



Multimodel hydrological ensemble prediction systems

Update on project 2-2 orientation

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Toronto – September 19, 2016



UNIVERSITÉ
LAVAL

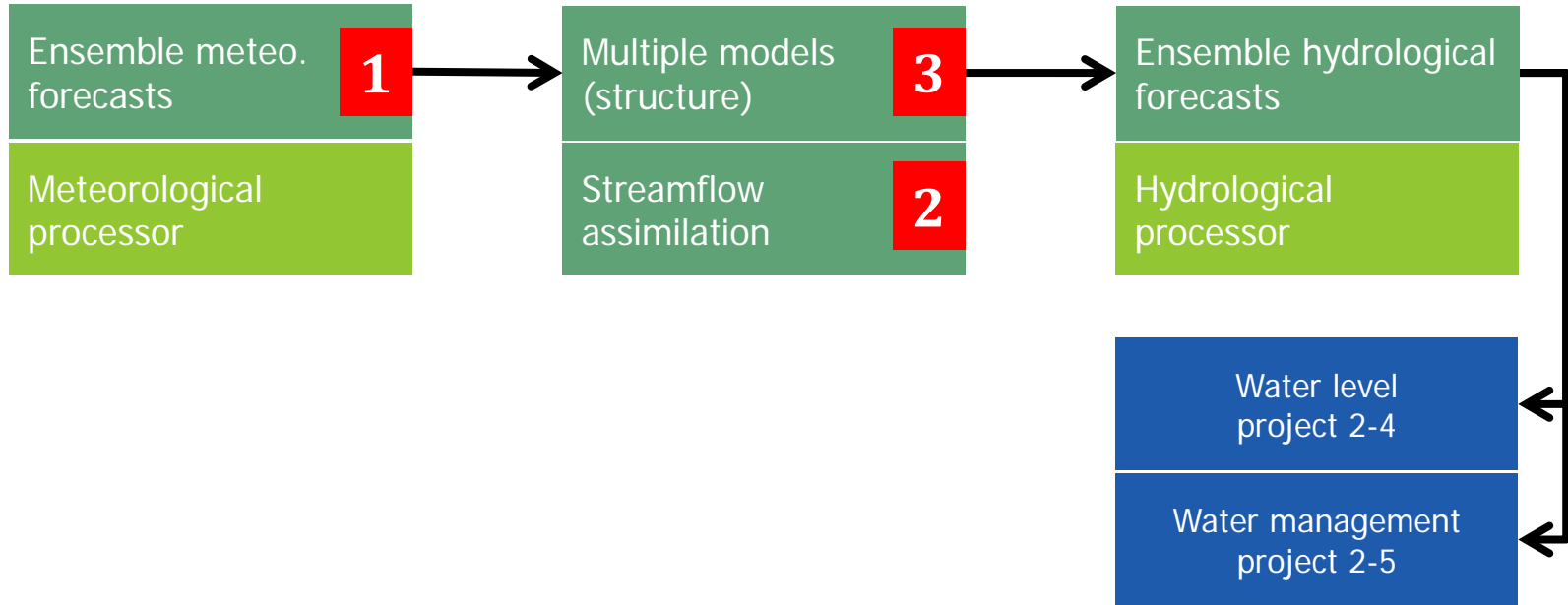
Project 2-2

- Objective
 - Compare the performance and reliability of many probabilistic implementations of operational ensemble streamflow forecasting based on multiple hydrological models

Project 2-2

- Hypotheses
 - There are three main sources of uncertainty
 - Meteorological forcing
 - Initial conditions of the watershed
 - Structure of the hydrological model
 - Accounting for these three sources of uncertainty may eliminate the need of hydrological post-processing

