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Reservoir management adaptation in climate change context

James Merleau *
merleau.james@ireq.ca
Marie Minville *
minville.marie@ireq.ca
Pascal Côté †
cote.pascal@etsmtl.ca

There seems to be growing evidence that hydrological regimes might be changing in the recent past, thereby exhibiting non-stationarity in central tendency and/or in dispersion. Furthermore, this phenomenon is especially present when dealing with hydrological projections obtained from climate model scenarios. In this context, determining reservoir management rules based on the statistical hypothesis of stationarity is problematic. The present contribution addresses this issue.

Non-stationarity is handled by a Mixture of Bayesian Dynamic Models in order to adapt the statistical component of the Stochastic Dynamic Programming method which determines the operating rules. We study the performance of this methodology with the following approach. Bias corrected variables (temperature and precipitation) from a projection (1961–2100) of the Canadian Regional Climate Model are fed into Hydrotel, a physically-based hydrological model. The hydrological projections are then used to update operating rules yearly via the optimization model. Some indicators of water resource management are analysed to illustrate the relevance of the proposed approach.

*Expertise mécanique, métallurgie et civil, Institut de recherche d'Hydro-Québec, 1800 boul. Lionel Boulet, Varennes, QC J3X 1S1, Canada.

†Département de génie de la construction, École de Technologie Supérieure, 1100, rue Notre-Dame Ouest, Montréal, QC H3C 1K3, Canada.