

PROJECT IN PROGRESS

DEVELOPMENT OF A GRIDDED OBSERVATIONAL DATASET FOR THE POST-PROCESSING OF SIMULATIONS ACCORDING TO HYDROLOGICAL PERFORMANCE

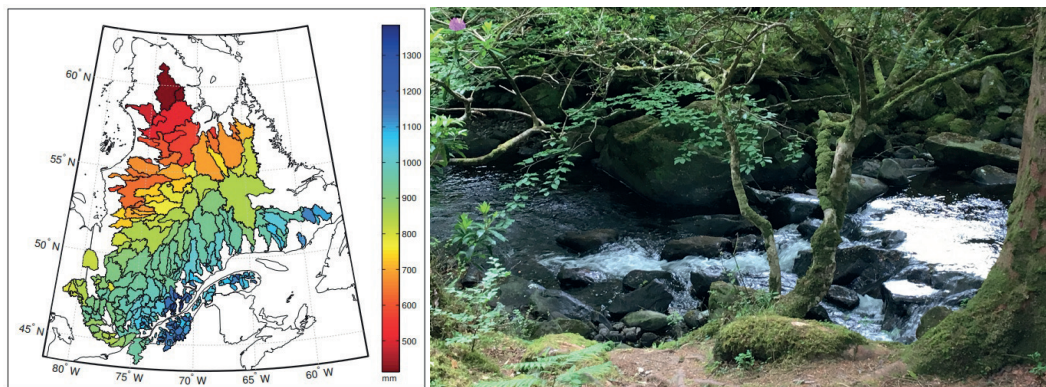


Photo : A. Poulin et R. Arsenault

PROGRAM: SUPPORT FOR INFO-CRUE

PROJECT STARTING DATE AND LENGTH
OCTOBER 2018 • 18 months

INFORMATION

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FUNDING

Environnement
et Lutte contre
les changements
climatiques



CONTEXT

In the wake of the floods in the spring of 2017, the Québec government set up the INFO-Crue program, whose objectives include the production of up-to-date, comprehensive flood zone maps for Québec to allow for adequate consideration of risk in land use planning and in the implementation of adaptation solutions. Several projects will be developed and implemented at different stages of the computing sequence chosen to perform the mapping in order to improve its performance and the consideration of uncertainty. Future flow simulations are based in part on post-processed climate simulations. Gridded observations are typically used to perform the post-processing since the climate simulations must be independent of weather station density. In terms of observations, NRCan gridded data (McKenney et al., 2011) have historically been used in post-processing, while interpolated hydrological grids from the Direction de la Qualité de l'Air et du Climat at the MELCC are used for model calibration and historical flow reconstruction. However, a number of problems with these gridded observation datasets have been raised in recent years, including underestimation of precipitation extremes.

OBJECTIVE

Produce a historical daily gridded meteorological dataset (1970-2018) combining reanalysis and satellite model data and observations at weather stations, which will address several shortcomings of the currently available datasets.

METHODOLOGY

- Conduct a literature review to update and/or complete the current inventory of existing datasets;
- Create, via an assimilation scheme, a robust product whose spatial and temporal representation of precipitation and temperature will be as close as possible to reality;
- Validate, using indicators, the climate performance of the created product via comparison with existing datasets/approaches;
- Validate the hydrological modelling performance of the created product via a multi-model approach using river flow indicators.

EXPECTED RESULTS

This project will lead to the production of precipitation and temperature grids across Québec as well as the updating of the MELCC's Direction de la Qualité de l'Air et du Climat meteorological database. The data will potentially be made available in an open-access database in conjunction with the publication that will be written as part of this project.

BENEFITS FOR ADAPTATION

The production of a high-quality gridded meteorological dataset for Québec, and potentially the whole of North America, will open the door to several avenues of research, including measuring the impact of this grid on climate simulation bias correction, long-term hydrological forecasting, and modelling and calibration of hydrological models. This would potentially reduce one of the major sources of uncertainty in all these areas of research.