Integrated Modelling Program for Canada
Global Water Futures

Multi-model Intercomparison Project on the Saskatchewan-Nelson-Churchill River Basin (Nelson-MiP project)

Monthly meeting – October 13th, 2020

Environment and Climate Change Canada
Environnement et Changement climatique Canada

STRATEGIC COMMUNITY CONSULTING

University of Saskatchewan

University of Waterloo

Manitoba Infrastructure

Water Security Agency

UNBC University of Northern British Columbia

Alberta Environment and Parks

University of Alberta

Manitoba Hydro

TransAlta

University of Manitoba

University of Calgary

Agenda

1. Choice of metrics for model calibration against streamflow
2. Process calibration – Data & Metrics
3. Date for next meeting in November
4. Presentation of UWaterloo group plan for Nelson-MiP

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Metrics for streamflow calibration

Outcomes of our discussion:

- We agreed on calibrating only on streamflow for Phase 1 and using only KGE ($f(Q) = KGE[Q]$) (1)

- We will not use this objective function from Knoben et al. 2020 for the calibration of streamflow:

  $f(Q) = 0.5\times(KGE[Q] + KGE\left[\frac{1}{(0.01\times Qm)+Q}\right])$ with $\boldsymbol{Qm}$ being the mean observed flow, but it can be used for validation

- We will circulate a list of metrics that can be used for the validation of streamflow, and will collectively decide on those to be used

- The choice of maximising the performance of the worst subbasin or the average performance of all sub-basins is left to modellers.

*Knoben et al. 2020 (https://doi.org/10.1029/2019WR025975)

Process calibration/validation

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Initial suggestion:

Variables	Data product	Spatial resolution	Temporal resolution	Data source	Link
Snow cover	MODIS	500m	Daily 2000-02-24 to Present	satellite	https://modis.gsfc.nasa.gov/data/dataprod/mod10.php
	GlobSnow 2.1	0.01°	Daily 1995 to 2012	Satellite	https://www.globsnow.info/se/
Snow depth and SWE	CMC snow depth analysis data	24 km × 24 km	Daily 08-1998 to 12-2019	in-situ observations	https://nsidc.org/data/NSIDC-0447
	AMSR-E/Aqua	25 km EASE-Grid	Daily 06-2002 to 04-2011		https://nsidc.org/data/amsre
	GlobSnow 3.0	0.25°	Daily & Monthly 1979 to 2018	satellite	https://www.globsnow.info/
	SnowCCI	15-69 km	Daily 03-1970 to 05-2018	satellite	https://climate.esa.int/en/odp/#/project
	SNODAS	1 km x 1 km	Daily 09-2003 to present	Satellite + in-situ + model	https://nsidc.org/data/g02158
	CSSD-gridded	0.10°	15-day 1951-2016	In-situ + model	https://open.canada.ca/data/en/dataset/f57afb37-90c7-4ff0-a757-ba792a4f40a1
Evapotranspiration	MODIS	500m	8-day 2001-01-01 to Present	Satellite +ground observations	https://modis.gsfc.nasa.gov/data/dataprod/mod16.php
	GLEAM v.3	0.25°	Daily 1980-2015	Satellite + model	https://www.gleam.eu/
Surface and root-zone Soil moisture	GLEAM v.3	0.25°	Daily 1980-2015	Satellite + model	https://www.gleam.eu/
	SMAP L3	36km EASE-Grid 2.0 Global	Daily 04-2015 to present	Satellite	https://nsidc.org/data/SPL3SMP

- Metrics for process calibration: KGE???

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Process calibration/validation

Outcomes of our discussion:

- For Phase 1 we collectively decided to validate some hydrological processes after streamflow calibration instead of doing process calibration as well.

- We will circulate a list of metrics that can be used for process validation. We will try different metrics for different processes. A single metric like KGE cannot be used for every process.

- Based on a literature review, we will selected a set of relevant data to be used for process validation. Emphasis will be put on the metrics instead of the data.

- In a subsequent Phase, we will do process calibration after learning from the process validation in Phase 1.

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Next meeting

November 18, 2020

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UWaterloo group plan for Nelson-MiP

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