CARIWIG Case Study Report
Effect of climate change on surface water resource (St Lucia)

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&

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Motivation:
There is a consensus that climate is changing and that water resources are likely to come under increasing pressures. To date, the quantification of this reduction has been limited.

Goal:
Assess the effect of climate change on surface water resource. This case study will provide quantified evidence of the potential effects of climate change on surface water resources for two catchments in Saint Lucia (Vieux Fort & Fond D’Or).
hydrological models: rainfall/runoff models

Source: www.ewater.com.au
Calibrate the hydrological models.
• Using historical data
• Ensemble modelling
• Latin hypercube sampling (LHS)

Calculate future river flows.
• Using future climate scenarios (i.e. CARIWIG Data)

Deduce the effects of climate change on surface water resources.
Set up an initial Probability Distributed Model (PDM) and define parameters uncertainty space.

Generate and run 5000 models
- Using Latin hypercube sampling (LHS) to optimise the exploration of the uncertainty space.

Extract and refine the 10 highest performing models by re-LHS 500 new models for each model.

Identify best 10 models and perform validation runs
- A total of 10000 simulations will have been performed to identify best model

Identify best model
Fond D’Or - best model

Calibration period
(83 flow records)

Validation period
(28 flow records)

NSE = 0.327
Vieux Fort - best model

Calibration period
(97 flow records)

Validation period
(40 flow records)

NSE = 0.507
Conclusion and perspectives

Done to date:
Calibration of two hydrological models for Fond D’Or and Vieux Fort Catchments.

Pending:
Use CARIWIG climate scenarios (i.e. rainfall and temperature) to assess the effect of climate change on surface water resource for both catchments (i.e. comparison between current and future flows)

Potential additional work:
- Develop a simple water balance model to estimate future water deficit (i.e. excel type)
- Develop integrated water model(s)
THANK YOU

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