H-EPS

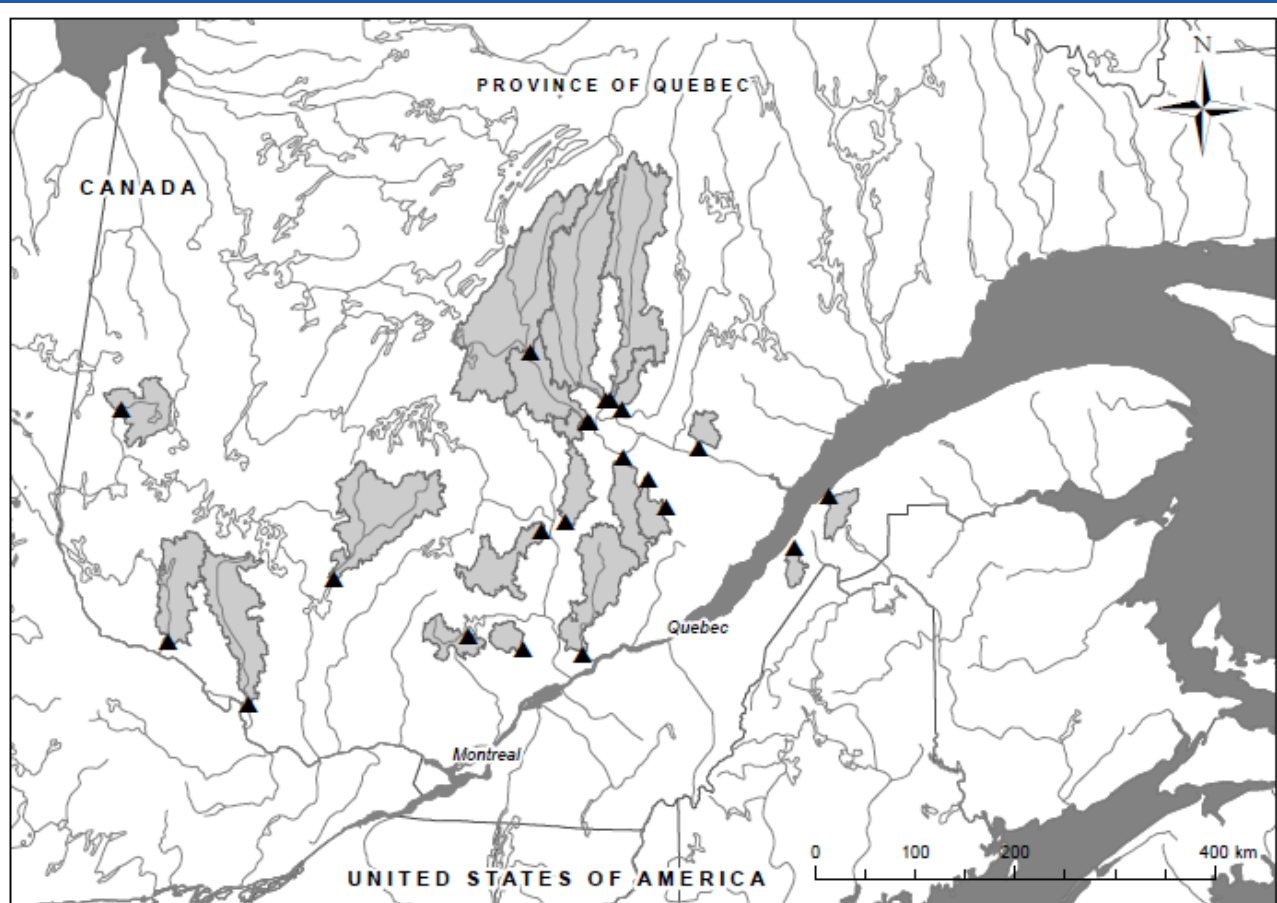


First database accounting for 3 sources of uncertainty

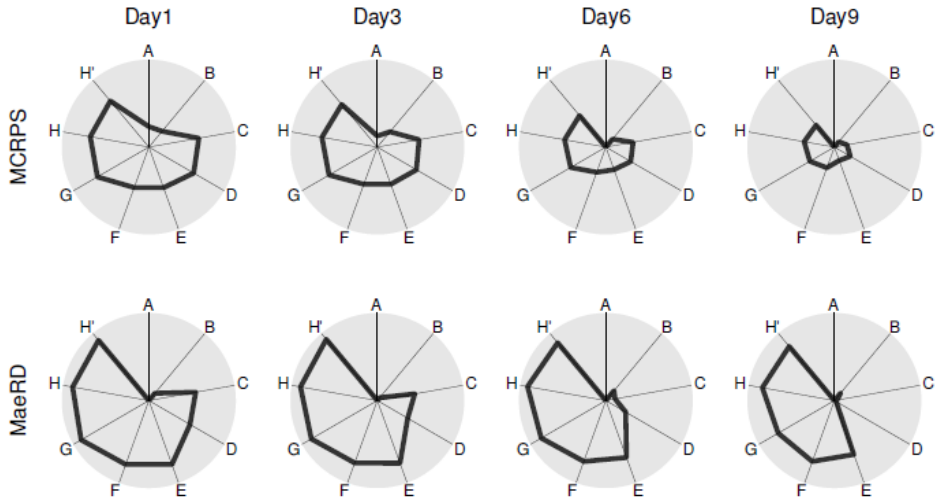
Table 2. Description of the nine systems.

Systems	A	B	C	D	E	F	G	H	H'
Multimodel	Off	Off	Off	Off	On	On	On	On	On
EnKF	Off	Off	On	On	Off	Off	On	On	On
Met. ensemble	Off	On	Off	On	Off	On	Off	On	On
Nb of members	(20×)1	(20×)50	(20×)50	(20×)2500	20	1000	1000	50 000	50 000

Thiboult A, Anctil F, Boucher MA. 2015. Accounting for three sources of uncertainty in ensemble hydrological forecasting, *Hydrol. Earth Syst. Sci. Discuss.