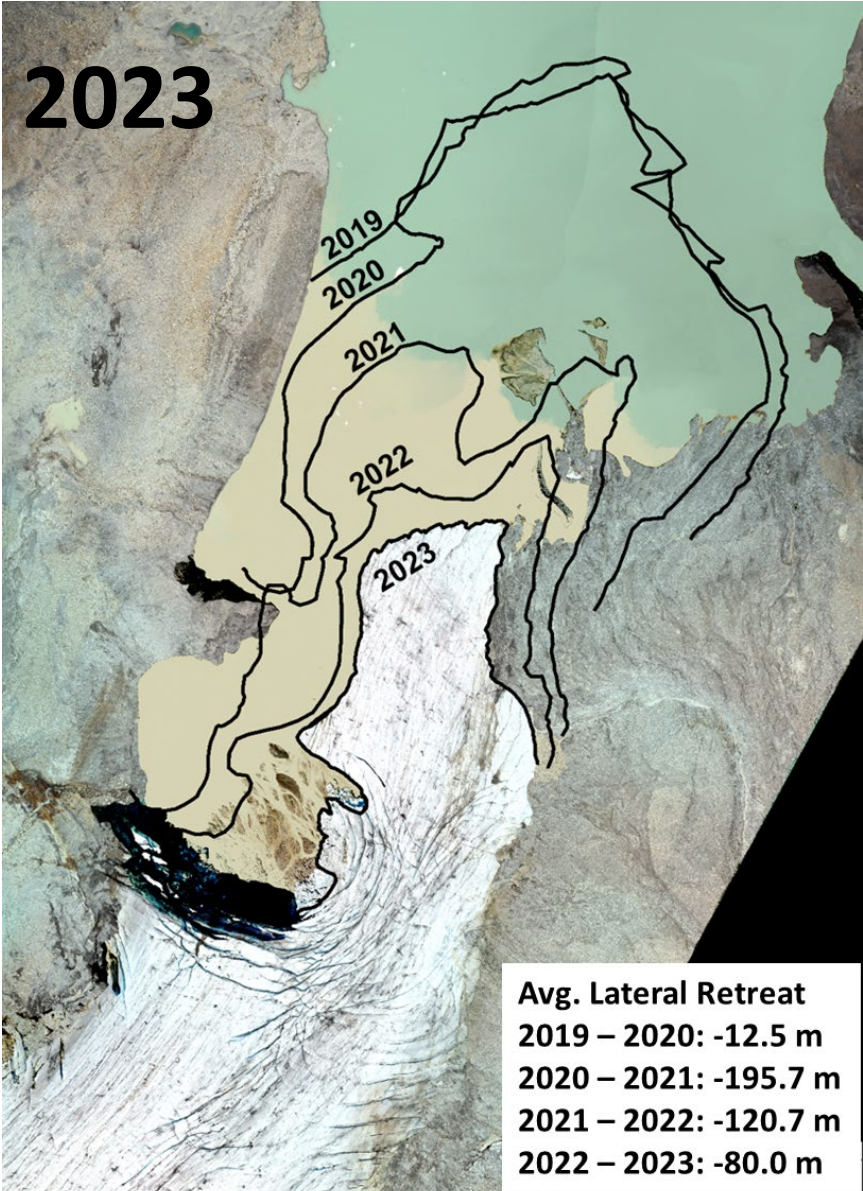


Banff National Park, early May 2023

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Snowpacks 150 mm below normal
Melt one month earlier than normal

