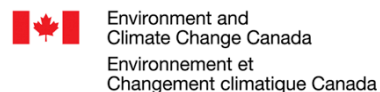




Integrated Modelling
Program for Canada
Global Water Futures

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

Monthly meeting – October 13th, 2020





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



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:

$f(Q) = 0.5 \times (KGE[Q] + KGE \left[\frac{1}{(0.01 \times Q_m) + Q} \right])$ with Q_m 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.

Process calibration/validation

Initial suggestion:



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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/dataproduct/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/dataproduct/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???



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 select 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.



Next meeting

November 18, 2020



UWaterloo group plan for Nelson-MiP

Drs J. Craig, J. Mai & B.Tolson