*, 12, 7179-7223, doi:10.5194/hessd-12-7179-2015.



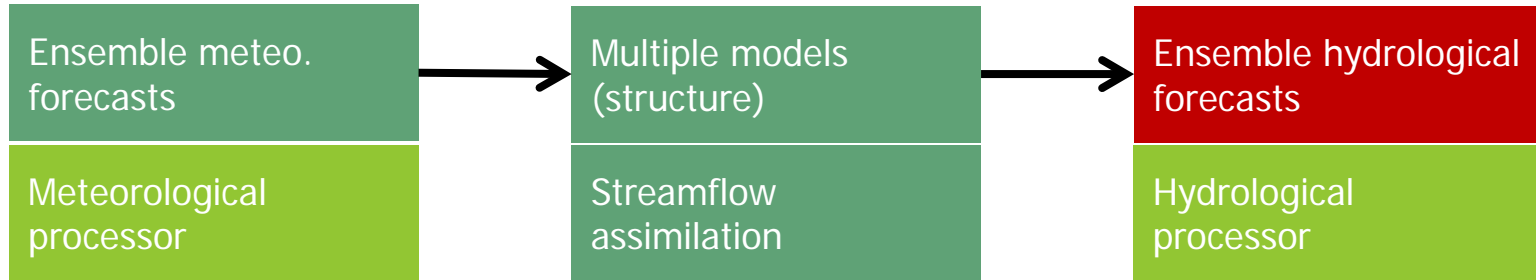
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EnKF	Off	Off	On	On	Off	Off	On	On	On
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The center indicates the climatology reference performance and the perimeter representing a perfectly accurate simulation

The center indicates a MaeRD = 0.5 while the perimeter corresponds to a perfect reliability