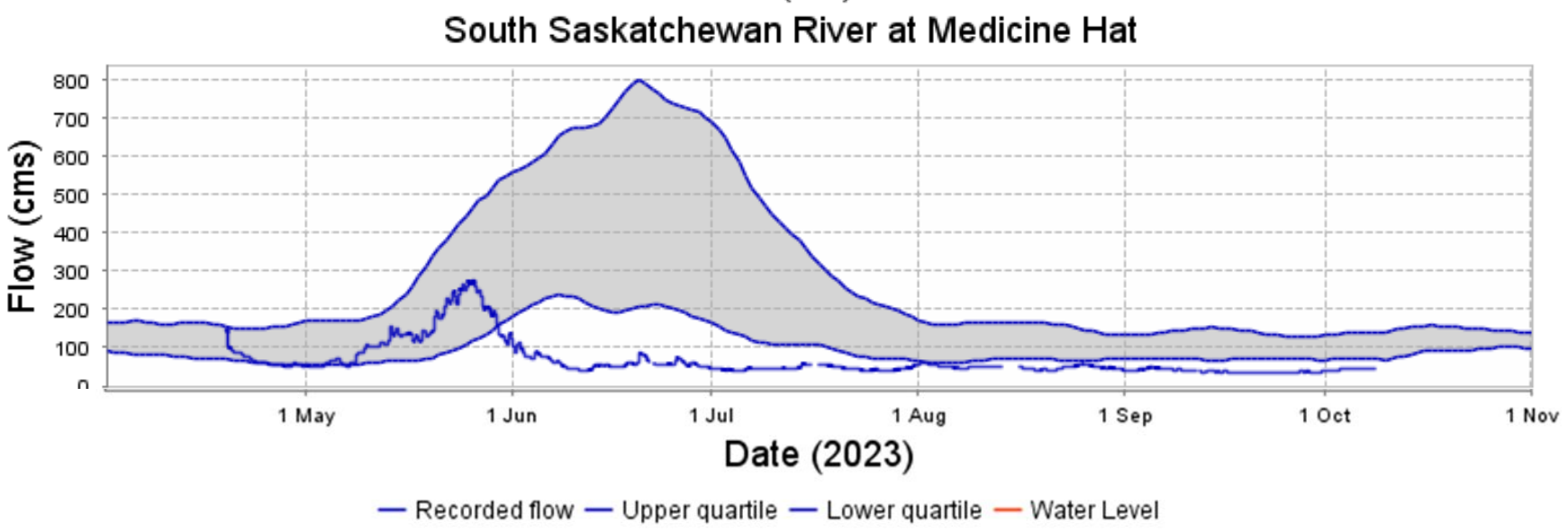
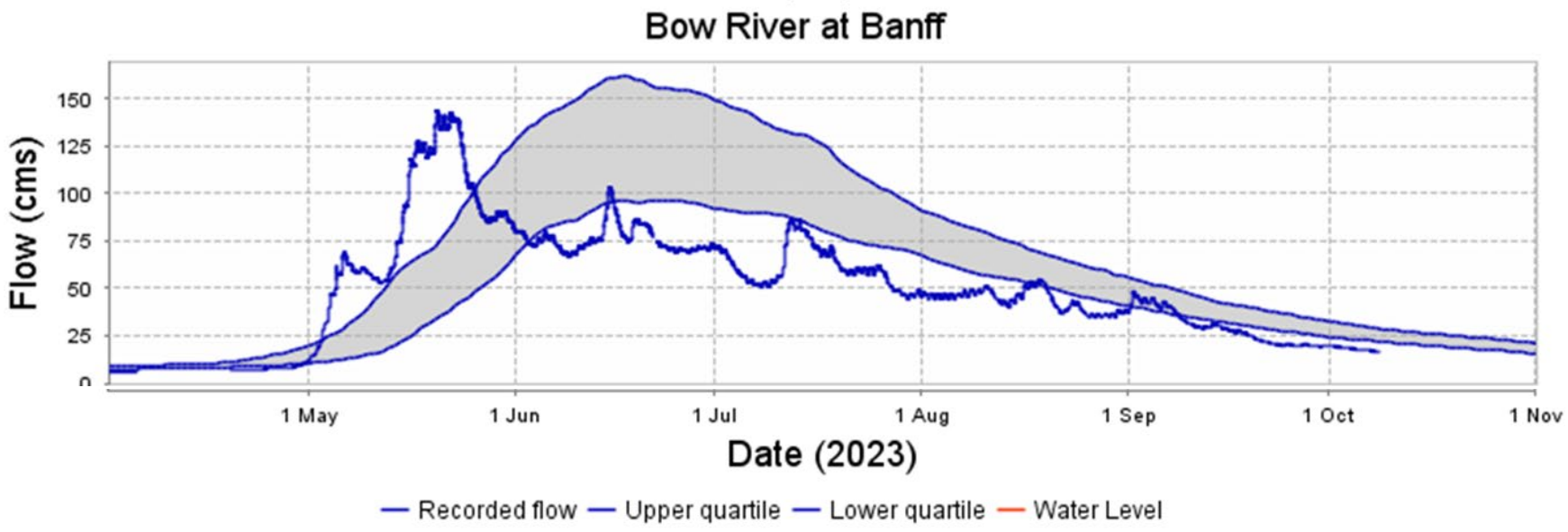
+1.5° C is too warm for mountain glaciers!



