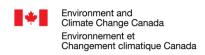# Multi-model Intercomparison Project on the Saskatchewan-Nelson-Churchill River Basin (Nelson-MiP project)

Monthly meeting – September 9th, 2020

Agenda

1. Follow-up on model setup and challenges encountered

2. Choice of metrics for model calibration against streamflow

3. Processes to be evaluated, data for process validation and metrics for process validation

4. Deliverables for next meeting & follow-up

Follow-up on model setup & challenges

- HYPE (UCalgary)
- SUMMA (USaskatchewan)
- SWAT-GIW (WSA)
- SWAT (RRB)
- SWAT-GWF (UAlberta)
- WATFLOOD-MH (Manitoba Hydro)
- VIC (UNBC)
- MESH (ECCC)
- HEC-HMS (Strategic Consulting)
- HBV-EC (Manitoba Infrastructure)
- WATFLOOD-MI (Manitoba Infrastructure)
- A model from the RAVEN modelling framework (UWaterloo)

Metrics for model calibration against streamflow

- Initial suggestion: Model calibration based on a combination of

- KGE

- NSE

- PBIAS

Outcomes of our discussion:

- Julie (UWaterloo) suggested using either KGE or NSE with preference given to KGE as the 3 components in KGE are equally weighted as opposed to NSE that gives a higher weight to NSE

- From our discussion, Masoud (UManitoba), Fuad and Wouter (USaskatchewan) recommended KGE on daily streamflow, but we shall add another criteria for low-flow evaluation, e.g. NSE on the log of discharge (discussion to continue on ncrb_mip slack channel or via email).

- Modellers should decide on the weight assigned to each metric in the objective function.

- The choice of maximising the performance of the worst subbasin or the average performance of all subbasins is left to the modeller.

Processes to be evaluated, data for process validation & metrics

- What hydrological processes should we validate?
- Snow water equivalent
- Evapotranspiration
- Soil temperature
- Surface storage
- Soil moisture
- Groundwater recharge
- …
- What data sources are you aware of to validate those processes?
- What evaluation metrics should we use for each hydrologic processes to be validated?

Processes to be evaluated, data for process validation & metrics

Outcomes of our discussion:

- We should calibrate the hydrologic processes instead of just validating key processes after streamflow calibration only

- We have not yet decided on what processes we should considered. Discussion to continue to the slack channel ncrb-mip

- Suggestions on data available for process calibration or validation should be sent per email or via our ncrb-mip slack channel

- Ameer (WSA) suggested using MODIS at 500m resolution for ET.

- Scott (Strategic Consulting) suggested looking at ERA5 data product.

- Wouter (Usaskatchewan) sent to ncrb_mip a set of possible evaluation data sources.

Deliverables & Follow-up

- Modellers can prepare 1-2 slides to show their progress on model setup / calibration.

- Manitoba Hydro will introduce us to their multi-model comparison project.

- James Craig (Uwaterloo) will give a presentation on RAVEN.

- Next meeting scheduled for **Wednesday October 14 @ 10:00AM MDT**