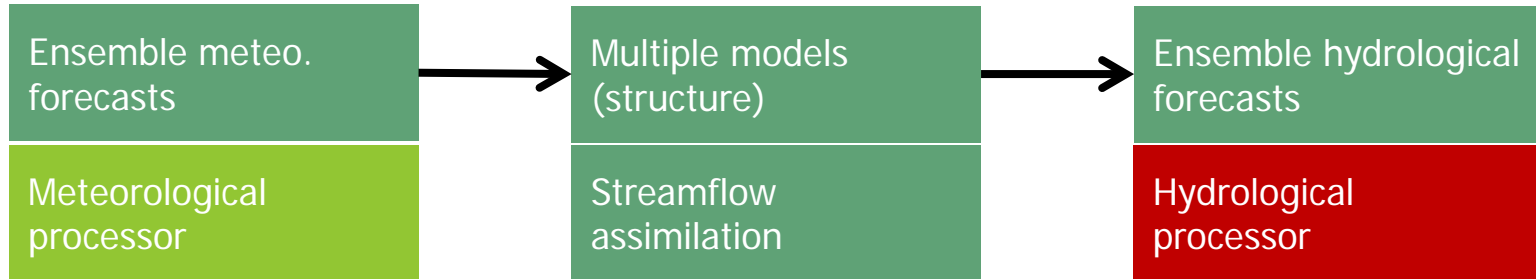
HQPs



PhD – Antoine Thiboult

First database accounting for 3 sources of uncertainty

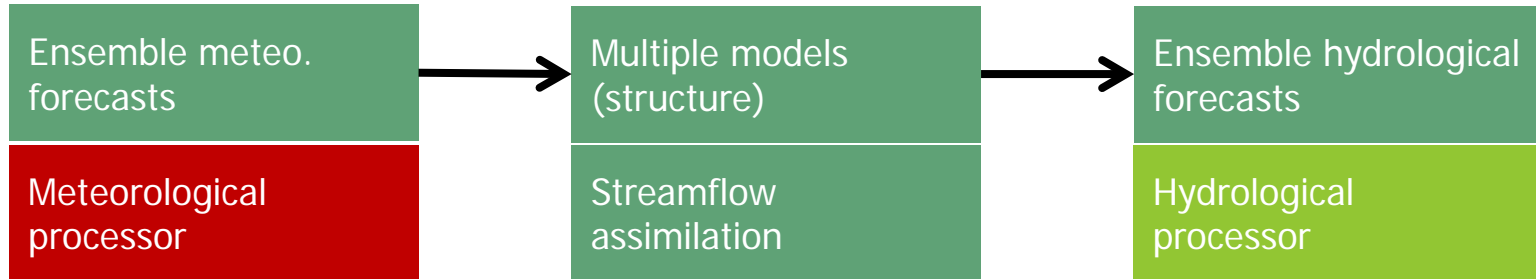
HQPs



PhD – Jing Xu

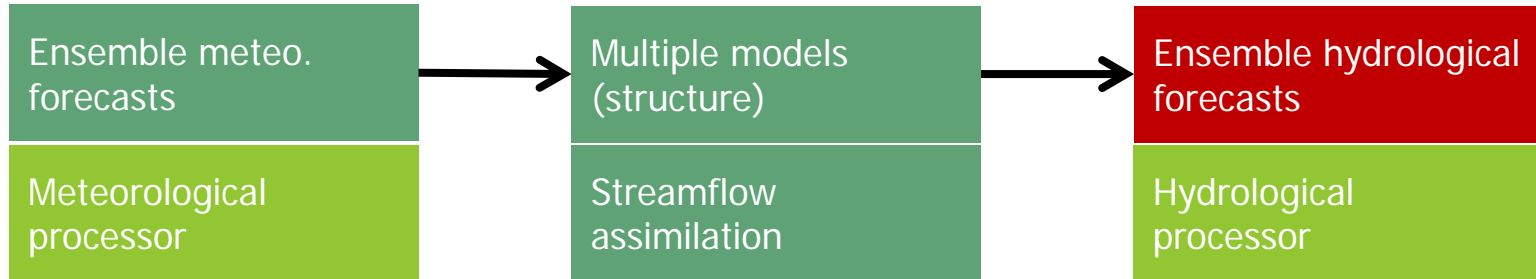
Explore the post-processing of the first database

HQPs



PDF – Mabrouk Abaza
Explore meteorological pre-processing

HQPs



MSc – Emixi Valdez

Produce ensembles for project 2-5

PDF – Carine Poncelt (February 2017)

Second database accounting for 3 sources of uncertainty