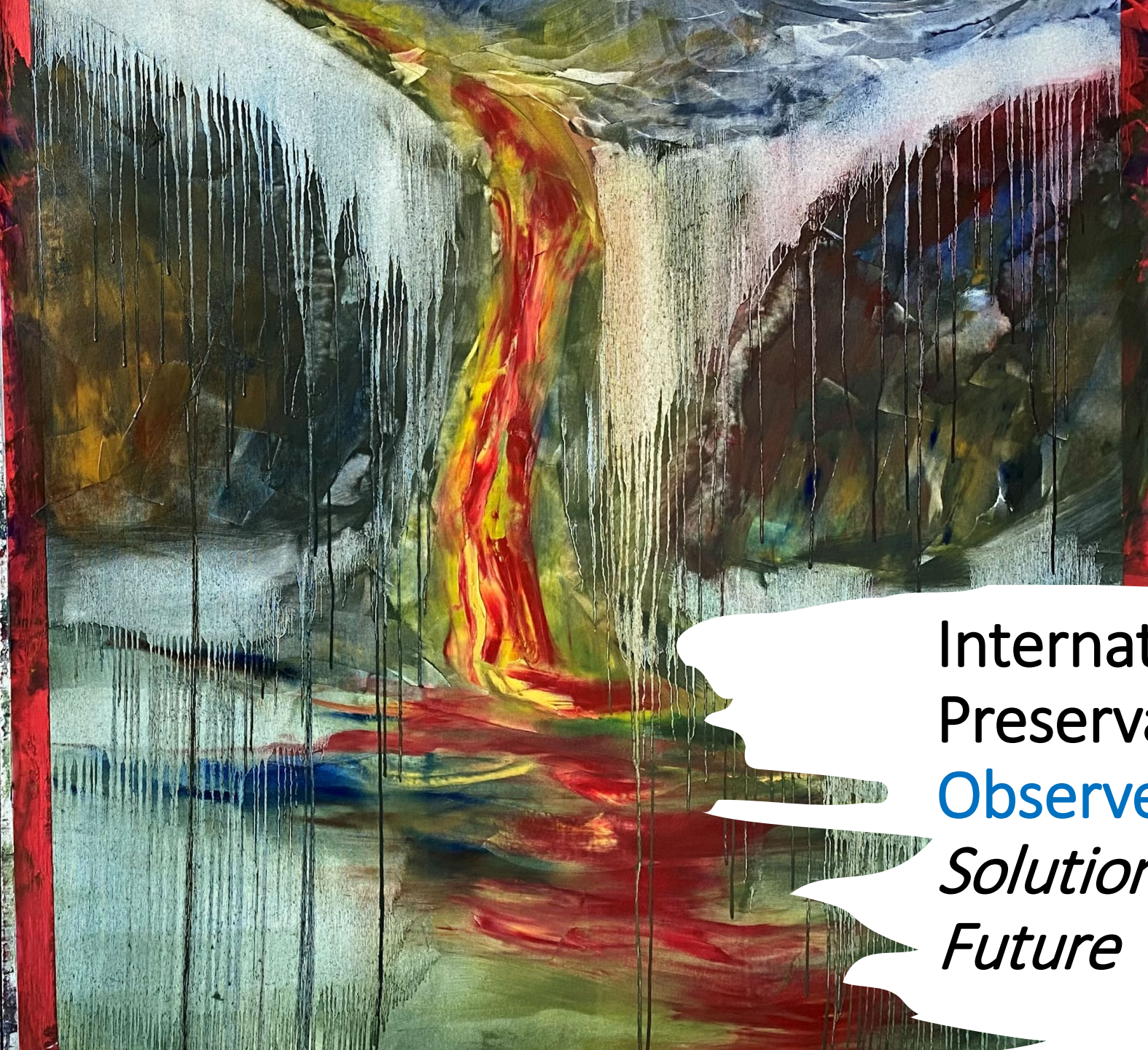
Peyto Glacier,
UNESCO-International
Hydrological Decade,
WMO-Global
Cryosphere Watch,
World Glacier
Monitoring Service

409 m retreat, 29 m
ablation (lower ice)
2019-2023

Downstream Hydrological and Agricultural Drought



Alberta, Canada August 2023



International Year for Glaciers'
Preservation - 2025
Observe, Predict, Protect
*Solutions for a Deglaciating
Future*

Solutions: Observations



- Measure and understand high mountain atmospheric, hydrological, cryospheric, ecological and human-water interactions
- Improve their prediction as coupled systems
- Diagnose their sensitivities to climate change and propose how they may be managed sustainability

<https://inarch.usask.ca/>



Solutions: Predictions

High fidelity
snowpack prediction
over millions of km²

Snow redistribution
& melt simulation
coupled to
Numerical Weather
Prediction Model

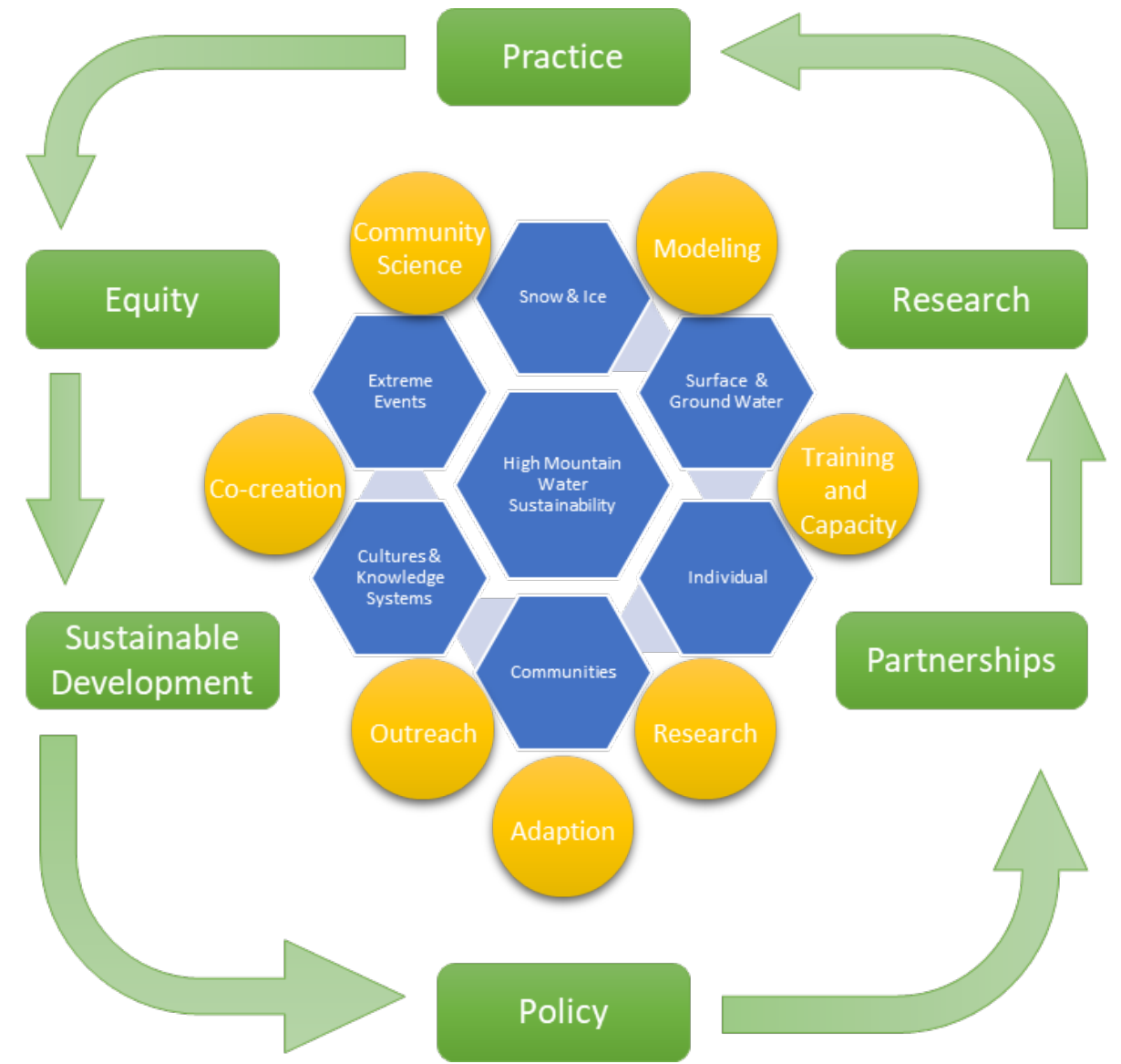
Downscaled to 50 m

www.snowcast.ca

Canadian
Hydrological Model,
Marsh et al., 2020,
2022



Solutions: Protect



UNESCO Chair in Mountain Water Sustainability

Choose the Better Future.

Observe, Predict, Protect,

Failure to mitigate and adapt



We need this future



Not this future

Artwork: Gennadiy Ivanov, GWF Artist in Residence, Norwich, England